#6 CHIKYU IODP BOARD MEETING

19-20 March, 2018
Kobe, Japan

Agenda book Ver.2.0

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM
JAMSTEC Japan Agency for Marine-Earth Science and Technology
CDEX CENTER FOR DEEP EARTH EXPLORATION

#6 CIB Meeting Agenda Book ver.2 revision summary

as of 16 March 2018

Agenda Item	Sub Item	Action taken	Material
2		Revision	List of Participants
2		Insertion	Wireless LAN connection information
3		Revision	Draft Agenda ver.1.5
6		Insertion	CIB message to Riser proposal lead proponents
7	e	Insertion	MEXT Report
9	a	Revision	Overall Chikyu Operation
11	a	Insertion	Proposal 866-Full2_Strasser cover sheet
15		Revision	Safety Review Committee Update
16	a	Revision	Main Points of JFY2017 Review

Agenda Item 1

Welcome Remarks

Agenda Item 2

Introductions and Logistics

Welcome and meeting logistics

1）Meeting Logistics

2）List of Participants

3）Emergency Escape Route

Chikyu IODP Board #6 Meeting Logistics
19-20 March 2018
Kobe, JAPAN

MEETING DATES & TIMES:

Monday, 19 March 09:00 - 17:30

Tuesday, 20 March 09:00 - 17:30

MEETING LOCATION: *Chikyu* IODP Board (CIB) will be held at the
Takigawa Memorial Hall, Rokkodai Campus, Kobe University
Access: http://www.kobe-u.ac.jp/en/campuslife/campus_guide/campus/rokkodai2.html

SOCIAL EVENT: ***Details to be announced later.**

1) Field Trip: Sunday, 18 March 08:30- : Nojima Fault Preservation Museum
2) Ice breaker: Sunday, 18 March 19:00-21:00: TBD
   Not an official event
3) Reception: Monday, 19 March 18:30-20:30: ANA CROWNE PLAZA KOBE
   Lavender (9th floor of the Hotel)
   http://www.anacrowneplaza-kobe.jp/en/banquet/space/medium/
   Free of charge

RECOMMENDED HOTEL AND LODGING RESERVATIONS
(Important Deadline Information):

There is a block of rooms at "ANA CROWNE PLAZA KOBE" at a rate of ¥15,120 per night for 18, 19, 21 March, and ¥23,760 per night for 17, 20 March. Please send your hotel reservation form via e-mail to CDEX office by **no later than 15 January 2018.**

E-mail: cib-reservation@jamstec.go.jp

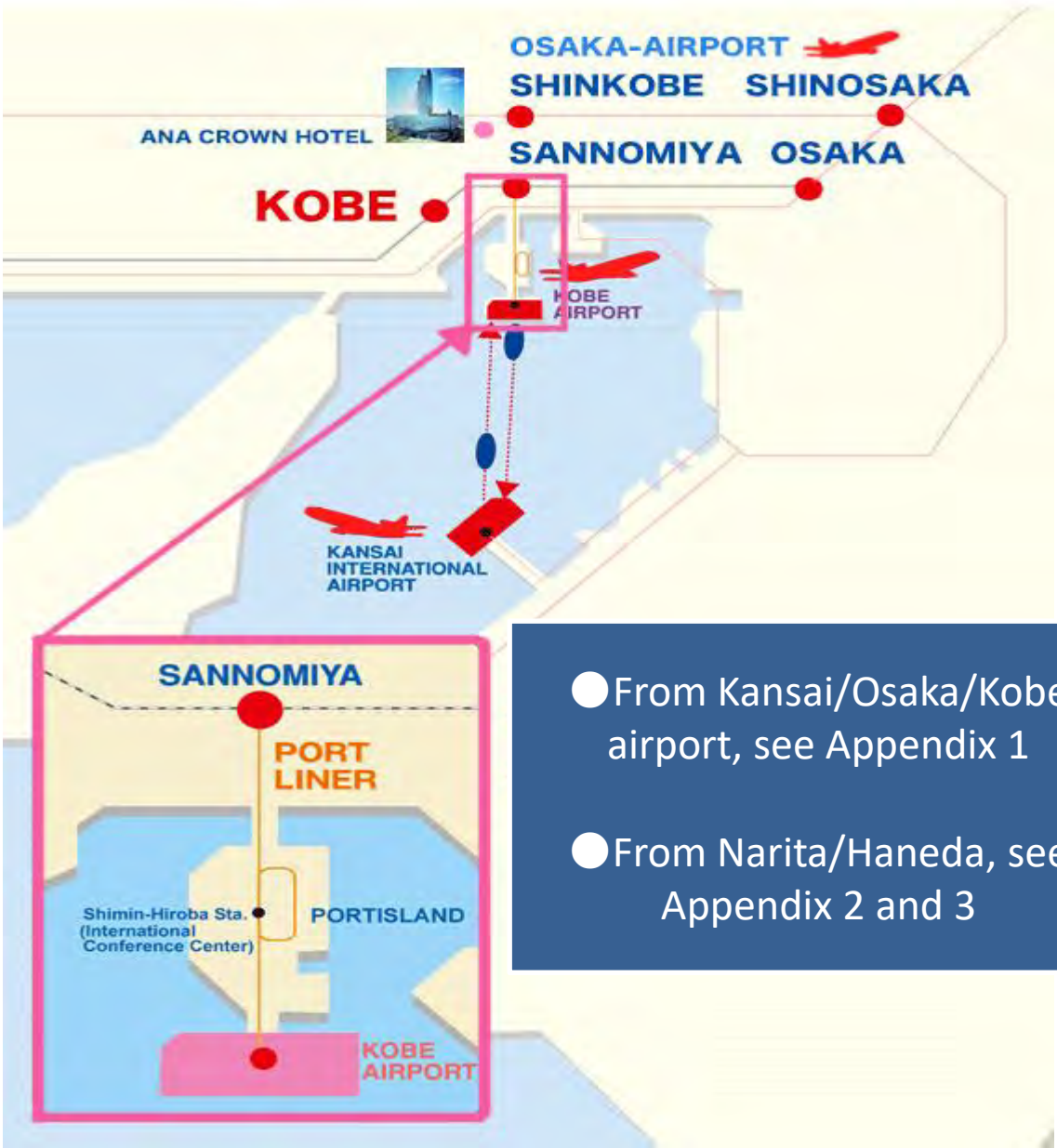
ANA CROWNE PLAZA KOBE
Address: 1-Chome, Kitano-cho Chuo-ku Kobe, 650-0002 JAPAN
Phone: +81 78 291 1121, Hotel Fax: +81 78 291 1154
Website: http://www.anacrowneplaza-kobe.jp/en/

For those who are staying at other hotels, please forward the name of your hotel and your check-in/check-out dates to cib-reservation@jamstec.go.jp

ACCESS TO & FROM THE VENUE:

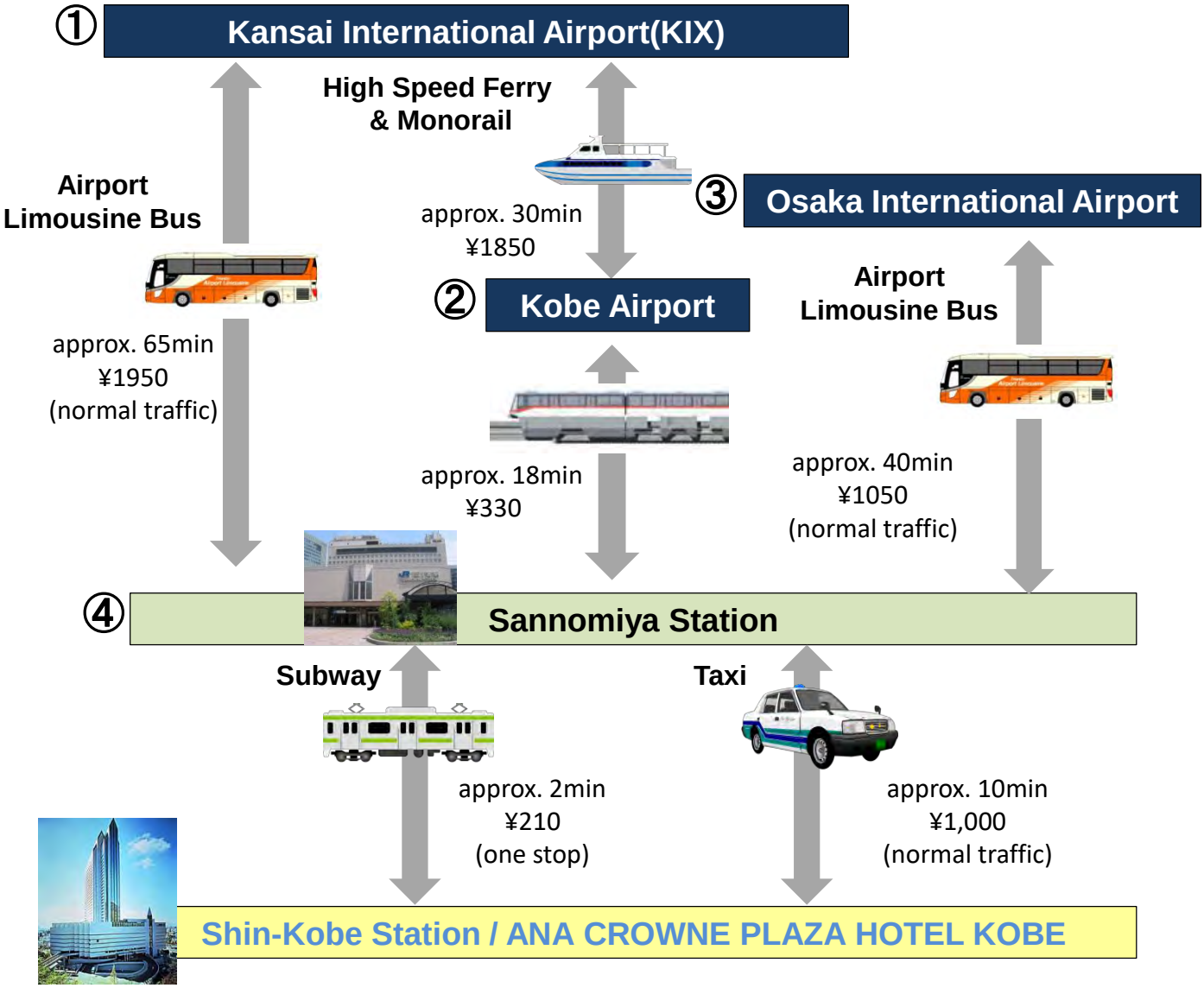
Our Staff will escort you from the hotel to the meeting venue by shuttle bus (about 30minutes trip) during the meeting. **Please meet at the hotel lobby at 8:15.**

TRAVEL INFORMATION



- From Kansai/Osaka/Kobe airport, see Appendix 1
- From Narita/Haneda, see Appendix 2 and 3

Appendix 1
From KIX/Osaka/Kobe Airport to ANA CROWNE PLAZA HOTEL KOBE



①From Kansai International Airport (KIX)

Airport Limousine Bus

Approximately 65 minutes from Kansai International Airport to Sannomiya (Fare: 1950 yen)

High Speed Ferry (Bay Shuttle)

Approximately 30 minutes from Kansai International Airport to the Kobe Airport Kaijyo Access Terminal (Fare: 1850 yen, please note that if you show your passport at the counter, it will be discounted for 1000 yen.)
For more information, please check the following website.
http://www.kobe-access.jp/en/half/index.html

Port Liner (Monorail)

Approximately 18 minutes from Kobe Airport to Sannomiya station (Fare: 330 yen)
http://www.kairport.co.jp/eng/access/port.html

Appendix 1
From KIX/Osaka/Kobe Airport to ANA CROWN PLAZA HOTEL KOBE

② From Kobe Airport

Port Liner (Monorail)
Approximately 18 minutes from Kobe Airport to Sannomiya station (Fare: 330 yen)
http://www.kairport.co.jp/eng/access/port.html

③ From Osaka International Airport

Airport Limousine Bus
Approximately 40 minutes from Osaka International Airport to Sannomiya (Fare: 1050 yen)

For more information, please check the following website.
http://www.okkbus.co.jp/en/

④ From Sannomiya Station to the Hotel

Subway
Take the Kobe city subway to Shin-Kobe station. Approximately 2 minutes from Sannomiya Station (one stop away).

For more information, please check the following website.
http://www.kobe-access.jp/en/half/index.html

Taxi
Approximately 10 minutes from the Sannnomiya station taxi stand to the hotel .
(Fare: about 1000 yen)

Appendix 2
From Narita/Haneda to ANA CROWN PLAZA HOTEL KOBE

⑤ **Narita Airport (NRT)**

Airport Limousine Bus
http://www.limousinebus.co.jp/en/

Approx. 105 min; 3,100 Yen

Narita Express (NEX)

Approx. 90 min; 3,190 Yen

⑥ **Haneda Airport (HND)**

Keikyu Line

Approx. 15 min; 410 Yen

Shinagawa Station

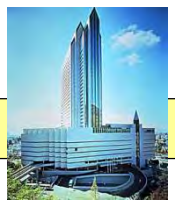
http://www.jreast.co.jp/e/stations/e788.html

Nozomi Shinkansen

Approx. 3 hours; 15,100 Yen
(reserved seat)

⑦ **Shin-Kobe Station**

Approx. 3 min walk



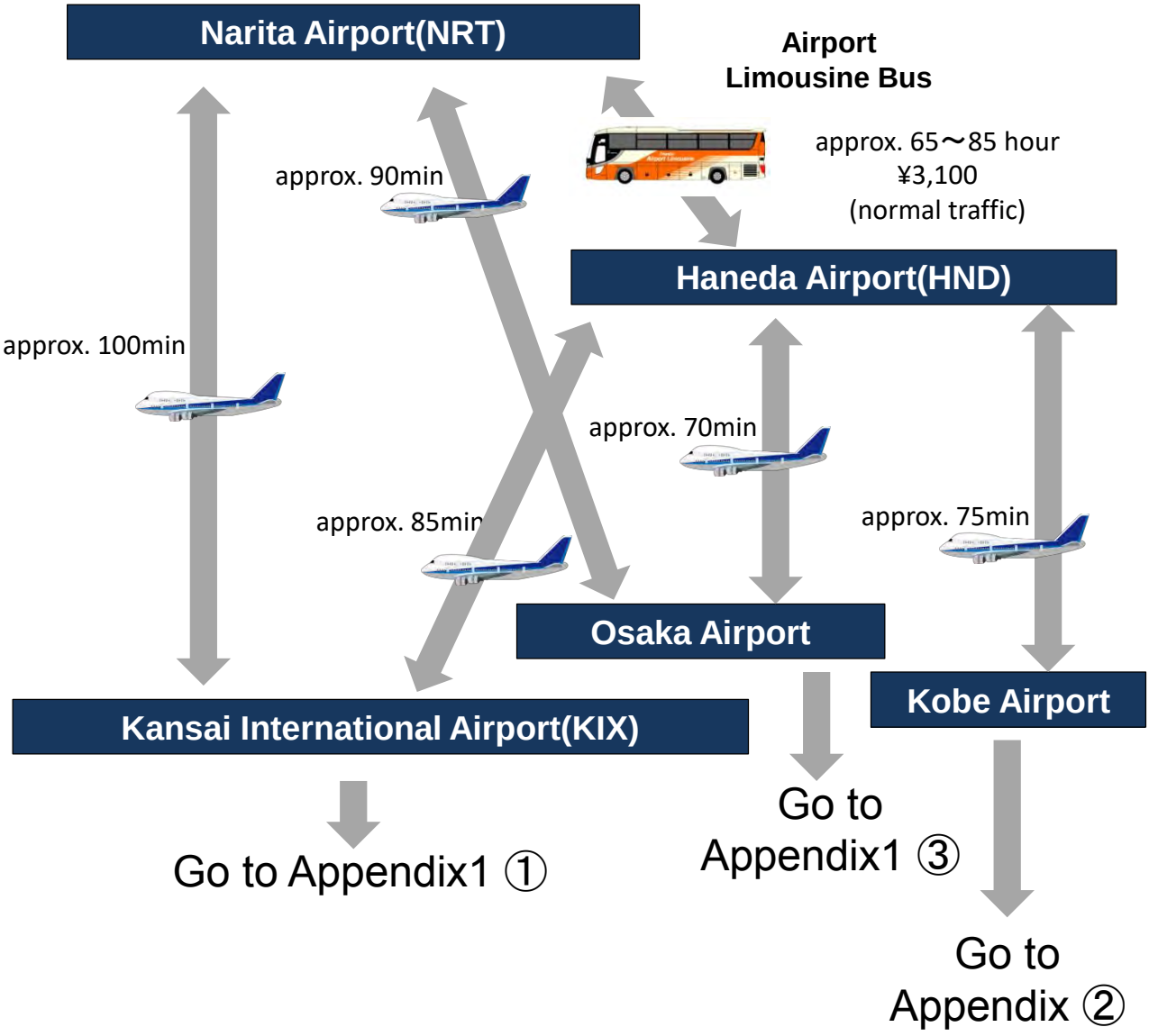
ANA CROWNE PLAZA KOBE

⑤ **From Narita Airport**: take the Narita Express (NEX) or Limousine bus to Shinagawa station. At Shinagawa Station, follow the signs to the JR bullet train (Shinkansen) gate and buy "Nozomi" tickets for **Shin-Kobe** station (reserved seats cost additional 5,810 Yen).
http://www.limousinebus.co.jp/en/

⑥ **From Haneda Airport**: take the Keikyu Line to Shinagawa Station. At Shinagawa Station take the Shinkansen and get off at **Shin-Kobe** station.

⑦ **From Shin-Kobe Station:** walk straight to the end of the concourse from the exit and cross the connecting bridge on the left.

Appendix 3
From Narita/Haneda to KIX/Osaka/Kobe Airport

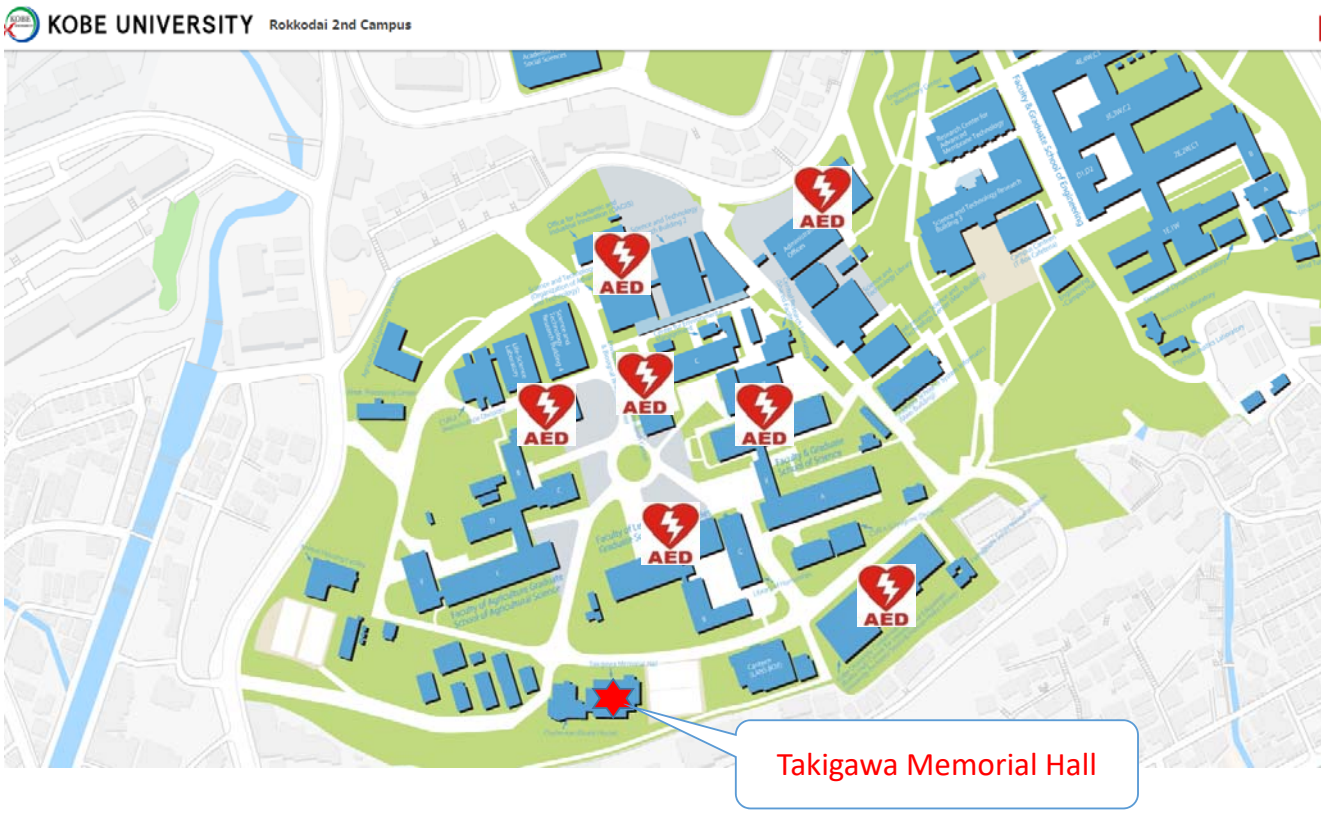


#6 Chikyu IODP Board Meeting
List of participants

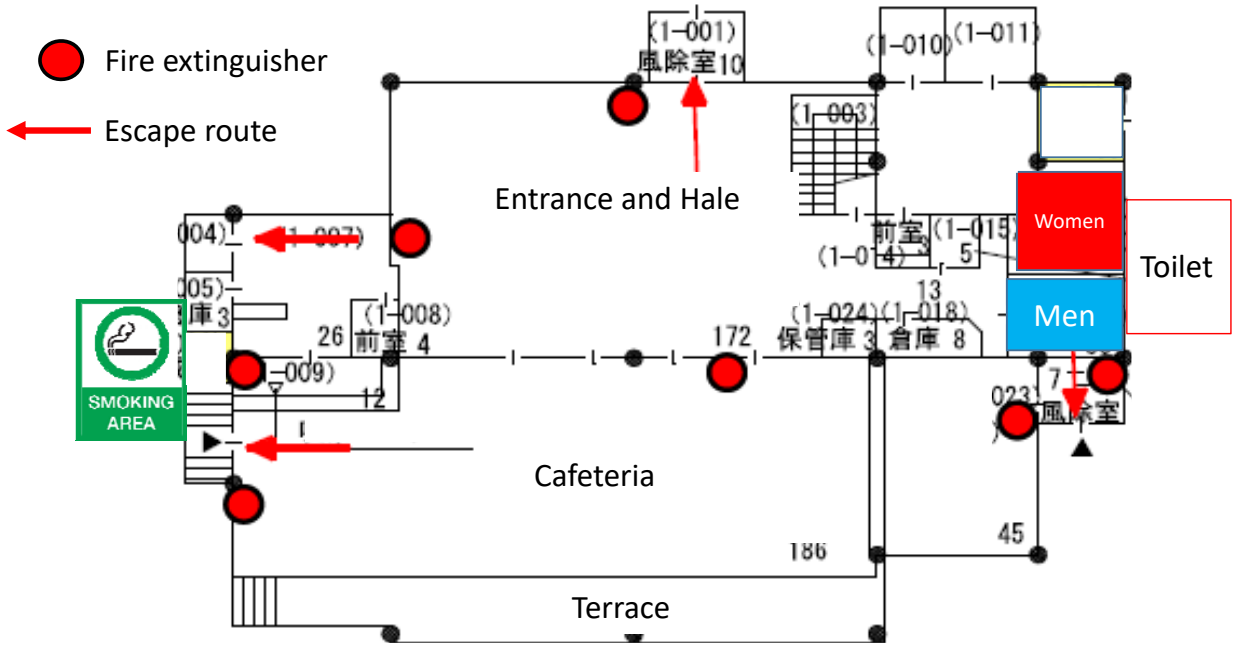
Member		Institution
Keir	Becker	University of Miami, USA
Gilbert	Camoin	ECORD Managing Agency (EMA), CEREGE, France
Benoit	Ildefonse	University of Montpellier, France
Hiroshi	Kitazato	Tokyo University of Marine Science and Technology, Japan
Shin'ichi	Kuramoto	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Jim	Mori	Kyoto University, Japan
Tatsuya	Watanabe	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Yoshiyuki	Tatsumi	CIB Chair - Kobe University, Japan
Ben	van der Pluijm	University of Michigan - Ann Arbor, USA
Liaisons		Institution
James	Austin	IODP Forum chair - University of Texas, Austin, USA
Brad	Clement*	JR Science Operator (JRSO), USA
Bob	Gatliff*	ECORD Science Operator (ESO), British Geological Survey, UK
Holly	Given*	IODP Science Support Office - Scripps Institution of Oceanography, USA
Sean	Gulick*	SEP Co-chair - East Carolina University, USA
Tsuyoshi	Ishikawa	Kochi Core Center (KCC) - JAMSTEC, Japan
Barry	Katz*	EPSP Chair - Chevron Corporation, Houston, TX, USA
Anthony	Koppers	JR Facility Board Chair - Oregon State University, USA
Gilles	Lericolais*	ECORD Facility Board Chair - IFREMER, France
Ken	Miller	SEP Co-chair - Rutgers University, USA
Sally	Morgan	ECORD Science Operator-University of Leicester-,UK
Observers		Institution
Naokazu	Ahagon	Kochi Core Center (KCC) - JAMSTEC, Japan
Jamie	Allan	National Science Foundation, USA
Leanne	Armand	Australian and New Zealand International Ocean Discovery Program Consortium(ANZIC), Australia
Wataru	Azuma	JAMSTEC, Japan
Akiko	Fuse	Marine Works Japan, Ltd.
Lallan	Gupta	Kochi Core Center (KCC) - JAMSTEC, Japan
Nadine	Hallmann	ECORD Managing Agency (EMA), CEREGE, France
Gaku	Kimura	Japan Drilling Earth Science Consortium (J-DESC) - Tokyo University of Marine Science and Technology, Japan
Shota	Kobayashi	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Harue	Masuda	Japan Drilling Earth Science Consortium (J-DESC) - Osaka City University, Japan
Antony	Morris	ESSAC, University of Plymouth, UK
Shigemi	Naganawa	Akita University, Japan
Sho	Nan	Kochi Core Center (KCC) - JAMSTEC, Japan
Mika	Saido	Marine Works Japan, Ltd.
Kiyoshi	Suyehiro	JAMSTEC, Japan
Yasu	Yamada	JAMSTEC, Japan
Michiko	Yamamoto	IODP Science Support Office - Scripps Institution of Oceanography, USA
Greg	Yaxley	Australian and New Zealand International Ocean Discovery Program Consortium(ANZIC), Australia
Hiroshi	Yonezawa	Mantle Quest Japan Company Ltd., Director and General Manager, Marine Operations Dept.Japan
JAMSTEC		Institution
Chihiro	Baba	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Yumi	Ebashi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Nobuhisa	Eguchi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Nori	Kyo	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Kazuhiro	Maeda	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Eigo	Miyazaki	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Toshimune	Nakamura	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Tomohisa	Nawate	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Yoshinori	Sanada	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Tomokazu	Saruhashi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Ikuo	Sawada	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Kae	Takahashi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Sean	Toczko	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Takehiko	Yano	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan

non-attendance*

Location and Emergency Escape Route of #6 CIB

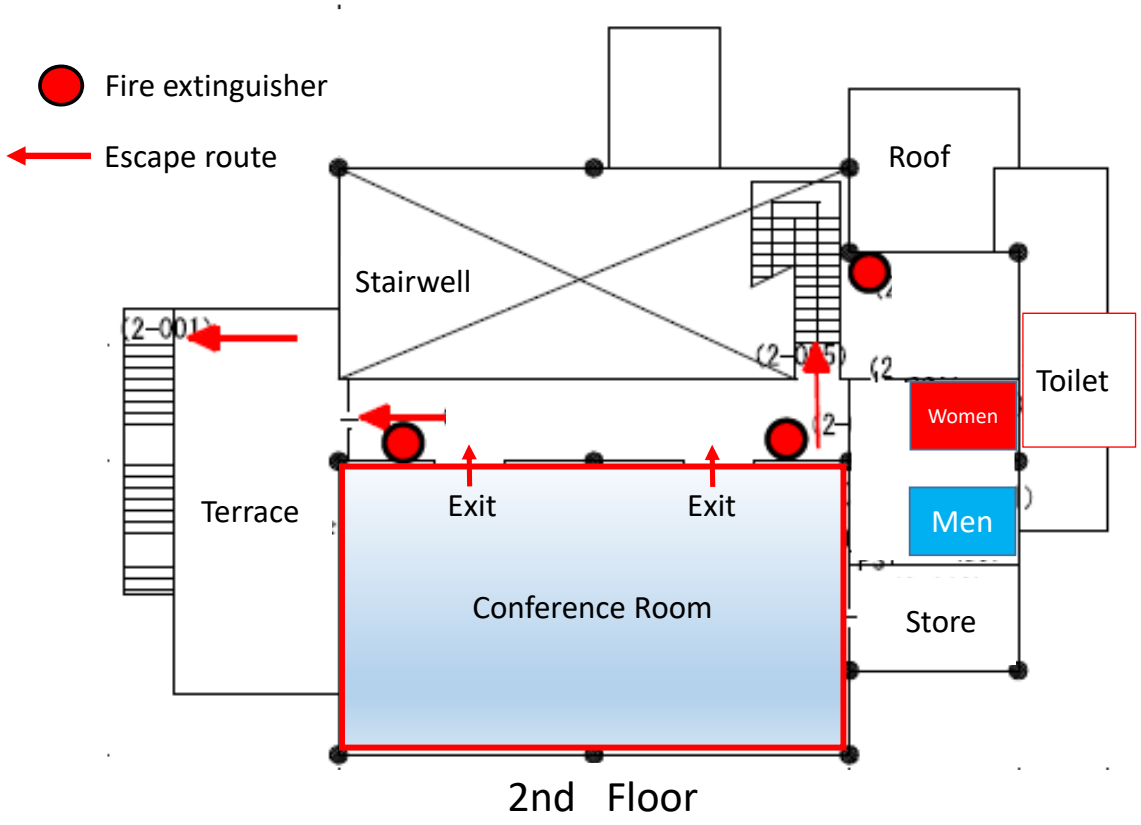


Emergency Escape Route



1st Floor

Emergency Escape Route



How to use Wireless LAN

in Takigawa Memorial Hall, Kobe University

1. Connect to Wireless LAN on your PC.
2. Select SSID "**KUVISITOR**" if there are Kobe Univ. networks on your PC.
3. Enter Pre-Shared Key "**KUVISITORWLAN**".
4. Launch a web browser and enter USERNAME and PASSWORD as web authentication ID/PW.

   USERNAME: **cib2018**

   PASSWORD: **jeiy5644**
5. Click Log In.

You will be connected to the Internet after you are done above.

Agenda Item 3

Approval of Agenda

Chikyu IODP Board #6 meeting
19 – 20 March 2018

Kobe University Takigawa Memorial Hall

Draft Agenda ver. 1.5

Day-1 **Monday, 19 March 2018**

0900-0905 **1. Welcome Remarks** (Kuramoto)

0905-0915 **2. Introductions and Logistics** (Maeda)

0915-0920 **3. Approval of Agenda** (Tatsumi)

0920-0930 **4. Approval of Last Meeting Minutes** (Tatsumi)

0930-0940 **5. CIB Decisions since Last Meeting** (Tatsumi)

0940-0950 **6. CIB Action Item Status** (Tatsumi)

Coffee Break

1015-1215 **7. Other FB, IODP Forum, and Agency Activities**

- a. IODP Forum (Austin)
- b. JR Facility Board (Koppers)
- c. ECORD Facility Board (Camoin)
- d. ECORD (Camoin)
- e. MEXT (Watanabe)
- f. NSF (Allan)
- g. ANZIC (Armand)
- h. PMOs
  - USSSP (Brenner)

LUNCH

1315-1400 **8. JR Advisory Panels Report/Proposal Overview**

- a. Science Support Office (Yamamoto)
- b. Science Evaluation Panel (Miller)

1400-1530 **9. Chikyu Operation/Status Update** (CDEX)

- a. Overall Chikyu Operation
- b. NanTroSEIZE
  - PCT report
  - IODP Exp. 380 Results
  - Core-Log-Seismic-Integration (CLSI)@Sea Program Results
  - IODP Exp. 358 Planning
- c. Lord Howe Rise Project
  - Current Status
  - PCT Report

Coffee Break

1600-1700 **10. TAT Report** (Becker)

1830- **Reception**

Day-2 **Tuesday, 20 March 2018**

0900-1000 **11. Chikyu Proposals (update and discussion)** (Miller/Tatsumi)
- a. Potential Chikyu Proposals at CIB and SEP
- b. Workshop Proposal

1000-1100 **12. Long Term Strategy for Future Chikyu Implementation** (All)
- a. Chikyu Riser proposals
- b. Collaboration with JRSO (TDCS)
- c. Collaboration with ESO? (Proposal 866)
- d. CDEX M2M Task Force Team
- e. Education/Research Program onboard *Chikyu*

Coffee Break

1130-1200 **13. Chikyu Outreach Activities** (CDEX)

LUNCH

1300-1320 **14. KCC Report** (Ishikawa)

1320-1340 **15. Safety Review Committee Update** (Naganawa)

1340-1540 **16. Chikyu/IODP Performance Review** (All)
- a. JFY2017 Review
- b. Current Mid-term (JFY2014 – 2018) Review Introduction

Coffee Break

1600-1615 **17. Review of Consensus Statements and Action Items**

1615-1630 **18. Next CIB meeting**

1630-1700 **19. Any Other Business**

Adjourn meeting

Agenda Item 4

Approval of Last Meeting Minutes

Name		Institution
Members		
Keir	Becker	TAT chair - University of Miami, USA
Gilbert	Camoin	ECORD Managing Agency (EMA), CEREGE, France
Benoît	Ildefonse	University of Montpellier
Hiroshi	Kitazato	Tokyo University of Marine Science and Technology,Japan
Shin'ichi	Kuramoto	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
James J.	Mori	Kyoto University, Japan
Eisho	Sato	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Yoshiyuki	Tatsumi	CIB Chair - Kobe University, Japan
Ben A.	Van der Pluijm	University of Michigan - Ann Arbor, USA
Liaisons		
James	Austin	IODP Forum chair - University of Texas, Austin, USA
Brad	Clements	JR Science Operator (JRSO), USA
Robert	Gatliff*	ECORD Science Operator (ESO), British Geological Survey, UK
Holly	Given	IODP Science Support Office - Scripps Institution of Oceanography, USA
Sean	Gulick*	SEP Co-chair - East Carolina University, USA
Tsuyoshi	Ishikawa	Kochi Core Center (KCC) - JAMSTEC, Japan
Barry	Katz*	EPSP Chair - Chevron Corporation, Houston, TX, USA
Anthony	Koppers*	JR Facility Board Chair - Oregon State University, USA
Gilles	Lericolais*	ECORD Facility Board Chair - IFREMER, France
Ken	Miller*	SEP Co-chair - Rutgers University, USA
Jin-Oh	Park	University of Tokyo, Japan
Observers		
Naokazu	Ahagon	Kochi Core Center (KCC) - JAMSTEC, Japan
Jamie	Allan	National Science Foundation, USA
Carl	Brenner*	USSSP, Lamont-Doherty Earth Observatory of Columbia University, USA
Se won	Chang*	Korea Institute of Geoscience and Mineral Resources (KIGAM), Korea
Kazuma	Doi*	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Akito	Furutani	Mantle Quest Japan Company Ltd.
Akiko	Fuse	Marine Works Japan, Ltd.
Lallan	Gupta	Kochi Core Center (KCC) - JAMSTEC, Japan
Nadine	Hallmann	ECORD Managing Agency (EMA), CEREGE, France
Andrew	Heap	Geoscience Australia, Australia
Satoshi	Hirano*	Marine Works Japan, Ltd.
Fumio	Inagaki*	ECORD FB, Kochi Core Center (KCC) - JAMSTEC, Japan
Thomas	Janecek*	National Science Foundation, USA
Gil Young	Kim*	K-IODP, Korea Institute of Geoscience and Mineral Resources (KIGAM), Korea
Gaku	Kimura	Japan Drilling Earth Science Consortium (J-DESC) - Tokyo University of Marine Scienc
Young Joo	Lee*	Korea Institute of Geoscience and Mineral Resources (KIGAM), Korea
Takeshi	Maki*	Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
Sidney L. M.	Mello*	IODP-Capes/Brazil Office, Universidade Federal Fluminense, Brazil
Shigemi	Naganawa	The University of Tokyo, Japan
Hiroshi	Nishi	Japan Drilling Earth Science Consortium (J-DESC) - Tohoku University, Japan
Yoko	Okamoto*	Marine Works Japan, Ltd.
Dhananjai K.	Pandey*	IODP-India, National Centre for Antarctic & Ocean Research
Mika	Saido	Marine Works Japan, Ltd.
Yasuji	Saito*	Committee for Earth Drilling Science,Japan
Toshikatsu	Sugawara*	Marine Works Japan, Ltd.
Kazuhiro	Sugiyama*	Marine Works Japan, Ltd.
Kiyoshi	Suyehiro	JAMSTEC, Japan
Shouting	Tuo	IODP-China Office, Tongji University, China
Yasu	Yamada	JAMSTEC, Japan
Michiko	Yamamoto	IODP Science Support Office - Scripps Institution of Oceanography, USA
Asahiko	Taira*	President of JAMSTEC, Japan
Wataru	Azuma	JAMSTEC, Japan
Chihiro	Baba	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Yumi	Ebashi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Nobuhisa	Eguchi	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Yusuke	Kubo*	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Nori	Kyo	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Shigemi	Matsuda	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Eigo	Miyazaki	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Taisei	Nakamura*	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Noriaki	Sakurai	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Ryoko	Sato*	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Ikuo	Sawada	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Sean	Toczko	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Kazuyasu	Wada*	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan
Takehiko	Yano	Center for Deep Earth Exploration (CDEX), JAMSTEC, Japan

non-attendance*

***Chikyu* IODP Board meeting #5**
15 - 16 March 2017

Takigawa Memorial Hall
Kobe University

Executive Summary (List of Consensus Items)

3. Approval of Agenda

CIB_Consensus_0317-01: Approve agenda.
The CIB approved the #5 meeting agenda as is.

4. Approval of Last Meeting Minutes

CIB_Consensus_0317-02: Approve minutes.
The CIB approved the last meeting's minutes without modification.

9. Chikyu Operation/Status Update

CIB_Consensus_0317-03: CIB liaison to NanTroSEIZE PCT.
The CIB selected Keir Becker to participate in the May 2017 NanTroSEIZE PCT meeting as a CIB liaison.

13. Chikyu Proposals

CIB_Consensus_0317-04: IODP Exp. 380.
The CIB endorsed IODP Proposal 603D, NanTroSEIZE shallow riserless LTBMS, for *Chikyu* IODP Exp. 380 that will be scheduled in October - December 2017.

CIB_Consensus_0317-05: WS/Field work at Sea.
The CIB encourages the presented ambitious plan of workshop/field work at sea during Exp. 380; the call for application should not solicit only graduate students but should also be open to post-doc, young, and early career scientists.

CIB_Consensus_0317_06: Deepening C0002 Riser Hole.
The CIB endorsed IODP Proposal 603, NanTroSEIZE Deep riser drilling at Site C0002 for Chikyu IODP operations to be scheduled in the Nov. 2018 - Mar. 2019 time window. C0002 operations include logging the deep accretionary prism, sampling the hanging wall, and installing a borehole observatory to measure strain and stress near the plate boundary and observe fluid properties of the Nankai plate boundary. The CIB recognized that deepening the current borehole C0002 to about 1000 m below its current depth will significantly improve the observations in the hanging-wall of the plate boundary. The observatory will be installed in a higher velocity unit as indicated by recent re-processing of 3D seismic data, and a monitoring location closer to the plate boundary fault will enable more sensitive measurements.

CIB_Consensus_0317_07: LHR Project.
The CIB designates IODP Proposal 871-CPP "Lord Howe Rise Continental Ribbon" as a "Chikyu Project".

CIB_Consensus_0317_08: LHR Project Coordination Team.
The CIB creates a Project Coordination Team (PCT) for the LHR project. Membership will be;
Science Representatives (*italics* are alternate member):
Lead Proponent: Ron Hackney (GA),
Earth theme: Yasu Yamada (JAMSTEC) & *Sanny Saito (JAMSTEC),*
Oceans/Climate theme: Kliti Grice (Curtin Univ., Perth) & *Junichiro Kuroda (Univ. Tokyo),*
Life theme: Marco Coolen (Curtin Univ., Perth) & *Fumio Inagaki (JAMSTEC)*

Additional GA representatives:
Andrew Heap
Jessica Gurney

CDEX representatives:
Kan Aoike
Nobu Eguchi
Tomo Saruhashi
Take Yano

14. Long Term Strategy for Future Chikyu Implementation

CIB_Consensus_0317_09: Proposal update.
The CIB will ask proponents of three riser proposals (CRISP (537), IBM (698), and Hikurangi (781)) to submit updates to the CIB by 1 October 2018 based on new results and drilling operations for further assessment of those proposals at the CIB. The CIB will contact the JRFB chair and the SEP co-chairs for potential involvement in this process.

CIB_Consensus_0317_10: Call for new riser pre-proposals.
The CIB recommends a change in the next IODP call for proposals. Currently, only CPP's are being considered as new riser proposals. To encourage exciting new riser projects for current and future IODP consideration, pre-proposals for new projects will be solicited. At its 2018 meeting, the CIB will resume its evaluation of any riser pre-proposals forwarded to it by the SEP.

CIB_Consensus_0317_11: **Scheduling Lord Howe Rise Project.**
The CIB applauds the efforts of the proponents of IODP Proposal 871-CPP Lord Howe Rise to obtain CPP funding for the project. The CIB recommends this riser operation be scheduled during the available time window in 2020, on condition that funding is available. This window will not be automatically extended without CIB discussion. The LHR PCT will work to ensure that the 2020 IODP window is met.

16. Chikyu/IODP Performance Review

CIB_Consensus_0317-12: Chikyu/IODP Operation.
Based on Chikyu operation/Status Update (Agenda item 9) and TAT Report (Agenda item 10), the CIB commends the great operational successes of the Chikyu in riserless mode during IODP Expeditions 365 and 370. The CIB also applauds the CDEX engineering and operational developments, especially development of "high

current drill pipe support system" for safe and efficient onboard work. The CIB recognized that CDEX was well prepared for each IODP expedition and the CIB encourages CDEX to maintain the same level of effort for future expedition planning.

CIB_Consensus_0317-13: Fund Raising/Saving.
The CIB commends the success of Chikyu IODP operations not only for basic science but also for disaster mitigation. To conduct further high-impact IODP expeditions, the CIB endorses CDEX for continued effort towards fund raising as well as cost savings for Chikyu IODP operations. The CIB recommends CDEX to consider those newly developed engineering equipment as a venue for raising funds from industries. Although the CIB is pleased with cost savings in creating a more flexible operation budget, the CIB expressed some concerns whether too much cost savings in the current five-year phase might negatively affect Chikyu maintenance and therefore readiness and preparedness of Chikyu beyond JFY2018.

CIB_Consensus_0317-14: Education & Outreach.
The CIB praises CDEX's education and outreach efforts, including several expedition video products for international audiences as well as the inaugural international Chikyu onboard school. The CIB recommends that CDEX decouples education and outreach activities, and endorses CDEX to consider future education opportunities for young and early career scientists.

CIB_Consensus_0317-15: Long Range Plan.
The CIB was pleased to schedule one riserless expedition (Exp. 380), one riser expedition (Exp. 358), and one potential riser CPP expedition at this meeting. The CIB understands that the final scheduling of IODP expeditions ultimately depends on JAMSTEC budgets; however, the CIB strongly encourages CDEX to ensure Chikyu continues to operate for excellent science.

18. Next CIB meeting

CIB_Consensus_0317_16: Next meeting.
The CIB decided the next meeting will be held on 19 – 20 March 2018 in Kobe, Japan.

19. Any Other Business

CIB_Consensus_0317_17: **Extension of Chair term.**
The CIB recommends a 2-year term extension of the current CIB chairperson be granted.

CIB_Consensus_0317-18: Proposal 898-Pre workshop proposal.
The CIB learned that the IODP Proposal 898-Pre "Fore Arc Mohole-to-Mantle" proponent team is planning to hold a workshop in October 2018. The CIB reviewed 898-Pre, and decided to invite a "Full-proposal development workshop" proposal with a submission deadline of 16 February 2018.

Chikyu IODP Board #5 meeting
15–16 March 2017
Takigawa Memorial Hall
Kobe University

Draft minutes ver. 1.1

Day-1 **Wednesday, 15 March 2017**

Agenda Items

1. Welcome Remarks (Shin'ichi Kuramoto)

(09:00 h.)

Shin'ichi Kuramoto (CDEX) welcomed the CIB members, liaisons, and observers, appreciating, first of all, Chair Yoshiyuki Tatsumi, for providing a nice venue for the fifth CIB meeting, and for the nice weather. He welcomed new CIB members Hiroshi Kitazato, Keir Becker, and Benoit Ildefonse. In addition, Kuramoto briefly mentioned the main task of the CIB—to discuss *Chikyu* future operations in specific and report to the president of JAMSTEC, and discussed the schedule of this two-day meeting. Kuramoto ended his opening remarks thanking the attendees.

2. Introduction and Logistics (Shigemi Matsuda)

(09:02 h.)

The Chair moved on to Agenda Item #2, Introduction and Logistics. Shigemi Matsuda briefly explained the meeting location and emergency escape route to the participants, and provided a small tip in case of Earthquake (follow the green sign).

Participants self-introduction started at 09:05 h.

3. Approval of Agenda (Chair - Tatsumi)

(09:09 h.)

The Chair shared the present agenda with the group, including a new discussion item for the CIB, the *Chikyu* performance review. The agenda was approved with no major changes. The Chair asked if there were any conflict of interests (COIs)

related to this agenda, and Andrew Heap identified himself as potentially conflicted over the next day's Lord Howe Rise (Proposal 871) discussion. The Chair said Andrew Heap may need to recuse himself. Jim Mori also identified himself as conflicted, as he is a proponent for JTRACK (Proposal 835). Chair Tatsumi said he is potentially conflicted over IBM (Proposal 698). Further potential COIs included: Yoshi Kawamura and Yasu Yamada for LHR (Proposal 871), and Gaku Kimura for NanTroSEIZE (Proposal 603).

CIB_Consensus_0317-01: Approve agenda.
The CIB approved the #5 meeting agenda as is.

4. Approval of Last Meeting Minutes (Chair - Tatsumi)

(09:14 h.)

The Chair asked if there were any comments or questions about the last meeting's minutes. There were none.

CIB_Consensus_0317-02: Approve minutes.
The CIB approved the last meeting's minutes without modification.

5. CIB Decisions since Last Meeting (Chair - Tatsumi)

(09:16 h.)

Chair Tatsumi asked Nobu Eguchi to cover CIB activities since the last meeting in Kobe. Eguchi described the video conference between CDEX and CIB members deciding the next IODP operation to endorse for the 2017 window. The 16 Feb 2017 discussion focused on two possible projects, the 603D NanTroSEIZE shallow riserless LTBMS, and the 835 JTRACK project. Considering the budget and time available for IODP operations, the consensus was that the NanTroSEIZE LTBMS proposal should be endorsed. Holly Givens asked if the meeting format was conducive to a good discussion, which Benoit Iledefonse responded was adequate, but could be improved; "still, it was much better than using email".

6. CIB Action Item Status (Chair - Tatsumi)

(09:25 h.)

Chair Tatsumi moved on to discuss the CIB action items. Eguchi showed the list, two action items, CIB comments on ADP proposal implementation guidelines (CIB action item 0316-01), and to inform SEP regarding alternate sites for Proposal 865; Nankai Trough T-Limits (CIB action item 0316-02) were already finished. CDEX will also report on fund-raising efforts (CIB action item 0316-03), to be

discussed by Kuramoto. Kuramoto began by describing CDEX's efforts to land commercial drilling contracts and cut costs for repair and maintenance of *Chikyu*. An important national gas hydrates effort will hire *Chikyu* for work, so this will help. Kuramoto will share details later during this meeting.

Eguchi noted that there are two action items (CIB action item 0316-04 and -05) related to riser projects remaining and to be discussed under Agenda Item 13 at this CIB meeting. Mori asked if he should speak, but it was decided to wait until tomorrow.

7. Other FB, IODP Forum, and Agency Activities

a. IODP Forum (James Austin)

(09:29 h.)

Austin began by introducing the purpose of the forum, and discussed the meaning of the term, "forum", which is a big open space for discussion and collaboration. Austin said that this is what the IODP Forum is; there have been three meetings so far, to discuss IODP as a program, and it seems to be working; from science, education and outreach, to future planning. Austin stressed the need to be responsive to the community of proposal writers, otherwise, we will not be successful. Austin said posting on websites doesn't mean we are responding to the community, and a look around this room shows everyone that we are not making a good enough effort reaching out to young scientists. Austin said if IODP doesn't reach out in an effective way to young generation scientists, IODP will not teach them what we are doing, they will not write proposals, and IODP will be finished. Austin stated that the forum looks at the platform providers and examines the science they are supporting; we are lucky that the new science plan, written by about 600 scientists several years ago is a great one, and is still very much valid.

The Forum worked on making a good appearance at the International Geological Congress in South Africa, Austin said that Becker, Gilbert Camoin, Yoshi Tatsumi, and himself worked on developing multiple IODP sessions (and a joint IODP-ICDP booth) for that meeting. Austin said the geoscience meeting in South Africa was used as a venue to find new members – no African nation has ever been an IODP member – and were able to get a tour of the new DeBeers marine research vessel. The hope was to connect to, and open communication with, the South African and Namibian scientific community. Austin mentioned that he's in touch with Anglo-African; their only profitable unit is in diamonds, and they are not in a

position to be intermediates between IODP and either Namibia or South Africa. Austin predicts, however, that as JR nears the Atlantic, interest will increase. He mentioned that DeBeers could potentially be an industry partner, looking at the 3D structure of diamond deposits, and JR could be involved.

Austin mentioned the need for inter-PMO communication, and that Carl Brenner, of USSSP, headed a PMO meeting after the last IODP Forum meeting in Brazil. This was very successful, and may become a regular event. Austin stressed that outreach and education are important, but separate, activities, and each PMO and operator have their own way of approaching these – cooperation in this is essential.

Austin discussed the SEPs' approach to the Forum in 2015, regarding the state of seismic data being submitted to IODP. There has always been an issue with the quality and costs of seismic data, and the Forum told the SEP that they would examine the issue in Brazil; a follow-up meeting in November submitted a white paper to NSF. A new group, the Marine Seismic Research Oversight Committee, has been formed with international experts to discuss better funding, efficient scheduling, proposals, and collaboration.

Austin briefly introduced each community and their current state of activity (Brazil, China, Japan, India). Brazil is a new member, financially supporting the current JRSO-IODP phase with 3M USD/year for three years. China is excited about becoming a new IODP platform provider, and has been talking about building a new drilling vessel. Austin shared that there would be an associated PMO meeting at the next forum meeting, 11–13 September 2017, in Shanghai. He would like people from the CIB to attend. India has invited the Forum to meet in Goa in September 2018.

Jamie Allan asked about the details under discussion for the workshop and forum to be hosted in Japan in 2019. Austin replied that since he will not be forum chair at the time he does not have any updates. Hiroshi Kitazato suggested that a Vancouver, Canada meeting would be a good opportunity to communicate with young scientists. Austin asked that the dates be shared with him, and also mentioned the "Denver II" meeting which will focus on younger scientists and also be held at the end of September.

The Chair called a coffee break at 09:51 hrs, and the meeting reconvened at

10:10 hrs.

b. JR Facility board (Jamie Allan)

(10:12 h.)

Jamie Allan presented the JRFB update on behalf of Anthony Koppers, who was absent. After Allan introduced the new JR schedule for FY17–19, he mentioned that JR was now ensured to operate on a 10-month schedule, even if the budget gets cut a bit, because there were several CPPs, JR costs were less than planned, and they received a little more funding from the US Congress than what was in the present budget. Allan mentioned that JR was required to undergo certified dock work in FY18. He also said that there is an interesting opportunity to provide JR with some work outside of IODP during the transit between the South Pacific and Chile. Allan said that the new science program of the JR is a success, since the ship was not only used on a regional basis much more, instead of sailing to port calls all over the place, but also doing thematic areas with coherent approaches to problems and more facts than we had in the past.

Allan said the JRFB has tried to set the ship's track several years in advance to promote coherent writing proposals. Allen said that one of the things that they found was that development of proposals in the South Atlantic seems to be taking more time than they initially outlined. This, Allen explained, was why they had modified the ship track a bit, rather than to shrink from the Southern Ocean to South Atlantic. Allan mentioned that proposals for the South Atlantic and port calls were likely to happen in a few years although there would be lots of things to be done.

Next, Allan talked about the last SEP in terms of JR proposals. There are no proposals forwarded to JRFB from the January 2017 SEP meeting: several proposals are in the holding bin, three have been sent to external review, and only three were deactivated. There are three fast-tracked proposals, and five proposals potentially ready by May 2017, which is important for scheduling.

Allan stated that non-disclosure agreements (NDA) for some kinds of site survey data are a challenge, and he complimented the Science Support Office for their excellent work. He said that data need to be available during the cruise for safety issues, and legal discussions had been made that would meet with lawyer and company requirements to create a statement covering their use. He told the group to be aware that there were a lot of difficulties in overwriter policies without having

all sources in one office. Allan said that the JRFB was focusing on the ship track for the next few years of FY 22–23, and said it's all working well.

Austin supported this by saying that it was important to motivate proponents to submit proposals not just internally, because it takes 2–3 years to get a proposal in the system. He also said that Koppers would prepare an article in *Eos* shortly for scientists outside the IODP community.

Allan ended with JRFB updates. New members are: Sean Gullick (Univ. of Texas), new SEP co-chairs for site characterization, Wolfgang Bach (Germany) and Liping Zhou (China), new JRFB science members, Beth Christensen (U.S.) and Dick Arculus (ANZIC), new curatorial advisory board (CAB) member, and Mike Lovell (ECORD) as a new chair of CAB. He also noted that 897-APL Southern Ocean Cretaceous Anoxia was added to Expedition 369. The next EPSP meeting would be held 2–3 May 2017 to deal with proposal 877-CPP2's (Flemings) site review. He mentioned that the 877-CPP2 safety review was not yet finished.

Austin mentioned that one of the main reasons JR would go through the Panama Canal into the Gulf of Mexico was DOE's (US Department of Energy) funds for 877-CPP2 (Flemings). He said it's a large amount of money (20 M USD) and tagged for FY19 in Gulf of Mexico.

The Chair asked if there were any comments, but no questions arose.

c. ECORD FB (Gilbert Camoin)

d. ECORD (Gilbert Camoin)

Gilbert Camoin merged the 2 agenda items into one presentation. He introduced some of the new names in ECORD: Mike Webb as the new chair of ECORD Council, Magnus Friberg as vice chair. There are also 3 new members in ECORD Facility Board: Gretchen Frueh-Green, Gabriele Uenzelmann-Neben, and Ellen Thomas.

ECORD now has 15 member countries, with 3 dropping out: Poland, Israel, and Belgium. These nations had no real drive to build a community and national effort to be an ECORD member. Turkey is interested, but ECORD has suggested that they first build a national consortium and then join. In talks last week, Turkey said

they are well on the way. Belgium is also working to do this, and hopes to return to ECORD. Camoin was happy that Spain has returned to ECORD. However, ECORD still has some concerns with the Canadian IODP organization, which next week plans to discuss funding with their national government. All of these committed to 2018. Next 2019-2023 is the focus. Camoin said that they are organizing a review of ECORD activities in preparation for renewal.

Camoin spoke about past and future MSP plans. The ECORD external review panel will be reporting to EMA and ECORD funding agencies for renewal. Mandated to review ECORD within IODP and the impact of science results, and effectiveness. The MARUM meeting will have 2 closed sessions. IODP science talks will highlight ECORD science within IODP.

Camoin said this review will continue until late June. Next year, work on MoU and funding agency agreements will begin, with a target for signing the MoUs, including with the US, in 2019.

Camoin showed the MSP expedition schedule to 2020. The next 3 are Corinth (Exp. 381), and ESO is now working to announce the expedition dates in 2018; the Artic (Exp. 377), and ESO is working with Russia for in-kind contributions including an icebreaker; and Antarctic (Exp. 373) in 2020. Past expeditions included Atlantis Massif (Exp. 357, very positive external reviews), and Chicxulub (Exp. 364) to be reviewed in Lisbon, prior to the SEP meeting on 20 June 2017. Ben van der Pluijm mentioned how tremendously successful the Chicxulub outreach program was, and this should be included in the review.

ECORD still has 4 slots for low cost (x3) and medium cost (x1) expeditions for the next few years. Camoin said they plan to tackle many science themes, not just climate change, and they are planning to do this with a diversity of drilling systems.

van der Plujim commented that he'd like to see fewer climate-related MSP expeditions; Allen reminded everyone that the MoU specifies that the MSP focus on shallow water, implying climate work. Austin said that the Corinth and Chicxulub were NOT climate expeditions. Givens wanted to confirm that IODP would be included in this call for new MSP expeditions, which Camoin did.

Camoin listed proposals now at the ECORD FB, including New England Shelf,

Hawaiian Drowned Reefs, and Sabine Bank Sea Level; there are not many MSP proposals at SEP. There are 3 that have been inactive for quite some time, and they need to be addressed at the next meeting. Do the proponents want to keep these in the system? Camoin said this is still not too bad, considering the number of slots ECORD needs filled. ECORD FB needs a diversity of proposals and the pressure to move.

Camoin discussed the Magellan Plus Workshop series, with one call yearly, for all IODP platforms and ICDP (ADP) welcome. There have been 14 workshops since 2014, with 15K Euro support per workshop. Some travel funds are also provided for EU scientists. Camoin discussed the upcoming workshop.

Camoin then gave an update on sea drills. A combined community ECORD infrastructure exists to support drilling, with 25 institutes and 16 countries working on this. Distributed European Drilling Infrastructure (DEDI) will help support multiple organizations to supply the best equipment and techniques to achieve their science goals.

Camoin spoke on ECORD educational activities. ECORD works to maintain and add to yearly activities. Some of the key focus points are early career scientists training, and scholarships and grants. This money can be used on all current and legacy IODP samples and data. ECORD supports educators on the JR and now the MSP. ECORD has now started its' own school of rock series; these efforts trained 150 students and early career students in 2016. Camoin also talked about some of the 39 Distinguished Lecturer Program talks given during 2016. ECORD also launched a new website last September, so Camoin encouraged everyone to take a look and give feedback. ECORD will have a booth at this year's EGU as usual. As part of this, ECORD is working with IODP on the 25 April IODP Town Hall, and with ICDP on the 27 April ICDP town hall. Camoin talked about the joint IODP-ICDP session, which is also being planned. Around 50% of the participants will be young, early career scientists.

Upcoming outreach plans include the 13-18 August Goldschmidt 2017 in Paris and a Scientific Drilling booth at the 2017 AGU in New Orleans. ECORD is working to prepare for the 2019 AGU 100 yr anniversary.

Austin talked about how the AGU program committee for the Fall meeting came to the IODP Forum for session support, since they realized how many of the

transcendent science themes the AGU promotes are deeply embedded in scientific ocean drilling. This is a good motion that should be followed through. Austin finished by remarking that the goal is to deliver taped union sessions highlighting these connections, and that these will eventually reach out into fundraising, outreach, etc.; even more important in the current challenging political climate. This effort will be gradually implemented as AGU prepares for the 2019 centennial. Becker asked why these are ranked the way they are? Austin responded that no "ranking" is implied here – these are just the way the program brought these themes.

Camoin ended with a review of the next upcoming meetings: in 2017, the ECORD council meeting in UK and in 2018, the ECORD FB in 6-7 March, in Italy.

ECORD's 2016 annual report is due out soon.

(10:26 h.)

e. MEXT (Eisho Sato)

(11:09 h.)

Eisho Sato briefly introduced the MEXT CIB report, including the planned MEXT personnel change (New director of Ocean and Earth Division, Takahiro Hayashi), renewal of JAMSTEC's 5-year plan, the MEXT JAMSTEC budget allocation plan, activities and structure/sub-divisions of MEXT, and plans for the next G7 meeting in Torino, Italy. Sato introduced the current JAMSTEC 5-year plan (reviewed in 2018 and ended at the end March, 2019) followed. Sato said that the JAMSTEC budget had been steadily decreasing, but the JFY17 budget would be larger than JFY16. Even so, decreasing budget trends would continue.

van der Pluijm asked if the new 5-year plan would be different from the current plan, and to what extent, since the current one already had a lot to cover. Sato said either Kuramoto or Wataru Azuma would be better to answer this. Azuma said what is important is data sharing. Kuramoto added that discussion about the new plan had just started, and he hoped that there would be no drastic changes from the current one. The Chair commented that the CIB members would like to hear more strategic plans of supporting IODP and we should probably discuss them later. Heap asked if the new minister and government might have some influence to affect changes. Sato did not think there would be much influence.

Azuma added that the Japanese Government's innovation projects and industry issues might be an important strategy to effect change.

f. NSF (Jamie Allan)

(11:27 h.)

Allan reported that the NSF perspective for JR has never been better, not only financially, but in how the ship is being run, how proposals are being evaluated, how the facility is being jointly managed by the community, the operators and funding agencies are all working together, and that many here have been a big part of this. These changes really prove that they are acting as a group.

Allan began talking about the budget, and said there's now a transition year since Donald Trump became president, and NSF is waiting to see what will happen, as no budget has yet been released. Allan reminded the group that the US budget is decided by Congress, and not by the president. He again mentioned that JR is now in a positive financial situation. The budget for JRSO is nearly 62.7M USD a year for 10.5 months operation over five expeditions in FY17. He explained that they are expecting 14.8M USD in base contributions from their partners, and additional contribution 12M USD was from CPP. Allen said that the facility and science are well balanced. He mentioned that the NSF goal was for 10 months/year through FY19, and one way they can achieve this is by spending less of their budget than expected in 2016, so this means a larger budget for FY17.

Benoit Ildefonse asked how JR managed to spend less, and asked if this was mostly because of drops in fuel costs. Allan answered "no"; fuel costs for the JR are only part of the story, with 35 tons/day to drive the ship, 20–25 tons/day onsite and 10 ton/day to tie up. So, fuel efficiency is met by not burning fuel for transit, but by focusing it on doing science regionally.

Allan said that during ODP JR used to operate for 12 months a year, and there were a few downsides to this: lab upgrades and improvements and maintenance were put off. Allen reminded everyone that the JR is an NSF facility and can be used for non-IODP projects as well, especially during IODP-off periods of time. With the retirement by the US Navy of the *Knorr*, the US lost its' long-core facility. As announced in the NSF Dear Colleague Letter (DCL) on 24 August 2016, JR would be available to perform this piston coring in 2019 during the transit between the western Pacific, southwest Pacific, and Chile. Allen said the 100-m limit was set following advice from the general counsel's office at NSF. They would like to avoid environmental impact statements for drilling, by instead following the

environmental procedures associated with the long-core facility, which significantly reduces the regulatory overhead. This coring capability would be scheduled after the facility board set the new schedule. Allan said the extra cost to use the ship would be 25 K USD/day, and funding would come from the facility section at NSF and from the geology and geophysics program. Allen also said that science staffing would be handled just as for other research cruises, and would be funded depending on the science project.

Allan explained the designated sequence of events for the JR NSF non-IODP coring program with a timeline slide. Azuma asked how many days are available for this non-IODP project. Allan answered that there would be 18 additional days during the transit in this case, for which the ship would otherwise be tied up and waiting at port.

Allan spoke about expedition data, which was discussed at the last IODP Forum. He said expedition data are very important for the FBs to consider, and is traditionally described as “data acquired during actual expeditions”, but extra data after the cruise would sometimes achieve expedition goals more effectively. Allen listed examples: whole-core XRF scanning for splicing, whole-core CT-scanning (for example Chicxulub), and isotopes. He said what was unaddressed is who pays for it. He introduced the JRFB approval to purchase an XRF scanner and now two scanners were available for JR expeditions at TAMU.

Allan discussed the next phase of IODP from 2019–2023. He said NSF goals remain at 10 months a year for JR operations. He said the original subcontract TAMU signed for IODP is until 2023, but NSF decided to make a cooperate agreement with TAMU and JRSO to have a new 5-year contract through 2024 instead of the typical 4-year contract. He mentioned next that partner contributions would increase to 1/3 of JR operation expenses, which used to be 50% in the beginning of ODP. Allan also said NSF decided to increase CPP costs to 8M USD after the survey.

Allan next said that NSF instructed the JRSO to increase U.S. science party members from 8 to 10 on JR expeditions in response to the “Sea Change” report recommendations. He mentioned that those staffed under the onboard outreach program were considered members of expedition science party with publishing responsibilities. He explained that all onboard outreach program participants and co-chiefs will be included in berth counts, post 2019.

Allan showed the timeline for the next three years and said that a facility review was ongoing. The U.S. Community Workshop would evaluate the effectiveness of JR as a facility toward achieving the Science Plan Challenges. He said FY18 would be the year to focus on preparing partner memoranda and National Science Board (NSB) action items for the smooth shift into the next phase of IODP (2019–2023).

van der Pluijm commented that the US regional planning is a budget-driven scenario, and emphasized that we should follow thematic driven planning, not just regions. Allan replied that NSF would consider both budgetary and science issues. Allen said it's important to look at things from a facility viewpoint, in terms of efficiency and costs, but thematic science targets need to be followed. van der Pluijm agreed.

Allan reported on how the first JR facility review was made. A 5-year cooperative agreement for JR operation required annual and mid-award (3rd-year) reviews. Allan also said that while reviews are confidential and cannot be posted, the NSF response is public. The NSF panel met at JRSO from 24–26 February 2016 for the FY15 review after receiving the report from FY15 co-chief review, which was held just two days before that. Allan said the first facility review was stunning and positive, and NSF accepted all panel recommendations, asking the JRSO chair to implement or consider them. Allan said the second JR facility review had just been produced on 1–3 March in College Station. Allan emphasized that not just U.S. members were invited to join the meeting as a panel, one important example was a Canadian member, who is an astronomer with experience working with large international observatories. The report that they received was powerful and it would be good enough to get U.S. community approval.

Lastly, Allan mentioned that IODP proposals at NSF have done very well, so funding wouldn't (shouldn't) be changed. Allan also pointed out the DCL published on 9 August 2016 regarding seismic capabilities. Allan confirmed that NSF is committed to providing future seismic capability to the U.S. community, and currently NSF is trying to evaluate several responses to this DCL.

Azuma asked who accepts these reviews. Allan answered that would go to him because it was his panel.

Given commented that the revision of berth allocations might be good for other facility boards to discuss and maybe adopt if it simplifies things from a programmatic point of view. Allan mentioned that the “Sea Change” Report was a guide as to how these should be done/sorted out. He additionally mentioned that the recommendations were not going to be negotiated, because the memorandum wouldn’t be approved above the division of sciences. Ildefonse commented that some small countries might react negatively to these changes. Allan said there had been problems regarding education/outreach people aboard JR, and what their exact role aboard ship was. Allan felt there should be a programmatic workshop clearly explaining what the expedition goals were. However, some education/outreach staff released inaccurate reports, showing that they had not worked closely with the co-chiefs, and this causes friction. On the other hand, Allan mentioned both the South China Sea and Chicxulub expeditions went very well. Allen stressed that this is not a new program, and that they worked well when they were properly mentored and involved; therefore, mentoring these people was very important. Allan also mentioned that some of these people had not been willing to collaborate. Brad Clements commented that a clear education plan might help guide and improve cooperation with the expedition and co-chiefs, and that this might be extended to IODP, program-wide. Camoin commented that this would have implications in staffing, since on MSPs there’ve been problems with outreach plans as well. Clements commented that sooner is better to address such a workshop.

The Chair concluded the discussion and confirmed there were no more questions or comments, and moved on.

g. ANZIC (Andrew Heap)

(12:04 h.)

Andrew Heap gave the ANZIC update. The lead agency is the Australian National University, and the partnership is made up of Australia and New Zealand. Heap said that since 2008 51 Australians and 11 New Zealanders have sailed on IODP expeditions. Heap mentioned that ANZIC is very happy with IODP membership. The current funding levels are good, but Heap hopes to see these raised by the Australian government. This takes money out of the Australian Research Council budget, but other methods are looking good. Heap said that there are movements to examine using the IODP model to fund all Australian research funding.

Heap mentioned how more ANZIC proposals have been coming through the

system. However, one worry is the costs of collecting site survey data; it's very expensive, and they've been working to resolve this.

Heap shared some details on the regional IODP proposals. One item he mentioned was an APL for Cretaceous climate, which has been resurrected. This will be added to Exp. 369 in 2017. ANZIC is very happy with this.

Heap shared some details on the IODP 2017-2020 drilling plans around Australia and New Zealand.

Heap then discussed the *Chikyu* Lord Howe Rise project; the Australian government contribution will be immense, and details are now being worked out. More details will be shared tomorrow. One site survey has been completed, with another planned for later this year. Funding negotiations with the national government are now underway with Geoscience Australia.

Given asked what legacy funding was, and Heap responded that this is for looking at legacy data & samples. van der Pluijm suggested that ANZIC needs to tell their funding agencies to provide more support to IODP, since ANZIC is getting so much out of the program.

Allen mentioned that the NSF director is headed to Australia soon, to brief GA on how to approach this, as well as looking at port call plans, etc. NSF feels that the program is getting a lot back from ANZIC.

Austin noted that the ANZIC community "punches above their weight" regarding the number of excellent proposal submissions, etc.

Heap acknowledged this, saying that they are busy supporting the development of new proposals and strengthening new ones. Heap invited participation in the Australasian IODP Regional Planning Workshop on 13-16 June WS at Sydney University, Australia. Heap ended by confirming that ANZIC has great support for IODP and sees much value in the program. ANZIC provides post cruise and legacy funding for scientists, and ANZIC always needs new proposals.

h. PMO

J-DESC (Hiroshi Nishi)

(12:19 h.)

Hiroshi Nishi presented J-DESCs' activities. He first listed seven international meetings (e.g., SEP, EPSP, CIB, ECORDFB, and JRFB), and the numbers for each (seven for SEP, one for EPSP, three for CIB, none for JRFB, and one for ECORD), in which Japanese members participated. Nishi mentioned that 29 Japanese scientists in total, and three to four in average, contributed onboard each IODP expedition. Nishii also added that while many applications were accepted, not so many were selected to board. Next, Nishi introduced the successful Expedition 370 (T-Limit of the Deep Biosphere off Muroto) thanks to the hard work of its' three co-chiefs, Heuer, Inagaki, and Morono. Nishi talked about J-DESC IODP cruise support, mentioning two sampling parties (Exp. 359 and Exp. 361), three 2nd post-cruise meetings (Exp. 350, Exp. 351, and Exp. 352), pre-cruise training (Exp. 362, Exp. 363, Exp. 364, Exp. 367, and Exp. 368), nine young scientists supported by JAMSTEC for post-cruise activity, and three IODP feasibility support activities (proposal support).

Nishi talked about last years' symposiums/workshops (three in English, two in Japanese, and one in both languages). He mentioned that the JpGU (Japan Geoscience Union) 2017 would be held on 21–25 May 2017. Nishi said that the J-DESC core school was very important, and a good opportunity to train young scientists, with five core schools held last year. Nishi then talked about J-DESC outreach activity, mentioning two special onboard-*Chikyu* tours held at Ishinomaki port in Miyagi and Kochi port in Kochi. Nishi also talked about the International short course held last year. Nishi showed several pictures from the the core school. Nishi mentioned a speech given at the Short Course on Core & Logging Data Interpretation Exercises at the Taiwan-Japan Deep Drilling Science Symposium on 1–4 February 2016 in Taiwan. Nishi spoke about the international *Chikyu* Onboard School, funded by JAMSTEC and J-DESC, and held onboard *Chikyu* from 3–6 July 2016. Six different countries were represented by 13 students, but there were actually 35 applications for this event. Nishi said J-DESC supported 10 participants for the *Chikyu* ship-tour in Yokohama, and 15 participants for the one in Miyagi. Nishi mentioned exhibitions in which J-DESC participated, JpGU (22–26 May 2016), Goldschmidt (26 June–1 July 2016), and the Geological Society of Japan (10–12 September 2016). Nishi introduced two Japanese publications: *J-DESC news*, and *Newton*, which featured Kuramoto (of CDEX) in an article explaining *Chikyu* operations and science services for the community. Nishi introduced the J-DESC website and its Facebook page.

Nishi announced two important things in closing: one is the JpGU IODP session, which will be held on 22 May 2017 with speakers; Kiyoshi Suyehiro, James Austin, Keir Becker, and Masafumi Murayama. Nishi encouraged the group to participate in this session which is very important for the future of IODP. Nishi then spoke about the ICDP Oman Drilling Project. The target of this project is drilling and coring the crust-mantle boundary to investigate the nature of the Moho transition zone. This project is being conducted in two different phases through 2016–2018. Phase I (2016–2017) has completed drilling at sites (GT2, GT1, GT2, and BT1), and full core characterization and description will be conducted on *Chikyu* in Summer 2017. There are three more target sites (MD1, MD, and BA1) during Phase II (2017–2018), and laboratory work will be conducted on *Chikyu*. This is the first time ICDP-IODP jointly cooperates on off-site core examination and curation. The proposed core flow for the work onboard *Chikyu* has been tentatively proposed and the team is waiting for the cores to be shipped.

The Chair closed the morning session, and broke for lunch at 12:30 hrs.

8. JR Advisory Panels Report / Proposal Overview

a. Science Support Office (Holly Given)

(13:29 h.)

Holly Given gave a brief update on the Science Support Office (SSO). For the new CIB members, Given explained that SSO has a 5-year cooperate agreement with NSF, and staffs this office with eight people, only three of whom are full-time equivalent workers. A marine seismic imaging specialist was newly hired because of a SEP requirement. Given mentioned the SSOs' main tasks: task one is JRFB, SEP, and EPSP support, and liaison with the ECORD FB and CIB. The second task is to oversee the proposal review process; the whole process from calling for proposals, submission software, getting them to SEP and maintaining a proposal archive. Given said SSO also maintains the iodp.org website, and asked the group to provide feedback on the website. Given mentioned that SSO is the guardian of IODP policy and documents, and also maintains and hosts the site-survey database, inherited from IODP-MI and which has been completely rewritten.

Given explained the history of proposal submissions: there were 82 new proposals, 48% de-activated, 36% still under active review, and 16% forwarded to FBs (half of those (6) scheduled/drilled) since the new IODP started on 1 October 2013. Given mentioned it would take 3.5 or 4 years to have a proposal get through all these processes in the new program.

Given next mentioned proposal outcomes from the last two SEP meetings; five sent to FB (incl. 835 JTRACK and 871 LHR for CIB), another five sent to external review (four for JR, one for *Chikyu*), one in the holding bin, seven full proposals have been invited, including 898 Fore Arc M2M proposal (Michibayashi) with *Chikyu*, and 10 proposals are de-activated but with no *Chikyu*-related ones included.

Given showed a page from the iodp.org website and explained how *Chikyu* proposals "in the system" can be sorted by platform, and also show the stage of each proposal in the process. Given showed that active proposals are also accessible at iodp.org. Right now, 87 proposals are active, and the distribution among science themes has not changed by much. Given also showed the lead proponents, by member affiliation, among other members, and then showed participation in the pool.

Given showed the latest call for proposals published in *Eos* as of 3 April 2017, and asked the group if there was any necessary amendment about the wording regarding *Chikyu* operations. van der Pluijm didn't like it, saying "it sounded as if *Chikyu* was almost dead". van der Pluijm also commented that the current wording might mislead proponents to think that riser proposals were no longer being solicited, and that *Chikyu* should be "alive" for the community. van der Pluijm suggested that the CIB statement about riser drilling should be strongly mentioned no matter how it is funded or not. The Chair said that would be a key long-term view discussion later on Day 2. Mori agreed and supported van der Pluijm's comments. Given asked for more comments about improving the wording and Ildefonse commented that it should reflect the consensus from last year. Ildefonse said the time limit is missing in the statement, to which Eguchi said that this was for the *Chikyu* mid-term, until 2019.

(Details in the agenda book.)

b. Science Evaluation Panel (Holly Given)

(13:43 h.)

Given presented the SEP's outcomes on behalf of Ken Miller and Sean Gulick, Co-chairs of SEP. Given briefly reviewed the status of two proposals that were sent to CIB with "Excellent" evaluations at the SEP meetings in June 2016 and

January 2017: 835-Full2 (JTRACK) and 871-CPP2 (Lord Howe Rise Ribbon). Given also showed a list of other proposals currently at the CIB.

(Details in the agenda book.)

There were no comments or questions.

9. *Chikyu* Operation/status update

a. Overall *Chikyu* Operation (Shin'ichi Kuramoto)

(13:57 h.)

Shin'ichi Kuramoto presented the *Chikyu* schedule since 2005; *Chikyu* IODP operations started in 2007, two years after delivery. In JFY16 saw two expeditions, Exps. 365 and 370. In Exp. 365, an older, previously installed observatory was replaced with an advanced Long-Term Borehole Measurement System (LTBMS). This has already been connected to the Dense Oceanfloor Network system for Earthquakes and Tsunamis (DONET) and is producing real-time monitoring data. One significant event was monitoring a M6 plate boundary earthquake just beneath the observatory on April 2016; a full report is soon-to-be published. Followed by a maintenance period and open ship tours, IODP expedition Exp. 370 (T-Limit) was launched. For the coming JFY17, new commercial work for a Japanese company will begin on 1 April, focusing on methane-hydrates. During the following maintenance period (mid-July to mid-September), the ICDP Oman drilling project cores will be loaded aboard *Chikyu* for core description. Kuramoto said there will be an open ship in Hachinohe in September, then back to Shimizu for maintenance and open ship. In October, IODP Exp. 380 will start. Kuramoto discussed the plan to invite early-career scientists onboard for a workshop during IODP Exp. 380. In January 2018, some Japanese commercial work is being negotiated (not contracted yet). Expeditions have been well received by TAT and garnered good media coverage. Kuramoto said that CDEX/JAMSTEC was looking to maximize funds from MEXT, combined with commercial work and cost-cutting efforts. Kuramoto said this meant some maintenance might be postponed until the next 5-year term. Kuramoto emphasized that JAMSTEC/CDEX would always welcome CPPs and new *Chikyu* memberships.

Camoin asked if Exp. 380 would be a regular expedition. Eguchi answered yes, that with about 10–12 people planned for the science party, there would be still available berths for the workshop participants. Eguchi continued to briefly explain

that young scientists would be welcome; they would sail the whole expedition and be able to use previously collected cores and LWD data to conduct original research and write papers. Ildefonse wanted confirmation that the workshop would be a training-oriented or research-oriented and related to this expedition. Eguchi confirmed that both were meant, and added that this was Kimura's idea–revisit the previously taken cores (data) since we have not used them all (item #13, details available in Toczko's talk).

Takehiko Yano took over to give a financial update. Yano commented that the JFY15 Indian commercial operation was thought to have lost money, but actually ended up making a good profit. Yano said this enabled CDEX to create a *Chikyu* independent account, which wouldn't be used by JAMSTEC for other purposes. In addition, Yano explained things needed to improve the current financial situation: e.g., making strong efforts to sell the *Chikyu* NanTroSEIZE project to the government, but so far has no response.

van der Pluijm asked what *Chikyu* maintained with all these large "maintenance" windows, which must cause a lot of lost costs. Eguchi answered that *Chikyu* was standing-by during those terms and always needed to be well prepared.

Yano continued to explain the overall budget situation of JAMSTEC, not specifically CDEX. Yano said that an average cut of three percent occurred every year as Sato (MEXT) mentioned. Yano explained that 30% of the budget was officially allocated for *Chikyu* operations, ca. 80–90M USD; however, reality was different and in fact only about 58M USD was actually allocated to CDEX. Yano showed the *Chikyu* funding structure (*Chikyu* Account) to explain several sources of funds: Government funds, *Chikyu* membership fees, Commercial operations, CPP, and Donations. Control of the basic cost is the key to manage *Chikyu* budgets, and all savings from cost cutting would be forwarded to the Deep Riser drilling.

van der Pluijm wanted to confirm that when the new program starts in 2019, there would basically be no money for drilling for the first two to three years. Yano said this was right, but added that a CPP is expected. Clements wanted to make sure that *Chikyu* expected to begin the Lord Howe Rise (LHR) project in 2020. Eguchi said that the LHR topic would be discussed in detail later. Allan commented that deferred maintenance would be good for the short-term, but has the potential to create issues in the long-term. Yano agreed. Allan asked if he was correct in

thinking that deferred maintenance would not risk impacting the operation. Kuramoto replied that *Chikyu* still needed to be inspected, even with deferred maintenance. van der Pluijm commented that last year's maintenance seemed relatively intense. Kuramoto commented that many requirements needed to be satisfied after the Macondo disaster in 2010. van der Pluijm said that to keep up with industry levels, it sounded like this was costing more. Eguchi said this really meant basic cost cutting. Clements asked if the *Chikyu* account diagram was vertically scaled, and Eguchi answered that this had no relative scale at all, it is just an illustration. The Chair commented that *Chikyu* might produce some money, and CIB would discuss this later. Austin commented that there would be one riserless option, JTRACK in 2018 or more riser with NanTroSEIZE. van der Pluijm agreed to discuss this later.

b. NanTroSEIZE, IODP Exp. 365, PCT report

IODP Exp. 365 (Sean Toczko)

(14:38 h.)

Sean Toczko presented the *Chikyu* operations updates for Exp. 365 and Exp. 370. Toczko introduced the Expedition 365 science party, including the videographers from Science Media, the site and objectives, operations, schedule (next milestones), and evaluation results. Toczko explained the GeniusPlug (microbio) and the LTBMS, are two different kinds of observatories. Toczko mentioned that Mie-ken Nanto Oki quake (M6) occurred on 1 April when GeniusPlug was retrieved. Toczko said a shore-based sampling party was held quay-side at the Port of Shimizu 25 July– 5 August 2016. The 1st post cruise meeting was on 5 December 2016, with the *Proceedings* due to be published in Spring 2017. Toczko also said the C0002 LTBMS paper will be published soon. The science party was happy about GeniusPlug recovery, LTBMS deployment, coring, laboratory support (MWJ), and flexibility (CDEX, MQJ, MWJ). Toczko also noted some comments: the curator was great, but Internet access, core laboratory layout, and the microbiology laboratory missing some standards were noted as unsatisfactory.

Austin said he liked the LTBMS video, showing Laura Wallace explaining a complicated tool very well, and said that CDEX released a great example of video, which can be used for outreach. Toczko agreed and commented that Science Media was very professional and did a great job. Allan also commented that the Exp. 365 YouTube videos were great and well evaluated in NSF as it raised the awareness of the IODP program. Eguchi suggested showing the video in the coffee break. Toczko mentioned that CDEX was trying to provide the videos to

high school teachers as PR and hoped that it works.

The Chair suggested moving on to the PCT meeting report, and the NanTroSEIZE PCT meeting updates followed.

PCT report (Sean Toczko)

(14:53 h.)

Toczko reported on the meeting held at the last AGU and discussed the details of Exp. 380, Exp. 365, and the C0002 deep riser extension. He added that another PCT meeting would be held in May (just before JpGU) to further discuss these items. The Chair suggested sending a CIB liaison to the PCT for the next meeting, and asked Becker to do so since he will attend JpGU. Becker accepted.

The Chair confirmed the CIB members' agreement on this suggestion.

CIB_Consensus_0317-03: CIB selected Keir Becker to participate in the May 2017 NanTroSEIZE PCT meeting as a CIB liaison

No questions or comments arose.

The Chair confirmed that the next Agenda item was Exp. 370.

c. IODP Exp. 370 (Sean Toczko)

(14:56 h.)

Toczko continued to introduce the expedition's objectives, sites, operations, its major issues, operational achievements, scientific achievements, and evaluation results.

Clements asked about the VIV ropes around the drill pipe. Toczko replied that they were attached to it to break up water flow around the pipe. Austin said that it was like a fairing. Toczko continued describing the drilling sequence and operational achievements of Exp. 370. Toczko mentioned that the observatory thermometer string was cut and lost. Toczko said shipboard and shore-based co-chiefs worked well together during Exp. 370, and the science party was mostly happy with conditions, except for the Internet.

At the end of presentation, Austin commented that it reminded him of Fumio Inagaki saying a punch line that there is no limit of life, while the notion here was

“T-Limit” implying that you know something you do not know. Austin continued, saying that the results were really exciting and big, much like Chicxulub. Toczko agreed that this was something NASA should be interested in. Becker added that the results showed temperatures a little higher than previously found, but that there has to be a T-Limit somewhere.

Austin emphasized that the result of this experiment was surprising. Ildefonse asked if that current research was a high profile for publications. Toczko replied that he was not sure, so Ildefonse rephrased his question because he was asking about when it would be published in Science or Nature. Toczko agreed it would be significant when it was published.

The Chair said the CIB would be very keen to hear about the results.

The Chair called a coffee break at 15:00 hrs.

10. TAT Report (Keir Becker)

(15:28 h.)

Becker gave a brief report on the TAT. Becker presented the TATs’ purpose and membership. Becker mentioned that TAT was really impressed with CDEX operations and developments. Becker talked about some of these technical developments, starting with the Okinawa project. Becker said that the SIP wellhead designs for HOT programs are really amazing and well-engineered. Becker said that speaking as a developer of the original CORKS, these are really impressive.

Becker showed a long and detailed list of Lord Howe Rise TAT recommendations, summarized in his presentation (see Agenda Book). Becker said an effort should be made to convince industry to help invest in LHR.

Becker ended with a long and detailed description of the drill well on paper (DWOP) activity recommended by TAT to CDEX in preparation for the deep C0002 riser well. These points are all summarized in Beckers’ presentation (see Agenda Book).

Ildefonse asked about the details of DWOP, which Becker said means getting the team into a room to simulate drilling the well. Given asked if this was like a

tabletop exercise. Becker agreed, saying this is standard in industry. Nishii appreciated this, and encouraged more efforts like these. Becker pointed out that the TAT is like the forum, with everyone in the room being an active participant.

11. *Chikyu* Outreach Activities (Nobuhisa Eguchi)

(15:53 h.)

Nobu Eguchi summarized CDEX education and outreach activities. These included open ship events at Ishinomaki port (August 2016), which had been seriously damaged by the Tohoku earthquake, Kochi's new port (November 2016), lectures/seminars for (junior) high school students, joint IODP/ICDP booth with USSSP and ECORD at AGU for the first time, YouTube videos created for Exp. 365 with more than 10,000 viewers, one YouTube video created for Exp. 370, filming by NHK crew, onboard school with 15 attendees from different countries (July 2016 and February 2017), and other media efforts and publications. Eguchi ended his presentation with the comment that outreach activity were okay more or less inside Japan, but emphasized that the necessity of reaching out internationally. Eguchi also added that education should also be more seriously considered domestically. Eguchi said that CDEX needs some website renewal, and also needs a revamp for smart phone users and better social media use. Eguchi mentioned the planned workshop onboard during Exp. 380, and said Toczko would share more details on Day 2.

Given said that there used to be a videographer team working at Scripps, but stopped since they were too expensive. Videos made on JR were getting better and better edited. That made Given wonder if videos could be a very effective outreach tool; CDEX agreed. Ildefonse also commented that professional videographers are needed to make good and effective videos. Given said some JR science parties had made good videos. Ildefonse disagreed, saying there's a lot of garbage out there. Eguchi agreed with Ildefonse and said that while Science Media was not cheap, they did really a professional job. In addition, CDEX got all the footage, incl. final products, which contractually could be used as desired by JAMSTEC. Camoin commented that this was a discussion held at the last meeting where there was talk about hiring a team. Camoin said that it helps when you have some "sexy" expeditions like Chicxulub, and you can try to sign up TV companies. Eguchi replied that with commercial contracts, copyright is always an issue to worry about.

Austin commented that this goes beyond label sharing. Some of these are designed for advertising outlets to make money. Austin wanted to know when we will start to make this a focus, now or later? Austin said the borehole instrument video was incredibly interesting to the community, and this should be especially so in a country where earthquake prediction has been a mainstream discussion, the public is interested in it for a very good reason. Here in Japan, there should be partnerships involved to make dollars. Austin asked why CDEX wasn't more interested in this – to which Eguchi responded they are. However, all video groups to date have been Japanese organizations, and focused exclusively on the local market. Given asked who knew about these observatories? Austin answered that he knew but he didn't hear anything otherwise about it.

Given asked if the borehole instruments were connected to DONET and did the science community know this? Toczko replied that some borehole data are available from a website run by Demian Saffer (Penn State Univ.); the link is in the Scientific Prospectus and *Proceedings*. This website shares pressure data from Site C0002 data. Toczko also said the DONET website also provides borehole observatory data; raw data are available. Given said discussions on getting subseafloor real time data have been going in for the past ten years, and now we seem to have achieved this. Given understood that part of the problem lies with website design and layout. Toczko agreed and added that Saffer's group webpage is quite nice with search capabilities, but the problem is that there is not enough infrastructure support to manage all the data coming out. Toczko said it would take money to hire a professional to design such a website. Given commented it would be exciting if we could get access to the real-time data, but people can't find through the CDEX website.

Eguchi added that use of the Science Media was the first time to use foreign company. Eguchi understood that these videos were targeted at people outside of Japan while *Chikyu* TV, created by Japanese companies, had limited appeal, and only really within Japan. Ildefonse said he feels CDEX needs to better manage languages, Japanese and English when advertising *Chikyu*, providing the example of the *Chikyu* twitter account: the last six tweets were all in Japanese. Given mentioned that it is not in the SSO mandate to support IODP outreach on the webpage. Ildefonse added there wasn't as much news about T-Limit as Chicxulub, and that we didn't know about the limits to life on this planet, and there were a great number of interesting stories that needed to get out.

The Chair closed the discussion and asked for the KCC report.

12. KCC Report (Tsuyoshi Ishikawa)

Note: Presentation order was changed from the original 14 on Day 2 to 12 on Day 1.

(16:26 h.)

Tsuyoshi Ishikawa presented KCC tasks (core storage management, sample requests evaluation, sampling plans for *Chikyu* IODP expeditions, organizing sampling parties, sample data management, and education & outreach). The curation of core materials in KCC includes legacy core from DSDP/ODP, and from non-IODP expeditions as well. Based on the geographical model, KCC is in charge of cores taken from the western Pacific and Indian Ocean, with just over 121 km of cores stored in KCC as of February 2017. He said core material was divided into three types: 1.5 m long core sections, 10 cm long microbiological whole round (WR) samples for deep biosphere study, which are saved at -80ºC, and cuttings samples from *Chikyu* riser drilling operations, which are saved at +4ºC at ~80% humidity. KCC follows the IODP sample data & obligation policy implementation plan.

Ishikawa mentioned they received many more sample requests than the previous year especially because of Exp. 370. Ishikawa said the number of shipped samples in 2016 was the most in KCC history, related to the Exp. 353 sampling party at KCC. There were about 75 IODP-related visitors to KCC.

Ishikawa showed some photos of the Exp. 370 onshore party; the cores taken onboard *Chikyu* were delivered by helicopter and shipped to KCC immediately so that onshore science party could begin detailed observation. Ishikawa also introduced the KCC symposium held on 15 October, which featured Fumio Inagaki in an internet broadcast from *Chikyu*. There were 1,055 viewers, including young students, and there was very good interaction with the audience.

Ishikawa said that KCC has cores from JR (Exp. 356, 359, 362, and 362T) and *Chikyu* (Exp. 365 and 370) in 2016, and they expect to receive cores from JR (Exp. 361, 356, 366, 363, 367, 368, and 371) during this year (2017).

Ishikawa introduced a new database for IODP core samples, and said it was much easier to find core samples than before, since now image data comparison is available.

Ishikawa said they regularly hold education and training for Japanese IODP expedition participants and also support the J-DESC yearly core school. For young Asian scientists, another science program was created, and four participants came from Myanmar. Ishikawa also said that some logging equipment, such as XCT scanner, have been opened to the IODP community outside Japan.

Regarding further actions, Ishikawa said that KCC had some budget problems for curatorial activities, so KCC needs to streamline or simplify activities, transfer some legacy cores from the old to the new reefer, promote the utilization of DeepBIOS cores with the science community, and discuss how to deal with the Nagoya Protocol.

Ishikawa gave a quick brief of the Nagoya Protocol, and then talked about how to implement access and benefit-sharing (ABS) measures for future IODP expeditions on *Chikyu*. Ishikawa talked about two documents being prepared; one is the Prior Informed Consent (PIC). This is not required when providing Japanese genetic resources outside Japan, but CDEX/JAMSTEC will seek PICs from other countries when required. The other is the Material Transfer Agreement (MTA), which CDEX first implemented for Exp. 370, and was also used for KCC sample requests. Lastly, Ishikawa explained KCC preparations for the coming year.

Given asked if outsiders can use the analytical facility. Lallan Gupta explained that after receiving requests through SDR, as this is a national facility, using it is free of charge; however, schedule of use and period needed have to be negotiated. Ildefonse asked if this facility is free when used for activities outside IODP. Gupta answered these are free as well.

The Chair confirmed there were no comments and closed the meeting for Day 1.

18:30- Reception

Day-2 Thursday, 16 March 2017

13. *Chikyu* Proposals (update and discussion) (Chair - Tatsumi)

Note: The order was changed from the original 12 on Day 1 to 13 on Day 2.

a. *Potential Chikyu Proposals at CIB and SEP*

b. *Recommendation for Future Chikyu IODP Window*

(08:53 h.)

The Chair began with the section of potential *Chikyu* proposals. There are many proposals listed and the chair asked Eguchi to explain them to the members.

Eguchi began explaining the list of *Chikyu* proposals currently at CIB and SEP. There are 10 *Chikyu* proposals at CIB: two CRISP (537-CDP7 and 537-Full4), three NanTroSEIZE (603-CDP3, 603C-Full, and 603D-Full2), one IBM (698-Full3), two Hikurangi (781-MDP and 781B-Full), one Japan Trench Tsunamigenesis (835-Full), and one Lord Howe Rise Continental Ribbon (871-CPP2/Add). Eguchi said JR would conduct the first Hikurangi project in May 2018. Eguchi explained that CDEX has established project coordination teams (PCTs) for CRISP, NanTroSEIZE, and IBM. Eguchi would share more details when they discuss the LHR later during the meeting.

Eguchi introduced the other *Chikyu* proposals at SEP as follows: KAP (707-CDP3) which is a combination *Chikyu* and JR proposal (only the umbrella proposal stays at SEP), the Indian Ridge Moho (800 MDP), which was partially completed by JR two years ago, but still remains at SEP, the umbrella proposals of MoHole to the Mantle (805-MDP) stays at SEP, DREAM riser operation (857-MDP2) was deactivated two years ago at SEP, two Bend-Fault proposals (876-Pre and 886-Pre), which will be explained a little bit more later, and the Fore Arc Mohole-to-Mantle (898-Pre) which is at SEP. These are all the proposals on the table for CIB from SEP.

The Chair asked the members to consider which project should be recommended for the IODP window over the next four years. First, the Chair mentioned that CIB would like to recommend Exp. 380 for the 2017 IODP window as was discussed during the previous video meeting. The Chair asked for confirmation that the CIB members have consensus on this. The Chair then asked Toczko to give a brief presentation on Exp. 380.

CIB_Consensus_0317-04: IODP Exp. 380.
The CIB endorsed IODP Proposal 603D, NanTroSEIZE shallow riserless LTBMS, for *Chikyu* IODP Exp. 380 that will be scheduled in October - December 2017.

Toczko described the concept of Exp. 380. Toczko said that *Chikyu* IODP Exp. 380, proposal 603D, NanTroSEIZE shallow riserless LTBMS, scheduled from 23 October to 5 December 2017. Toczko said the call for application had already been sent to PMOs on 24 February 2017. Toczko explained that the main purpose of this expedition is to deploy an LTBMS at the accretionary toe, originally with Site C0007 as the primary site and Site C0006 as the secondary site. Toczko showed 314 LWD/Logging unit data depicting sandy formation, correlated with core sampling results from C0006 from Exp. 316. Toczko showed the planned drilling sequence for Site C0006.

Eguchi asked Toczko to explain the TAT discussion/suggestions and explain why screened casing would not be used. Toczko said that the target area was completely fractured and it just needed to be isolated from the seafloor, but there was a formation "sweet spot" for the sensors to aim for. Toczko discussed the results from the December PCT meeting where the consensus was that logging would be nice, but is not actually required. Eguchi asked Becker to confirm that there are no major differences found from the previous data as Toczko said that sweet spot was about 100 m. Becker agreed with the target zone, and again talked about the TAT recommendation to include LWD, if possible. Becker (and the TAT) agreed with the PCT's decision, however.

Toczko talked about DONET and its' relation to Sites C0006 and C0007. The DONET cabled network has a cable and "Node C" close to the drilling site. Because of the close proximity of the cables to the proposed sites, CDEX was currently negotiating with DONET to drill at Site C0006, considering the worst case would be that one of the secondary cables could get severed; a seafloor survey would help pinpoint the cable locations. These considerations made Site C0006 superior to Site C0007, especially that no LWD data were collected at the latter site. Additionally, Site C0007 was far too close to the cables, in any case.

Toczko discussed the plans for the concurrent workshop, details and outline (workshop and fieldwork at sea). Toczko basically said that the workshop was a weeklong activity, with the benefit of having the "fieldwork" in the Chikyu labs for three weeks, examining and sampling Site C0006 & C0007 cores, and C0006 LWD data. Toczko said that this program is aimed at early-career and young scientists. Toczko mentioned that important factors to consider are the JAMSTEC/CDEX HSE regulations for helicopter transfer to/from Chikyu. This requires helicopter underwater escape training (HUET) certification for 2 to fewer

flights per year, and this means OPITO certification. Some of the PMOs, Toczko said, are supportive of this, and negotiations are underway to determine the level of support available.

Becker liked the idea of the workshop, but asked who would be in charge. Toczko answered that Kimura would be onboard as leader. The Co-chiefs, Harold Tobin and Masataka Kinoshita could assist, and Eiichiro Araki would be on board as well. van der Pluijm also liked this idea, and wondered if it would be practical to target post-doc or junior faculty, because they probably would have the scheduling freedom, and van der Pluijm also felt it was important to engage students aggressively by giving them a chance and to get them involved in the system for the future.

Camoin thought he would approve this proposal and asked how many slots were available and how would participants be selected. Eguchi answered there was room for 10–12 in addition to the Exp. 380 scientists. Camoin asked again about how selection would be handled. Eguchi answered that they might ask applicants to submit research plans based on what kind of materials and data available onboard, and the NanTroSEIZE PCT could review them for selection.

Ildefonse said he was not sure if he would agree or not, because he thought it would be probably fair enough to have NanTroSEIZE post-cruise activity. However, it might be difficult to get such an opportunity and participants would help with evolving science.

Jin-Oh Park asked about the recruiting target for this challenging activity, and who would help narrow it down? Toczko answered that CDEX were working with the NanTroSEIZE PCT, and CDEX was still refining whom to invite. Given said that there is a restriction on senior graduate students in the academic year for some places. Given also asked what the goal of the workshop was; focused on training or publications. Toczko answered that publications are the chief goal. Given also asked if applicants should already have been involved in related research. Toczko said this was not necessary: Eguchi also said that this is really a challenge and even they (CDEX) were wondering who would apply. Given said that this was a way to do more marketing. Ildefonse suggested that while some students might be working on this course, the rest of them might be going to work on the core few years later inspired by this adventure at sea, of which he suspected there might be

a few. Camoin additionally suggested that we should announce this and have it done very quickly.

Gaku Kimura briefed the CIB with more details of this project. The expedition itself would only comprise 40 days of mainly engineering operations. The real/actual engineering operation results would be the observatory sharing data through DONET, and the current status of DONET includes borehole observatories at C0010 and C0002. Kimura said the new observatory would be a great advance, and data would be accessible to the public. Kimura mentioned the huge amount of data produced so far, and spoke about the impressive paper published about the fault zone. Kimura mentioned that there have been few papers describing the geology and geophysics for these sites even though basic descriptions were completed. After the Tohoku earthquake, concerns about large tsunami in Nankai were revived, so all the integrated data produced from this proposed workshop would be helpful. Kimura was confident that getting many young scientists to look at borehole observatory data, combined with logging data and core samples would help produce exciting new science, so this program is very exciting. Kimura said that basic discussion on the programs' structure is already finished and data integration is what he expects students, young career scientists, and specialty staff to be working on together for 40 days. Kimura admitted that there are still some difficult issues, such as logistics, choosing applicants, and balancing applicants and disciplines. However, Kimura emphasized this would be a new kind of collaboration and activity, and expected that during the next PCT meeting in May, the program will be fully refined.

The Chair said probably all CIB members understand the importance of this workshop. Kuramoto said that they needed to consult with the PCT about this workshop to discuss using DONET data in real-time, experiencing work at sea aboard *Chikyu*, and better defining the program goals before the expedition. These are some of the things CDEX will be asking the PCT about.

The Chair asked the CIB members if they would like to encourage this challenging program. Ildefonse asked if the CIB should officially support the workshop proposal. The Chair said yes. Camoin asked about the timing for application. The Chair said timing was very tight. Eguchi said it would be announced in one week or two.

The Chair asked CIB members once again to confirm if CIB would like to encourage this workshop proposal.

All agreed.

CIB_Consensus_0317-05: WS/Field work at Sea.
CIB encourages the presented ambitious plan of workshop/field work at sea during Exp. 380; the call for application should not solicit only graduate students but should also be open to post-doc, young, and early career scientists.

The Chair then talked about some items for 2018. The last CIB consensus endorsed riser operations at Hole C0002F in 2018. Chair Tatsumi reminded everyone that the day before, CDEX showed its' efforts in getting funds to implement this project. Funds were still not fully sufficient but funding was being sought, so the Chair asked the members to discuss if the 2018 IODP window should be opened for the C0002F riser hole project.

Mori asked if there were any other options than the riser operation. The Chair answered that there were three other riser proposals and one non-riser proposal. Mori asked if there was space for JTRACK to come up or not. van der Pluijm suggested focusing on riser options first, and then if they didn't work, go to the JTRACK discussion. Ildefonse asked if there was enough time to do C0002F, are the resources available, would this complete the NanTroSEIZE project, or would there be another step to go? Mori said that we should be clear on the target, and said NanTroSEIZE needs to deepen the hole by at least 1,000 m. Becker said that TAT members saw the reprocessed 3D data, which seemed to show the new targets. Eguchi said a presentation on this subject was ready. The Chair asked Kimura, who Eguchi identified as one of the PCT chief project scientists, to give his presentation.

Kimura began his Site C0002 overview. Kimura said *Chikyu* had 10 years drilling NanTroSEIZE, a project of high social relevance, which became extremely more so after the Tohoku Earthquake. Kimura said from the beginning, an early warning system was wanted. Kimura acknowledged that the budgetary realities are quite difficult, which help make this project seem to be a never-ending one. Kimura's suggestion is that one possible solution is to complete Hole C0002F to as deep as possible, with complete logging, coring, and install an LTBMS. Kimura said we

could declare victory after this operation, and we could preserve the plate boundary target for a possible future Japanese CPP, which would allow requesting more funds from the Japanese government. Kimura showed the original targets, then the reprocessed 3D seismic data, comparing the 2016 vs. 2006 processing. Kimura described the reprocessed 3D seismic data as being much clearer, with a greatly improved 3D profile. Even so, Kimura said we are still a few kilometers away from the primary target, and this being too expensive to accomplish, so the target was modified to target the high velocity zone (more than 5 km/s) within the hanging wall. Kimura said we could learn the current status of this hanging wall portion, measure *in-situ* stress, pore pressure, and material process here, if we could reach this target and get samples. Kimura ended by mentioning that this was the strategy to support NanTroSEIZE as the next riser drilling target.

Allan asked about the error bar on the velocity model. J. Park answered that was a new velocity model, and that the first impression is that this was more accurate. Camoin asked, as a non-specialist, what the target was here, 1,000 m or 500 m, and what was needed to reach the significant velocity changes. Kimura answered that maybe it would be important to get the high velocity portion, which probably is storing strain. Camoin then asked if we need 1,000 m to reach it. Austin said we should make sure that we have the science goals that you need to answer the questions, and use that as your value to "declare victory". Austin said that it's clear we need to drill deep enough to get it.

The Chair asked Kimura if drilling would stop once reaching the orange high velocity area, to which Kimura said yes. The Chair asked Kimura again if he would like to continue this project beyond this expedition since the final goal is the plate boundary. Kimura said theoretically "yes" because he understood it's difficult to continue operations in a much narrower hole. Kimura said it would be great if we could at least reach the target in the hanging wall, which would lead us to propose a new project to do new science in a new hole. Ildefonse commented that part of his question was answered here, and in the time you think you have, can we do this. Ildefonse said his understanding was to go as deep as possible, since there was no clear "boundary" or target between 3–4 km or 5 km., so he asked how much drilling could be done in the time allotted. Eguchi answered that CDEX had started scoping this deep hole, and in the time allowed in this window, he said we could reach 4200 mbsf, more or less. Ildefonse said this had been scoped, and you had a plan to reach, on here, from the sea level, it's just over six kilometers.

van der Pluijm said he knew structural geology, and didn't think this was the way to end the project with no real geology to find. van der Pluijm said that you wouldn't learn more in the 1000 m that you didn't already know; he commented "it's pity that we're saying, we got really close, but we didn't reach it", and that was a downer. As devil's advocate, van der Pluijm questioned this being the best use of our time and money, and suggested that we should decide very carefully.

Becker said that a counter point was that the ultimate goal was to place the instrument to the hanging wall and footwall, however, this would be very difficult to do both in one hole here. He commented that you could get the hanging wall first, come back and get the footwall later maybe with the CPP or something like that.

van der Pluijm disagreed by saying his point that we couldn't declare victory if we don't get to where we wanted to go. Ildefonse asked if it really makes sense to go one more kilometer and install the LTBMS. Mori said that key would be getting to where there is not a lot of structural "mess". Mori also said one really important thing would be going to another 1000 m deeper; it would be good enough to measure strain, with a good observatory, and that would be a huge difference by getting data twice as close to the target. Austin commented that these are the arguments you need; getting closer for strain measurement was an advance argument, and quantifiable and objective goals needed to be spelled out.

Ildefonse said that if equipment needs to be installed, how much/long is needed to do this. Toczko asked if this just covers installation. Ildefonse rephrased to ask how long it would take for a minimum riser operation. Eguchi answered that this would make things easier, but scientists want core, if we start to run out of time, we could sacrifice coring for an extended TD. Ildefonse asked about the case just to install the LTBMS at the current depth. Sawada said this would take three to four weeks. Eguchi added that riser pipe & BOP connection would take two weeks (after confirming with N. Kyo), and therefore it would take 2.5 months in total. Ildefonse commented that not going 1 km deeper might be a better case to use available time and money resources. Austin said that a case needs to be built for coming back, so you need to be in the best possible place to do so. Austin suggested going for the hanging wall target, then come back with a CPP in a clean new hole. Austin said that Mori 's argument regarding strain measurement was a great one, but he also said that this argument was not about time and money, it's about science.

Kimura said the primary goal here is science, but to reach the plate boundary would take three times the budget on hand. Kimura agreed that even getting simple pressure measurements had been converted to strain and showed very good data by Achim Kopf and his group. Kimura said this showed a good path towards getting important data even from a shallower target, and would allow reopening the argument to go deeper. Kimura said that now we knew the temperature there was quite high, around 120°C. Kimura said only pressure measurements were possible with this shallow configuration, and it's quite important to know what is going on in the fault zone. Kimura again mentioned that we could invite more money in the future to re-open the hole to reach to the final target.

van der Pluijm asked if we do this, we would be locking *Chikyu* in for the next 5-years, and wondered it was positive or negative for proponents. van der Pluijm said he was not for or against this, rather he agreed we should go deeper. However, van der Pluijm also believed that the new phase should also be something new. Mori said if we decided not to do it, this would be on the table regardless, and also said that not doing it now would not solve the issue as you mentioned. Ildefonse said if he were a proponent, he would want to return to the system. van der Pluijm said we were like Moho people now, but we should remember that we do have alternatives, so this discussion was a big step.

The Chair asked CIB members if they agreed about this project. Austin asked if the money was available. Eguchi answered that the money on hand (31M USD) would need to be spent by the end of 5-year term, 31 March 2019, as Yano presented on Day 1. He added that CDEX needs to gather more money from other operations including commercial options and other opportunities.

The Chair asked the group if we could endorse the C0002 riser project for the 2018 IODP window, then JAMSTEC should prepare the money for it. Camoin asked if the pink scheduled option was already decided. Eguchi explained that they still had not included those other options, so there should be more opportunities. Ildefonse asked to confirm if the plan was minimum or maximum. Eguchi said it was maximum for the long term and some more opportunities.

van der Pluijm asked if the CIB should be looking at other options, since there's no consensus yet. van der Pluijm then asked if we should discuss these options,

commenting that he would be disappointed in ending NanTroSEIZE here, like this. Ildefonse asked if this was the only riser operation proposal. The Chair said we have a non-riser candidate to consider as well. He explained that in the last meeting, we decided that the next riser would be NanTroSEIZE, so he suggested getting into this after discussing riserless options.

Eguchi talked about available non-riser proposals, saying JTRACK: 835-Full is the only thing in the hopper. van der Pluijm asked for a summary. Mori briefly explained that there were good results from JFAST drilling the fault, but this was just one site, and more coverage, or transects, is needed. The project wants to confirm frictional properties and compare them to places where there was no large slip. Clements asked the length of the drill string. Eguchi answered that for JFAST it was around 7,900 m.

Austin commented that SEP likes this and wondered what will put *Chikyu* in a good place for the new program? Austin asked which is better science; Nankai or JTRACK? Austin asked CDEX if they could do JTRACK in the allotted time. The Chair asked Kuramoto to comment. Kuramoto said the operation would be possible, but even though the last great Nankai Trough earthquakes happened nearly 80 years ago, the Tohoku earthquake had a huge impact on science and the public. Kuramoto said that's why public focus is back on the Nankai region. CDEX would prefer riser drilling than riserless. Ildefonse commented that this tells him that the Nankai riser drilling would be better for renewal, since that was what *Chikyu* was designed to do.

The Chair asked if there were any other comments.

Becker commented that this was related to non-riser drilling, and he reminded everyone that a shorter version of the T-Limit project was endorsed last year. Becker said he hadn't seen anything about other site of this proposal yet. Eguchi did not have a lot to add, but said T-Limit proposal had two sites: 11-74 was done, but the 11-73 portion remained. Becker said so this option is in never-never land. Kuramoto explained that we needed to confirm the bottom-hole temperature, as well as the life limit confirmation first before continuing. The Chair asked if the group were ready to form consensus about C0002 riser drilling in 2018.

Mori said that we should go for the riser option, which was what *Chikyu* was designed for; therefor Mori supported the choice to go for riser drilling. Austin said

Chikyu was also sold to get into deeper water than JR could do; but you don't want to get into a corner. Austin said that JTRACK was a unique option for *Chikyu* to have on the table, and it is also great science.

The Chair asked Ildefonse to prepare the consensus statement by this afternoon. Camoin said the case for science needs to be clearly stated. Becker reminded everyone that Mori stated that the extension would get us much better strain in the hanging wall. Austin said measuring strain, drilling deeper, and installing the LTBMS.

CIB_Consensus_0317_06: Deepening C0002 Riser Hole.
The CIB endorsed IODP Proposal 603, NanTroSEIZE Deep riser drilling at Site C0002 for Chikyu IODP operations to be scheduled in the Nov. 2018 - Mar. 2019 time window. C0002 operations include logging the deep accretionary prism, sampling the hanging wall, and installing a borehole observatory to measure strain and stress near the plate boundary and observe fluid properties of the Nankai plate boundary. The CIB recognized that deepening the current borehole C0002 to about 1000 m below its current depth will significantly improve the observations in the hanging-wall of the plate boundary. The observatory will be installed in a higher velocity unit as indicated by recent re-processing of 3D seismic data, and a monitoring location closer to the plate boundary fault will enable more sensitive measurements.

The Chair called for a coffee break at 10:15 hrs.

c. Lord Howe Rise CPP Project (Sean Toczko)

(10:45 h.)
The Chair asked Toczko present the Lord Howe Rise CPP.

Toczko briefly reviewed the Lord Howe Rise deep drilling project, drilling through Cretaceous formations to basement in a continental ribbon, the Lord Howe Rise. Toczko showed the three IODP themes (Earth, Oceans/Climate, and Life) related to the project. Toczko talked about how recent surveys have revised primary site choices due to deep drill-site target prioritization. Toczko said that JAMSTEC and the Australian Government (Geoscience Australia) are working on pre-drilling site surveys; one was completed in May 2016, and another is scheduled for this November and December. Toczko said this project will be a collaborative effort funded by the Australian government and JAMSTEC.

Nishi asked if the Cretaceous sequence includes the K-T boundary or not. Heap replied that the main goal here is reconstructing the ribbon's history.

The Chair asked if there were any questions and confirmed no, and thanked Toczko for his presentation.

(10:53 h.)
The Chair asked Eguchi to tell the history of this proposal. Eguchi provided background information of the LHR proposal and workshop process. The original proposal was submitted in October 2014 and was constantly updated since this was a riser proposal. CIB endorsed the workshop in 2015. Based on the workshop discussion, the proponents submitted a full proposal. SEP reviewed it in 2016, and requested revisions. As Toczko mentioned earlier, the first site survey was conducted, and this data was included in the revised proposals. SEP reviewed it and happily sent it to CIB rated "Excellent".

The Chair asked Heap to excuse himself, and the group began discussion on whether this should be designated as a *Chikyu* project. Becker wanted to confirm what this meant, "designating as a *Chikyu* project". Eguchi said this was a slightly different category in CIB: riser proposals (CRISP, IBM, and NanTroSEIZE) are designated as "*Chikyu* projects" at CIB, and then a PCT is formed. Hikurangi is at CIB but no PCT has been formed. Eguchi said the CIB needs to decide if a PCT should be created for the Lord Howe Rise project. Becker wanted to confirm that the CIB had not yet created any PCT for CRISP or IBM? Eguchi said there were, but it's a different discussion point.

Allan asked how much time is needed to set up a PCT? Eguchi answered as soon as possible. Becker asked if CIB should discuss creating a CPP *Chikyu* project. Eguchi answered that unlike *JR*, a *Chikyu* CPP basically covers operation costs, but not basic costs as shown in Agenda Item #9 (Yano's presentation). Ildefonse wanted to confirm that we would be allocating resources to start scoping, and Eguchi agreed. The Chair asked if the CIB members were happy with designating the Lord Howe Rise as a *Chikyu* project. Becker agreed, saying this would help raise CPP funding. van der Pluijm said that what complicates things here is designating a new riser drilling project after we said we would not be doing so. Camoin said yes, but there was an exception for CPPs. Austin asked if the CIB would choose the PCT members. The Chair said that this would be the next step.

CIB_Consensus_0317_07: LHR Project.
The CIB designates IODP Proposal 871-CPP "Lord Howe Rise Continental Ribbon" as a "Chikyu Project".

Eguchi briefly explained the working structure between the Australian Government (Geoscience Australia: GA) and JAMSTEC regarding LHR before going on to discuss PCT members. There are five agreements (Four completed, and one pending). CDEX will contribute a team and GA will do the same; Eguchi said the science members should be decided jointly, with CIB support. Eguchi said the first meeting was held last month; it would be held every two months, with weekly telecons. As Toczko mentioned, the first site survey (JAMSTEC conducted) was completed, and. GA would conduct a geotech survey in November–December 2017.

Eguchi continued presenting the GA/JAMSTEC consensus items. Eguchi said that normally, the PCT does not have a budget management function, but this PCT will, as per GA insistence; the PCT itself should include four scientists, four CDEX representatives and two GA management personnel. Eguchi said that the Lord Howe Rise PCT SOW (scope of work) was not circulated within the CIB yet, but would be next week, and Eguchi showed slides for general terms of reference (each PCT has a SOW; available as downloadable pdfs) and also presented GA's suggested member candidates. Eguchi added CDEX proposed alternates for the Japanese members. Given and Ildefonse asked why CDEX was supporting candidates different from GA's suggestion. Eguchi explained that these members were all JAMSTEC personnel, and CDEX would prefer people from outside of JAMSTEC; therefore, ended up with flipping Marco Coolen and Fumio Inagaki, and added Junichiro Kuroda. Given pointed out that this eliminated the sole Australian female scientist. Becker asked what GA thought about this. Eguchi said that he had already talked about this with Heap and that would be a discussion for CIB. Eguchi also said that lead proponent Ron Hackney knew that the CIB had a final call on membership. Becker mentioned TAT's recommendation—highlighting the value of a stratigraphic model. Eguchi replied that those people might cover that part, and would bring this up at the next meeting with GA in April.

The Chair asked the group if there were any further comments before agreement could be made. Eguchi reminded the group that the list of PCT member candidates (CDEX's suggestion) had been discussed with Heap. The Chair asked if Eguchi expected that GA would accept the CIBs' suggestions. Eguchi replied that should be fine with them, and he would speak to them about it tomorrow morning. The Chair checked if GA would be happy if the CIB agreed on membership. Eguchi replied if they did not agree, he would bring that back to the

CIB. The Chair asked the group if there were any comments, and Ildefonse commented that it might be better to replace the Japanese JAMSTEC scientist (microbiologist) with a non-JAMSTEC scientist. Eguchi said that finding someone to replace Inagaki would be difficult.

van der Pluijm asked if the CIB couldn't wait until tomorrow for GA's feedback and then make a consensus statement? Ildefonse wondered if it was important to clarify the backup people. Eguchi answered yes, because CDEX needs the CIB to designate them as alternates. Ildefonse pointed out the gender balance would be important as Given mentioned earlier, and suggested switching the climate people (Junichiro Kuroda and Jessica Whiteside) so the female scientist would be the primary. Eguchi agreed, saying that there was no confirmation from Kuroda yet, and he may still decline. Austin suggested letting the two parties sort this out; make an agreement on creating the PCT first, and then let the CIB sort this out after the agreement is settled. Ildefonse said what about first forwarding the CIB the approved membership and if that came back to us, the CIB would approve with no videoconference needed. The Chair told the group that they could communicate the details later by email. Eguchi said that the CIB could just establish the PCT, saying: "Create the PCT".

CIB_Consensus_0317_08: LHR Project Coordination Team.
The CIB creates a Project Coordination Team (PCT) for the LHR project.

Membership will be;
Science Representatives (*italics* are alternate member):
Lead Proponent: Ron Hackney (GA),
Earth theme: Yasu Yamada (JAMSTEC) & *Sanny Saito (JAMSTEC),*
Oceans/Climate theme: Kliti Grice (Curtin Univ., Perth) & *Junichiro Kuroda (Univ. Tokyo),*
Life theme: Marco Coolen (Curtin Univ., Perth) & *Fumio Inagaki (JAMSTEC)*

Additional GA representatives:
Andrew Heap
Jessica Gurney

CDEX representatives:
Kan Aoike
Nobu Eguchi
Tomo Saruhashi
Take Yano

The Chair said we would move to the next item at 11:23 hr.

d. Bend Fault Serpentanization WS report (Nobuhisa Eguchi)

(11:25 h.)
Eguchi discussed this workshop, approved by the last CIB, and conducted on 19–21 June 2016 in London. Eguchi said the currently relevant proposals are 876-Pre Bend-Fault Serpentinization, and 886-Pre NW Pacific Bend-Fault Hydrology, and both were still at SEP. Eguchi commented that these were in the agenda book, and added that 876 is ultra-deep drilling. Ildefonse commented that this was before you told us no more non-CPP riser drilling. Eguchi said that this workshop was disappointed by the CIB message that, except for CPPs, that no more riser operations were being sought. Ildefonse added that the workshop participants tried to figure out how to get the maximum science here with riserless drilling.

The Chair decided to adjourn to a small meeting of the CIB members for about 30 minutes in the next room.

The main gist of this breakout was to nail down the CIBs decision regarding the current riser proposals: CRISP, IBM, and Hikurangi. Furthermore, what would the official CIB stance be on requesting new riser proposals? Ildefonse wondered why, if this was not a confidential meeting, were we meeting in a separate room? Eguchi replied that this was just to streamline discussion, and all items discussed would be brought to the entire meeting's attention.

The Chair suggested that not only CPPs, but all kinds of riser proposals be accepted. Becker agreed that this was needed, but Camoin wanted to confirm that this would help renewal. The discussion moved on to the messaging, and how this should be crafted for an *Eos* advertisement, that would create hope and not confusion. Eguchi and the Chair suggested that messages be sent to the proponents of the current riser proposals for addendums and updates be forwarded to SEP. van der Pluijm wanted to ensure that all proposals get treated on an equal basis, and suggested that the Hikurangi proponents might think that they are next in line.

All agreed that Lord Howe Rise be scheduled, but as van der Pluijm suggested, they do not get a sliding window to fit into the drilling schedule whenever they want. The Chair confirmed that the 2020 IODP riser window be reserved for the Lord Howe Rise CPP.

(11:30–12:00 h.)

14. Long Term Strategy for Future *Chikyu* Implementation (All)

Note: The order was changed from the original 13 to 14 on Day 2.

(12:02 h.)

The meeting resumed after the short breakout session. Becker said that the CIB knows that the Chair (Tatsumi) is an IBM proponent, but decided he was not in COI. The Chair reminded everyone that for riser proposals there are a few things to consider. Mori noted that the CIB was supposed to science rank these, but since they've already been ranked, maybe this was not a great idea. Mori also said if these get sent back for rescheduling and re-ranking, the CIB would have to explain why, and this would not be very constructive.

The Chair asked if the science needed to be updated, if the proposals' needs updating. The Chair suggested asking proponents to send addendums to SEP by 1 Oct 2018 and see if the CIB can discuss these after the SEP review. Given said that the CIB's message to SEP is important, since otherwise, SEP may try to start from zero again. The Chair wanted to clarify that the CIB would be asking for science updates from drilling results; however, what about for riser proposals? Both Given and Ildefonse agreed that clear direction to SEP should be given, especially how the outcomes from JR riserless drilling affects the riser proposals. Allen suggested some direct communication with the SEP chairs Gulick and Miller, to see the best way to approach this. Allen warned about getting too deep into details; for example, for CRISP, the whole strategy may change. Allen suggested that the SEP might pleasantly surprise the CIB.

Ildefonse said the CIB needs to let proponents know that there are new things that require riser proposal revision. Given mentioned that since the SEP membership has changed, sending these back for revision could have different results. Becker added that the CIB needs to identify items for the next 5-year term. Austin agreed saying they need clear "instructions".

Michiko Yamamoto asked if the CIB wants a Proponent Response Letter (PRL), if there isn't any new site info. Eguchi said if updates are needed, and a PRL is better, let's do that. Given agreed, saying, that this is the new system. Ildefonse said even so, some of these proposals may need revision. Becker wanted to clarify who the updates should be submitted to? The CIB? Given suggested the

CIB ask SEP to comment on the updates. Austin pointed out that in the case of Hikurangi, there are two Hikurangi expeditions with four co-chiefs, showing that more information is needed from just one expedition alone. Becker suggested that maybe this should be submitted to the CIB.

van der Pluijm said that there should be new pre-proposals, and there should be a distinction between these. Allen suggested keeping the JRFB and the SEP chairs included and not the whole membership; this may be a way of minimizing potential problems. The Chair decided to ask proponents to update science, and submit addendum to the CIB. The Chair wondered if the SEP chair would be able to assist the CIB. The deadline should be based on the SEP schedule, 1 Oct 2018.

Given wondered what would happen if the situation were overly complicated? van der Pluijm said the CIB should handle it. A brief discussion on formatting was held, with the result that the CIB would rely on SEP to create a format – if needed.
Clement was curious as to what CIB would do with this information, and the Chair replied that this would guide planning for the next 5-year session. Becker suggested writing a general consensus and then finish the details later. van der Pluijm again said we should encourage new riser pre-proposals, which the Chair agreed with. There was some concern that there may be confusion between pre-proposals and SEP-approved proposals, but Given said this should be clearly understood. van der Pluijm and Ildefonse wanted to make clear that CIB is setting a path to riser work beyond NanTroSEIZE.

CIB_Consensus_0317_09: Proposal update.
The CIB will ask proponents of three riser proposals (CRISP (537), IBM (698), and Hikurangi (781)) to submit updates to the CIB by 1 October 2018 based on new results and drilling operations for further assessment of those proposals at the CIB. The CIB will contact the JRFB chair and the SEP co-chairs for potential involvement in this process.

CIB_Consensus_0317_10: Call for new riser pre-proposals.
The CIB recommends a change in the next IODP call for proposals. Currently, only CPP's are being considered as new riser proposals. To encourage exciting new riser projects for current and future IODP consideration, pre-proposals for new projects will be solicited. At its 2018 meeting, the CIB will resume its evaluation of any riser pre-proposals forwarded to it by the SEP.

The Chair called a break for lunch at 13:00 hrs.

LUNCH

(13:29)
The Chair began the afternoon session with the LHR CPP scheduling. The Chair mentioned that CIB had designated this as a *Chikyu* project and that this could be a candidate for the IODP window near the end of 2020. The Chair recognized that tentatively fixing the schedule was essential to get GA funding. The Chair said this had been discussed in the side meeting, and recognized that this LHR CPP should be the candidate in the 2020 window if the funding was soon available. The Chair asked for comments.

van der Pluijm said that we should go on record as identifying this for the IODP window in 2020, but the CIB should not automatically approve other times or scheduling.

The Chair asked for any other comments. There were no comments, so Heap was called back to the meeting room.

CIB_Consensus_0317_11: **Scheduling Lord Howe Rise Project.**
The CIB applauds the efforts of the proponents of IODP Proposal 871-CPP Lord Howe Rise to obtain CPP funding for the project. The CIB recommends this riser operation be scheduled during the available time window in 2020, on condition that funding is available. This window will not be automatically extended without CIB discussion. The LHR PCT will work to ensure that the 2020 IODP window is met.

15. Safety Review Committee Update (Shigemi Naganawa)
(13:32)
Shigemi Naganawa presented the 2016 drill pipe drop incident. Naganawa told the group that after the fourth CIB meeting, two *Chikyu* safety review committee and three drilling sub-committee meetings were held. Following CIB recommendation, Naganawa said that they discussed a detailed technical investigation, analyses, and simulation to specify the causes.

Naganawa explained both #12 and #13 tests and said that although the incident occurred during #13 test, the cause was actually estimated to have occurred during test #12. Naganawa also explained the technical causes, which CDEX analyzed; there were three technical causes. One was a fracture propagation process from surface observation. After some tests, they found that total number of repeated stress was estimated as 3×10^4 from numerical simulations which matched well with the results of material testing and crack propagation analysis.

The second was the torque record, showing that micro cracks were believed to occur during high pipe rotation. The third is heat effect, where CDEX observed changes in composition and the strength of pipe material from the heat effect in the surface layer of the pipe section in contact with the insert bowl.

In addition to these technical causes, Naganawa also pointed out two root management causes. One was the evaluation test plan and procedures. Naganawa said that CDEX should have carried out the test much more carefully with enhanced safety measures and greater crew accident prevention awareness. Second, was requiring safety evaluations of the equipment technical test. Naganawa said CDEX should have included risk communication among the participants onboard, including the crew, and should have reminded them of the importance of precaution.

Naganawa summarized the committee's recommendations:

- More direct communication with crew so that they can be reminded to follow the general safety rules.
- Improve safety evaluation workflow to evaluate engineering development tests and training cruises in the same manner as scientific drilling.
- Share knowledge and findings with the public and related industry communities.
- Share the operating plan and risk assessment with all personnel on *Chikyu* in order to have successful operation

Naganawa showed a revised *Chikyu* safety evaluation workflow, where the *Chikyu* safety review committee can review not only the scientific drilling cruises but also technical tests conducted on *Chikyu*. Naganawa said that this new process would enhance both internal and external safety evaluation processes in CDEX.

The Chair asked the group for questions, and there were none.

16. *Chikyu*/IODP Performance Review (All)

(13:45 h.)

The Chair began by tasking CIB members to summarize today and yesterday's reviews, since CDEX was very interested in feedback from an external committee.

The Chair opened the discussion with the review topic "Operation". The Chair asked Becker for comments. Becker said that the TAT had very positive reviews

on operations and engineering development. The Chair asked if we could circulate this draft by the end of the month. Kuramoto answered yes, saying CDEX needed to report the CIB and TAT comments to an internal JAMSTEC committee. Mori said that CDEX was well prepared for discussions, logistics, future planning, etc. The Chair confirmed that there were no further comments on this first topic.

The Chair moved to the second topic “fund raising and savings”. The Chair recalled that CDEX presented their best efforts to increase their budget, appealing to “social relevance” and “disaster mitigation” as key words to push the Japanese government. The Chair asked if there were any additional comments. Austin said that TAT mentioned the possibility of raising money from engineering developments, such as patents and commercial returns, which should be included here. The Chair said that to get more funding, CDEX/JAMSTEC needs proposal pressure and interest from the younger generation. van der Pluijm said the phrase should be “societal” not “social relevance”; additionally, “mitigation” was not an appropriate key word, because it “refers to post-disaster”, and we should be minimizing the effects. Given pointed out that “mitigation” was OK, because it works to help reduce the negative effects. Becker suggested that adding “deep biosphere” seems to be helpful. Ildefonse said that we should include fundamental research. The Chair said that we definitely need a catchy key word, to raise awareness and interest in our mission. Ildefonse said that we should add “deep biosphere”.

The Chair moved on to the third topic “education and outreach”. The Chair said that one of the key issues here is how to nurture younger generations of scientists. Camoin wanted to decouple education and outreach since they are different things. The Chair agreed and asked the members about the effectiveness of CDEX’s education and outreach efforts. Kitazato said we should be contributing to open science, sharing data with other communities; for example, oceanographic data collected by *Chikyu* during expeditions should be made available. Ildefonse reminded everyone that IODP was doing exactly this, sharing data openly, to all. Kuramoto said JAMSTEC was looking for external suggestions to be forwarded to the JAMSTEC President, and upwards to the MEXT Minister. Ildefonse asked Kuramoto if we should highlight good things or point out improvements. Eguchi answered both, and said that they would like to get comments of good things, bad things, or any other things. van der Pluijm said that one strength is international collaboration, it’s one of the biggest successes of IODP. Ildefonse said that perhaps better advertising of the data and sample availability would help, but

added that in France, there are people asking “why pay for IODP when the data and samples are available for free?” Ildefonse added that an active community is needed to maximize the use of these resources. The Chair said more collaboration with IODP members needs to be considered. Becker wondered that with IODPs’ current decentralization, what could be done? Camoin suggested more involvement and sharing of what each group is doing, share experience, and maybe the IODP forum is such a place.

Austin said that communication in the forum was only a beginning; the educational world makes formal assessments of their activities, and statistics are extremely important here. How many people visited the website, how many people read the statement, how many workshops, visitors, papers, etc, and they tabulate the results. Austin reminded the group that the education community hire professionals to make formal assessments of these impacts, since without a formal assessment, nobody would believe what you report. Austin wasn’t aware that CDEX required this; while discussion with a professional group might help, this would cost money. Austin said NSF budgets money for these assessments; perhaps CDEX should do the same. Austin said we need to track publications and outcomes. Austin said this is a “numbers game” and we have to keep that in mind, as the same lessons can be applied to educational efforts and outreach. Camoin repeated that this was why education and outreach need to be decoupled. Allen said he may ask Austin to add an agenda item regarding the roles of education officers aboard JR, and Austin said the Forum is the best place to start.

The Chair moved on to the next topic: “Long range plans”. The Chair reminded everyone that the mornings’ discussion covered future riser & riserless projects. Keeping in mind that riser drilling is a major and key task of *Chikyu*, the Chair said we also need to recommend riserless operations. The Chair asked CDEX to show their long-range plans. Austin wanted to know what “long range” meant: 2018 or the 2019-2023 phase. Kuramoto said this was for 2019–2023. Ildefonse was puzzled, since the message from last year was all negative, with budgets constantly falling, but somehow this year everything’s positive. Ildefonse wondered if the problem here is that there is no real “vision” but everything is based on “budget”.

Austin said that CDEX had riser and riserless proposals with good science, which had gone through SEP. The science is there, and there have been many positive results; Camoin mentioned the two successful riserless expeditions in 2016.

Austin said the main task is CDEX finding the money. Becker made the point that the scientific impact of these efforts is not getting out there, at least he hasn't seen it, and this need to be a priority. The Chair said we need to encourage CDEX.

The Chair then moved on to the importance of nurturing early career scientists. The Chair mentioned that this is the force behind the efforts to establish the workshop on *Chikyu* during Expedition 380, the core schools, and the international efforts made by CDEX. Given said that she always checked the science members of each expedition, and was encouraged by seeing a lot of young career scientists in the T-Limit expedition. Given was also impressed by nationalities, age, gender balance, and so on. Austin said that he thought IODP-wide action was been taken to address this. Camoin asked CDEX if there was a deficit of early-career scientists from Japan. Kuramoto said this was very true. The Chair said we would prepare a draft and circulate it among the CIB members, and forward it to CDEX by the end of the month.

CIB_Consensus_0317-12: Chikyu/IODP Operation.
Based on Chikyu operation/Status Update (Agenda item 9) and TAT Report (Agenda item 10), the CIB commends the great operational successes of the Chikyu in riserless mode during IODP Expeditions 365 and 370. The CIB also applauds the CDEX engineering and operational developments, especially development of "high current drill pipe support system" for safe and efficient onboard work. The CIB recognized that CDEX was well prepared for each IODP expedition and the CIB encourages CDEX to maintain the same level of effort for future expedition planning.

CIB_Consensus_0317-13: Fund Raising/Saving.
The CIB commends the success of Chikyu IODP operations not only for basic science but also for disaster mitigation. To conduct further high-impact IODP expeditions, the CIB endorses CDEX for continued effort towards fund raising as well as cost savings for Chikyu IODP operations. The CIB recommends CDEX to consider those newly developed engineering equipment as a venue for raising funds from industries. Although the CIB is pleased with cost savings in creating a more flexible operation budget, the CIB expressed some concerns whether too much cost savings in the current five-year phase might negatively affect Chikyu maintenance and therefore readiness and preparedness of Chikyu beyond JFY2018.

CIB_Consensus_0317-14: Education & Outreach.
The CIB praises CDEX's education and outreach efforts, including several expedition video products for international audiences as well as the inaugural international Chikyu onboard school. The CIB recommends that CDEX decouples education and outreach activities, and endorses CDEX to consider future education opportunities for young and early career scientists.

CIB_Consensus_0317-15: Long Range Plan.
The CIB was pleased to schedule one riserless expedition (Exp. 380), one riser expedition (Exp. 358), and one potential riser CPP expedition at this meeting. The CIB understands that the final scheduling of IODP expeditions ultimately depends on JAMSTEC budgets; however, the CIB strongly encourages CDEX to ensure Chikyu continues to operate for excellent science.

17. Next CIB meeting

Note: The order was changed from the original 18 to 17 on Day 2.

(14:20 h.)

The Chair moved on to selecting the dates for the next CIB meeting. Eguchi felt that the ECORD FB and CIB meetings should be separated by at least one month, therefore proposed 19–20 March or 22–23 March 2018 for the next CIB meeting. However, Eguchi asked the CIB members to comments on this first. van der Pluijm said that 19–20 March was better and all agreed on this.

The Chair announced the next meeting would be held on 19–20 March 2018.

CIB_Consensus_0317_16: Next meeting.
The CIB decided the next meeting will be held on 19 – 20 March 2018 in Kobe, Japan.

18. Other Business

Note: The order was changed from the original 19 to 18 on Day 2.

(14:25 h.)

The Chair asked if there was any other business. Becker asked to confirm that the term of the Chair was about to end – if so, this would be a bad time to rotate the chair. Becker suggested that the Chair stay for another term. Austin agreed, saying that leadership continuity was a good idea. Eguchi said that since the Chair's term was two years, once accepted, this would mean two more years. van der Pluijm wanted to think positively and suggested we request the renewal. The Chair said if the group desired, he would accept and do his best. Ildefonse asked if we could have a meeting on *Chikyu*. Eguchi answered maybe, but there would be no drinking.

CIB_Consensus_0317_17: **Extension of Chair term.**
The CIB recommends a 2-year term extension of the current CIB chairperson be granted.

The Chair called for a short 30-minute coffee break at 14:30 hrs.

19. Review of Consensus Statements and Action Items

Note: The order was changed from the original 17 to 19 on Day 2.

(15:07 h.)

The Chair started the final item, review of consensus statements and action items. Eguchi then reviewed the draft items one by one.

The Chair checked for final comments, and there being none, thanked all the attendees and closed the meeting at 16:00 h.

Meeting adjourned

CIB_Consensus_0317-18: Proposal 898-Pre workshop proposal.
The CIB learned that the IODP Proposal 898-Pre "Fore Arc Mohole-to-Mantle" proponent team is planning to hold a workshop in October 2018. The CIB reviewed 898-Pre, and decided to invite a "Full-proposal development workshop" proposal with a submission deadline of 16 February 2018.

Background: The CIB has a process to invite a "Full proposal development workshop" proposal for pre proposals that have been evaluated as "Develop Full Proposal" at SEP. IODP Proposal 898-Pre "Fore Arc Mohole-to-Mantle" was forwarded to CIB as a potential *Chikyu* proposal at the March 2017 meeting; however, there was no discussion regarding this at the meeting. CDEX had learned that the proponent team of this proposal was planning to hold a workshop in October 2018. CDEX asked the CIB members to discuss, by email (29 December 2017), whether to invite a workshop proposal or not, after consultation with the CIB chair. This was done because waiting until the March 2018 CIB meeting to discuss this would be too late for the workshop preparation.
All the CIB members were in favor of inviting a workshop proposal and were in consensus (18 January 2018).

This consensus was recorded in CIB #5 meeting minutes.

Agenda Item 5

CIB Decisions since Last Meeting

Consensus item after CIB #5 meeting

CIB_Consensus_0317-18: Proposal 898-Pre workshop proposal.
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All the CIB members were in favor of inviting a workshop proposal and were in consensus (18 January 2018).

This consensus was recorded in CIB #5 meeting minutes.

Agenda Item 6

CIB Action Item Status

Status of CIB action items since the last meeting

Based on #5 CIB meeting discussion (Consensus 0317-09), the following message was sent to the lead proponents of IODP Proposal 537B, 698, and 781 on 11 May 2017 from CIB secretariat.

Dear xxx (lead proponent name),

The latest Chikyu IODP Board (CIB) made the following consensus at its 5th meeting.

CIB_Consensus_0317_09: Proposal update.
The CIB will ask proponents of three riser proposals (CRISP (537), IBM (698), and Hikurangi (781)) to submit updates to the CIB by 1 October 2018 based on new results and drilling operations for further assessment of those proposals at the CIB. The CIB will contact the JRFB chair and the SEP co-chairs for potential involvement in this process.

Your proposal IODP Proposal xxx had been designated as "Chikyu project" by CIB at its 1st meeting and the Project Coordination Team had created. However, mainly due to CDEX/JAMSTEC financial situation, your project had not been executed.

The CIB discussed your proposal at its 5th meeting and decided to ask update of your proposal based on new results from previous expeditions and/or results from workshops.

You will submit your update as Proponent Response Letter (PRL) or Addendum (if there are any change in your scientific goals and/or change your site). Details of those proposal format is available from (http://iodp.org/iodp-proposal-submission-guidelines-8-2016/file).

Please let me know (cib-info@jamstec.go.jp) if you have any questions and/or concerns.

Sincerely yours,

CIB Chair,
Yoshi Tatsumi

Agenda Item 7

Other FB, IODP Forum, and Agency Activities

a. IODP Forum

b. JR Facility Board

c. ECORD Facility Board

d. ECORD

e. MEXT

f. NSF

g. ANZIC

h. PMOs

IODP Forum: Meeting #4 (Shanghai, China)

James A. Austin, Jr. - IODP Forum Chair
Senior Research Scientist
University of Texas/Austin
Jackson School of Geosciences
Institute for Geophysics

INSTITUTE FOR GEOPHYSICS
JACKSON SCHOOL OF GEOSCIENCES
THE UNIVERSITY OF TEXAS AT AUSTIN

General Purpose

The IODP Forum is **custodian of the Science Plan** and a **venue for exchanging ideas and views on the scientific progress of the "program"**. As occasion warrants, the Forum Chair will also **provide advice to IODP Facility Boards** on Platform Provider activity:

- No specified budget (but with some support from the SSO); attendance by representatives of partner countries/consortia at scheduled meetings is voluntary and supported by those members.
- This phase of scientific ocean drilling is "collaborative"; in such a form, important "program" aspects (e.g., responsiveness to submitted proposals from the international scientific community, seeking new partners,…) can get lost. The Forum helps to prevent that from occurring.
- Philosophical rather than political clout; ***however, the Forum mechanism IS working.***

The Forum meets once/year

Our most recent meeting (#4) took place in Shanghai, China, on 11-12 September, 2017:

- All Forum decisions are by consensus; items arising from the last meeting can be found at www.iodp.org/iodp-forum.
- Here, I present relevant consensus items from the last meeting and invite brief comment/discussion.

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Forum Consensus Item 17-02: The Forum, after receiving the results of reviews commissioned by both the ANZIC and ECORD consortia in service of their respective renewals for ongoing participation in IODP, acknowledges the continuing need to foster the ***"Biosphere Frontiers"*** theme of the decadal Science Plan. The Forum supports a workshop-based approach to: 1.) identify new/broader components of the international scientific community to develop "Biosphere Frontier" drilling proposals and 2.) build that biosphere theme more strongly into the current flow of IODP proposals.

Forum Consensus Item 17-03: One of the Forum's primary responsibilities is to be a custodian of progress of IODP towards fulfillment of its decadal Science Plan. Since the inception of the Forum, its Chair (in concert with the Science Support Office) has maintained a progress report on pre-(drilling) expedition assessments (by proponents, primarily) of that progress. While results of those assessments foster optimism that progress is being made across all of the Science Plan's themes and component challenges, post-expedition assessments have not been systematic, but are equally important for the health of scientific ocean drilling. That task will be undertaken for *JOIDES Resolution* expeditions during the first phase (2013-2017) of IODP by the JRAW ("Assessment of the *JOIDES Resolution* in Meeting the Challenges of the IODP Science Plan") workshop, to be held in late September 2017. ***The Forum looks forward to the JRAW report, and urges similar assessment efforts by other IODP platform providers/component drilling communities.***

- ***As of submission of this presentation, the JRAW report was not yet available, but should be out "soon".***

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Forum Consensus Item 17-04: Taking into account the generally acknowledged validity of IODP's current decadal Science Plan for the next ~5-year phase of scientific ocean drilling, and after extensive discussion following a forward-thinking presentation by a representative from China, the ***Forum endorses a long-term (multi-year), workshop-based approach to assess the technologies needed to reach the full potential of that Science Plan.*** Those workshops, to be held beginning in ~2019, should incorporate: 1.) the diverse challenges inherent in a multiple (drilling) platform approach to addressing the Science Plan, 2,) the importance of inclusion of both member and non-member scientific communities, as well as industry, in order to build scientific ocean drilling's constituency, and 3.) interest expressed by China and other IODP members and consortia to lead this effort. Ideally, this initiative should be progressed in parallel with any and all (new and ongoing) planning efforts designed to keep IODP as presently constituted alive and well.

Forum Consensus Item 17-05: The Forum applauds the initiative expressed by the group pursuing a ***commemorative volume in the journal Oceanography entitled "Scientific Ocean Drilling: Looking to the Future"***. This publication will form both a commemoration and a celebration of 50 years of scientific ocean drilling; the volume is expected to be published in time for the anniversary, ~December 2018. The Forum sees this activity as emblematic of a range of activities which could and should be pursued, both to honor this milestone and to support the productive continuation of IODP beyond 2018.

- ***Anthony Koppers (Chair, JRFB) is the lead editor; more details can be gotten from him.***

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Forum Consensus Item 17-06: The Forum is encouraged by activities in support of its ***Consensus 16-06 over the past year in support of both publicizing and supporting the crucial relationship between seismic imaging/drill-site characterization and scientific ocean drilling, across all platforms.*** However, the risk of a reduction in seismic imaging capabilities internationally remains. The Forum notes that the efficiency of *JOIDES Resolution* (JR) operations within this phase of IODP has been improved by multi-year regional planning; recently, the primary seismic imaging asset of the U.S. has been operated productively in a similar way. ***The Forum suggests and supports development of a planning effort linking seismic imaging and drilling, through workshops, with emphasis on likely future areas of anticipated IODP operations. The primary goal is to support seismic imaging efforts in support of and en route to development of competitive proposals to drill all accessible parts of the global ocean system, during the next phase of IODP.***

Forum Consensus Item 17-07: The Forum receives multiple reports from IODP member countries and consortia concerning ***"education [E] and outreach [O]"*** activities in support of scientific ocean drilling. Those activities are diverse and in many instances inspiring. However, at the same time, they are generally underfunded and dispersed, which is accentuated by both inherent cultural and language differences across the IODP membership. Education activities generally focus on development of curricula, whereas outreach activities broadly target the general public. ***A recent ECORD program review suggests a renewed emphasis on outreach efforts. The Forum encourages these outreach efforts, particularly those that can be generalized across the IODP to enhance efficiencies. A long-term objective is increased decoupling of "E" vs. "O" activities, with emphasis on those IODP efforts that lead to measurable impacts.***

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Forum Consensus Item 17-09: The Forum enthusiastically accepts the invitation from our Indian colleague Brijesh Bansal to hold the ***next meeting of the Forum (#5) in Goa in September 2018 (exact dates to be determined).*** Japan has offered to host the Forum #6 meeting in Osaka in September 2019. The Forum greets that invitation with equal enthusiasm.

- ***The search for the next Forum Chair is underway (application deadline 1 March). The review committee has been named, and an acceptable candidate should be in place in time to attend the Forum meeting in Goa.***

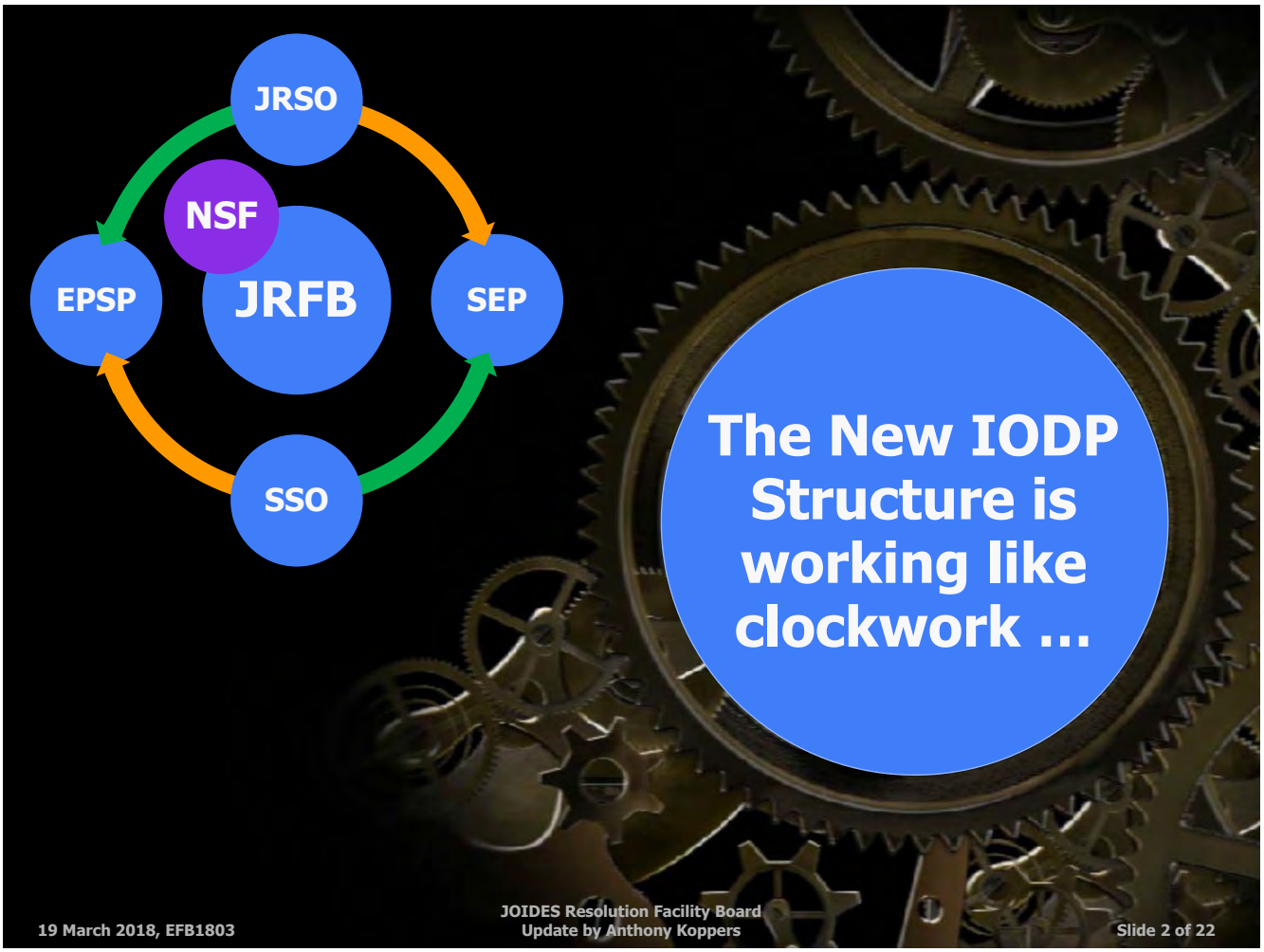
Questions? Comments?

CIB
March, 2018

JOIDES Resolution Facility Board

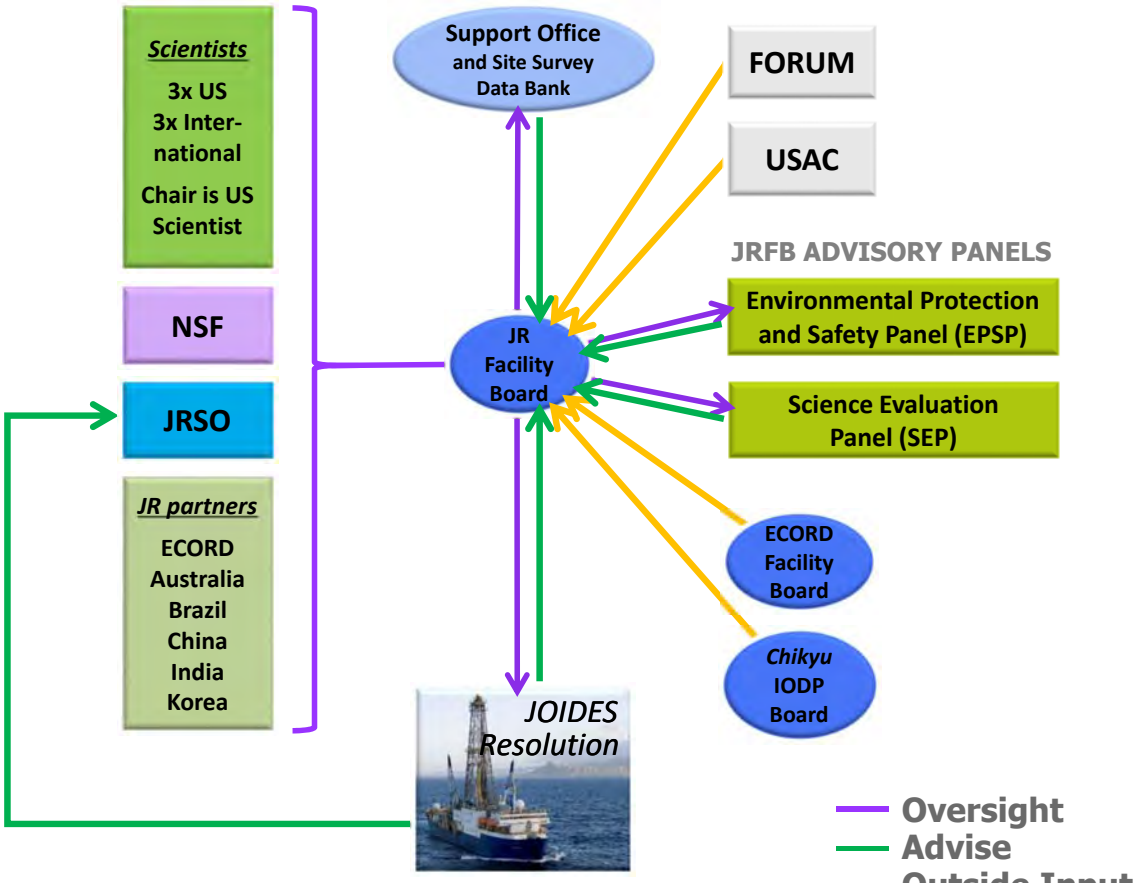
19 March, 2018

CIB 1803 MEETING



The New IODP Structure is working like clockwork …

Outline



1B. JRFB Mandate and Role

JRFB 1705 Consensus Statement 16

The JRFB reaffirms its ***primary goal*** of implementing ***all proposals*** that are thoroughly reviewed, scientifically evaluated, and forwarded by SEP and that have been recommended for approval by EPSP.

Decisions on scheduling are principally dependent on the planned regional track of the JOIDES Resolution; maximizing the fit and balance of proposals to the IODP 2013-2023 science plan; funding and ship time availability; and safety, permitting and other logistical constraints.

1B. JRFB Mandate and Role

- **Terms of References**
  - JRFB, SEP, EPSP
- **Policies and Guidelines**
  - SEP and EPSP-related Guidelines
  - IODP Environmental Principles
  - IODP Sample and Data Obligation Policy
  - JR 3rd Party Tool Policy
  - JR Facility Conflict of Interest Policy
  - JR Staffing Procedures
  - JR Standard Measurements
- **Approving Panel Membership and Leadership**
  - JRFB, SEP, EPSP, CAB

1B. JRFB Mandate and Role

■ ■ Single Guidelines

IODP Proposal Submission Guidelines

IODP Science Evaluation Panel (SEP): Proposal Submission Guidelines

Approved by *JOIDES Resolution* Facility Board: **18 May 2016**
Latest Revision: **28 April, 2016**

Chapter 1 Introduction

Science in IODP is driven by community-generated proposals targeting the four research themes outlined in the program's overall Science Plan, *Illuminating Earth's Past, Present, and Future* (www.iodp.org/program-documents). The program provides multiple drilling platforms (www.iodp.org/ships/platforms) that are very expensive to operate. For example, a 2-month-long expedition with the riserless platform ***JOIDES Resolution*** costs between USD 8-14 million, while operations with the riser vessel ***CHIKYU*** can be in the hundreds of millions of dollars and ***Mission Specific Platform (MSP)*** expeditions range from USD <8 to >15 million. Because the level of investment goes beyond an individual researcher or a single research group, the IODP proposal structure, review and planning processes are comprehensive and differ from those applied to other grant applications. Because of this difference the IODP process is iterative and open to communication between the science proponents, the advisory panels, and the drilling platform operators. It is a process designed to transform exciting science into successful expeditions. The detailed technical planning, implementation, and financial responsibilities involved are managed within the program, so, except in specific circumstances, there is no budget section in an IODP proposal.

Science in IODP is driven by community-generated proposals targeting the research themes outlined in the program's overall science plan and utilizing multiple drilling platforms. IODP proposal submission is a process designed to transform exciting science into successful expeditions.

Proposal Submission Guidelines

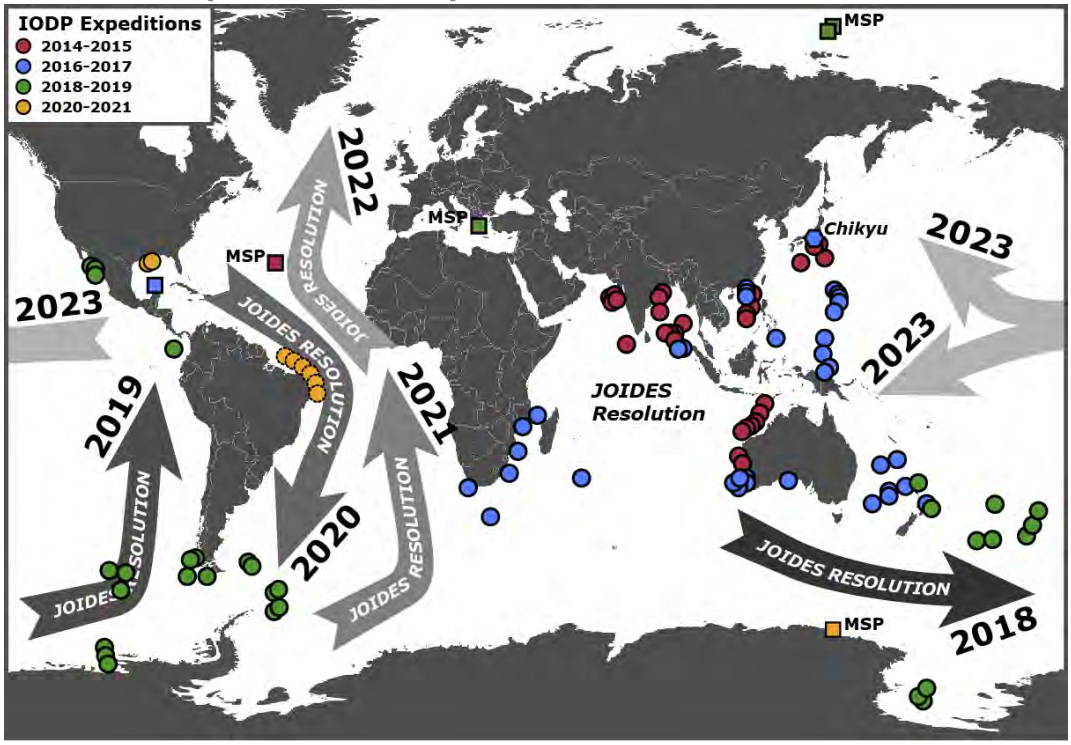
IODP Site Evaluation Panel

IODP
INTERNATIONAL OCEAN DISCOVERY PROGRAM

The JOIDES Resolution Facility Board approved these guidelines on May 18, 2016

2A. Long-Term JR Cruise Track

UPDATED MAP (CALENDAR YEARS) FOLLOWING JRFB MEETING OF MAY 2017



2B. Single Global Circumnavigation

JRFB 1705 Consensus Statement 8

The JRFB reaffirms that the JOIDES Resolution will fulfill at least a ***single global circumnavigation*** … by 2023.

JRFB 1705 Consensus Statement 9

The JRFB expects that the JOIDES Resolution will complete its global circumnavigation ***in the Indo-Pacific in FY'23***

■ ■ **PROPOSAL CALL**

- **Requires immediate proposal pressure for high latitude expeditions in the Arctic and North Pacific in 2022-23**
- **Early proposal call for Indo-Pacific expeditions in 2023-24**

2C. Scheduling of the JR

■ ■ **Scheduling happens during May JRFB Meeting**

■ ■ **Always scheduling 2-3 years into future, thus in May 2018 we will schedule for FY20-21**

■ ■ **Staying true to the outlined regional track**

■ ■ **Since 2017 the JR is at full utilization as we are operating 10-11 months/year**

■ ■ **Since 2014 we have sailed 4 CPP expeditions (with China/India) and 1 CPP is planned in the Gulf of Mexico for 2020 (with DOE)**

■ ■ **Implementing engineering-only expeditions**

■ ■ **Also scheduling short and/or hybrid expeditions**

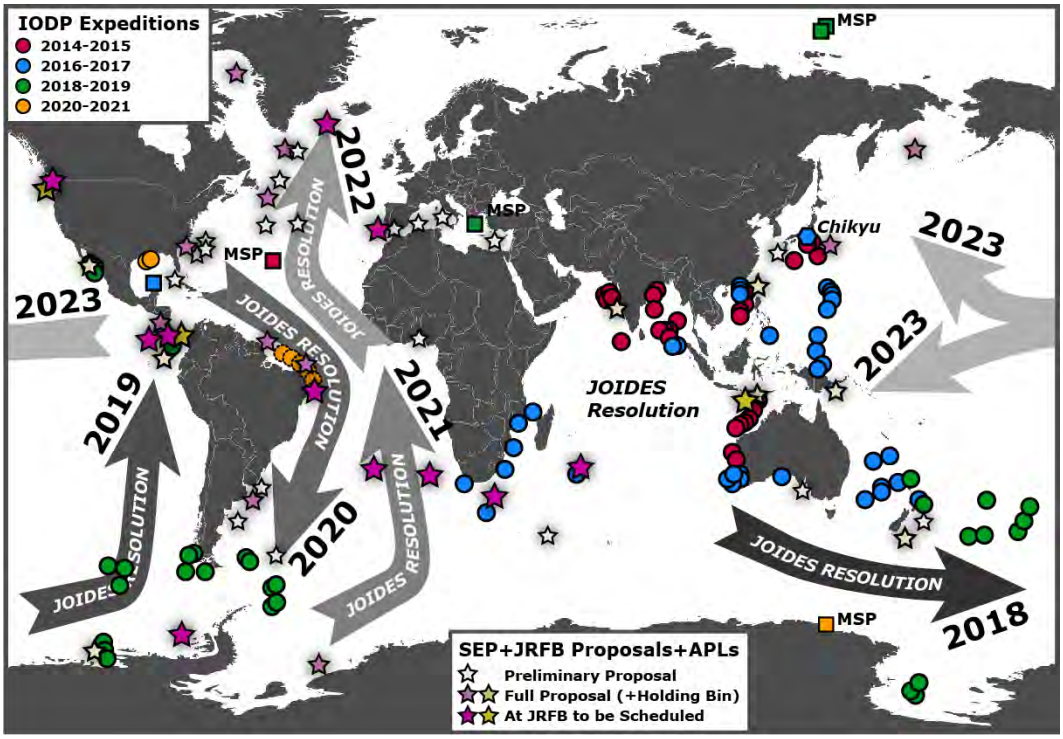
2C. New JR Schedule FY'19-20 *

Fiscal Year 1 Oct - 30 Sept	Proposal Expedition	Title
FY'19	Expedition 378	South Pacific Paleogene
FY'19	Expedition 379	Amundsen Sea Ice Sheet History
FY'19	P902 + P846-APL	Combined Expedition Iceberg Alley Paleoceanography and Falkland Water Depth Record
FY'19	P912	Drake Passage Paleoceanography
FY'19	Transit / Engineering / P769-APL	Transit to the Gulf of California during which various engineering tests and the Costa Rica Crustal Architecture 769-APL will be carried out (no full science party required)
FY'20	P833	Guaymas Basin Activity
FY'20	Transit / Tie-Up / Preparation Time	Transit to the Gulf of Mexico, one-month tie-up period for JOIDES Resolution maintenance and repairs, followed by a two-week preparation time window for P887 Gulf of Mexico operations
FY'20	**P887-CPP**	Gulf of Mexico Methane Hydrates
FY'20	TBD	Scheduling of at least one expedition in the western tropical Atlantic

* Subject to funding being available for ship operations in FY'19-20

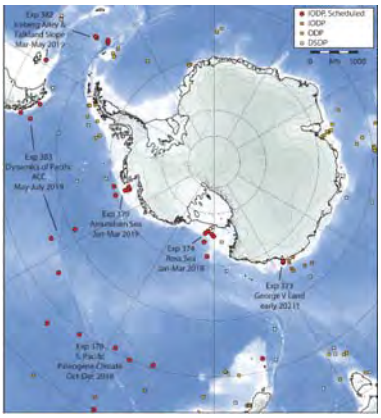
2D. Proposal Pressure

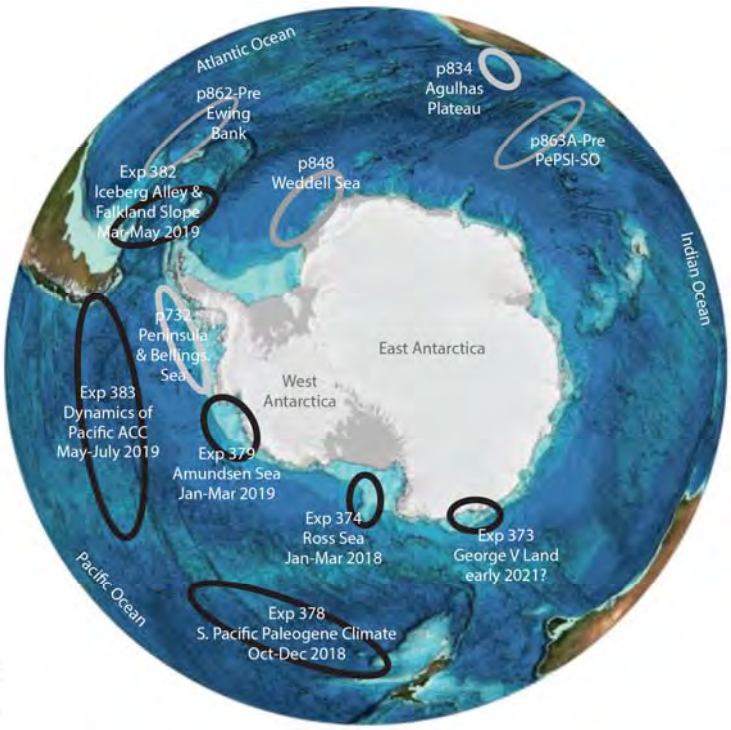
UPDATED MAP (CALENDAR YEARS) FOLLOWING SEP MEETING OF JAN 2018



2E. IODP-wide Mission Antarctica

PROPOSAL PRESSURE IN THE SOUTHERN OCEANS





Antarctic and Southern Ocean drilling proposals in the IODP system.
Status, January 2018:

- Scheduled
- at Facility Board
- at Science Evaluation Panel
- Pre-proposal or in revision

3. Improvements in the JR Facility

JRFB 1705 Consensus Statement 11

The JRFB affirms its long-term goal to maintain the JOIDES Resolution facility and the Gulf Coast Repository as a state-of-the-art "floating Earth science laboratory" that is up-to-date with current analytical equipment, software and databases, while adding new standard shipboard and onshore analytical capabilities,
if required by a ***demonstrable need of the larger IODP science community***

3. Improvements in the JR Facility

JRFB 1705 Consensus Statement 7

The JRFB recommends the immediate formation of a "Deep Crustal Drilling Engineering" workgroup at the JRSO with representatives of the JRFB and JRSO, Siem Offshore drilling engineers, and the principal proponents, in order to review the results of Expedition 360 "SW Indian Ridge Lower Crust and Moho, Leg 1" and Expedition 355 "Superfast Spreading Rate Crust, Leg 4" and make recommendations on how to successfully achieve drilling, coring and logging ***deeper than 1.5 km into ocean crust*** hard rock environments.

4. Special Oceanography Volume

Scientific Ocean Drilling: Looking to the Future

Guest Editors

Anthony A.P. Koppers, Carlota Escutia
Fumio Inagaki, Heiko Pälike
Demian Saffer, Debbie Thomas

Oceanography Editor

Ellen S. Kappel

DSDP
ODP
IODP

50
YEARS

The Oceanography Society will publish this Special Issue before the AGU Fall Meeting in December 2018 in Washington, DC

Sponsored by NSF, ECORD Council, J-DESC and ANZIC

4. Special Oceanography Volume

- **The overall goal of the special issue is to provide the scientific basis for continuation of scientific ocean drilling into the future and post-2023:**
  - It is a valuable community tool that has contributed significantly to addressing global geoscience questions
  - There remain many geoscience problems to solve that require data collected by a scientific drilling platform
  - Anticipated future enhancements in drilling, coring and logging technologies will allow new approaches
  - Keep fostering strong collaborations among scientists from different disciplines, institutions and countries
  - Provide platform for students to gain valuable seagoing experience and network with international scientists

4. Special Oceanography Volume

- **Main Chapters (up to 10)**
  - Keeping an Eye on Ice Shelf Stability
  - The Impact of Meteorite Impacts
  - A Historic Measure on Sea Level Rise
  - The Limits and Functionality of Deep Life
  - Earth's Largest Earthquakes and Tsunamis
  - Slow Motion Earthquakes: Taking the Pulse of Slow Slip
  - What Lies Beneath (the Oceanic Crust)
  - How to Create Virgin Subduction Zones
  - Channeling Water Through Ocean Crust
  - Blowing in the Monsoon Wind
  - Large Amplitude Paleoclimatic Perturbations

4. Special Oceanography Volume

■ ■ Short Stories (up to 10)

- Fifty Years of Scientific Ocean Drilling
- Reading All the Pages in the Book on Climate History
- Listening Down the Pipe (using Observatories)
- Rewriting Textbooks on Mantle Plume Fixity
- Finding Dry Spells in Ocean Sediments
- Starting a New Ocean and Stopping It
- Short-Term Thermal Memory and Paleo-Seismology
- Riser Drilling: Access to the Deep Subsurface
- The Orbital Pacemaker of the Earth System
- The Source of Deep Frozen Gas Hydrates
- The Habitability of Life in the Earth's Interior
- Large Submarine Eruptions and Environmental Disturbances

4. Special Oceanography Volume

■ ■ Info Boxes (up to 10)

- Three Descriptions of the IODP Platforms
- Five Researcher Impact Stories/Interviews
- The New IODP Research Program (on IODP#2)
- Scientific Ocean Drilling in the Earth Sciences
- Reaching Out with IODP
- Activities Crossing the Ocean-Continent Divide

■ ■ Special Features (up to 4)

- Cover and Back page illustrations
- Paper fold Drill Site Map
- Paper fold Seismic Profile

4. IODP Autobiographies

■ ■ Similar to Women in Oceanography

- 200+ autobiographies "People in Scientific Ocean Drilling"
- Live PDF document on the TOS website (and IODP.org)
- Funding is unclear at this moment, as we give preference to TOS Special Volume first; could be pursued in 2019 (?)

THE OFFICIAL MAGAZINE OF THE OCEANOGRAPHY SOCIETY

Oceanography

Women in Oceanography: A Decade Later

Autobiographical Sketches

Thank You !

19 March, 2018

CIB 1803 MEETING

7 c & d ECORD News and ECORD Facility Board (G. Camoin)

ECORD is a unique European distributed research infrastructure that connects research facilities at multiple sites across Europe. The ECORD research facilities are engaged in the multidisciplinary aspects of the subsurface scientific research and have a longstanding culture of cooperation on Science, Technology and Education.
ECORD combines research, education and innovation and offers a unique portfolio of science and educational activities, world-class capabilities, state-of-the-art technology and remarkable knowledge-based resources to the European Earth and Environmental science community.

In 2017, the ECORD research infrastructure has developed all its capabilities, especially with the successful completion of the offshore phase of the mission-specific platform Expedition 381 « Corinth Corinth Active Rift Development », the organization of five MagellanPlus workshops and the training of more than 150 students and early career scientists in ECORD Summer Schools and Training Course. The outstanding intellectual contribution of the ECORD scientists to IODP is reflected by the involvement of 428 scientists in active IODP proposals, the participation of 53 ECORD scientists on six IODP expeditions and the publication of more than 180 papers related to ocean drilling programmes. In parallel, ECORD has ensured all the tasks related to its status of IODP Platform Provider, including the maintenance of sustainable sample and data curation facilities at the Bremen Core Repository and the promotion of ECORD and IODP activities and accomplishments to large audiences.

ECORD has started in 2017 to prepare the second phase (2019-2023) of IODP through its external evaluation, the revision of its Memorandum of Understanding and the reevaluation of its partnership with the US National Science Foundation (NSF). Based on the well-established operation of the ECORD infrastructure, its successful implementation, its competitiveness in the international research landscape and maximum return from the investment, ECORD sees its future with confidence, 50 years after the first scientific ocean drilling operations by the « *Glomar Challenger* » in the Gulf of Mexico (DSDP Leg 1).

ECORD membership and ECORD post 2018 renewal

In 2017, ECORD has entered a three-step process that should lead the current fifteen ECORD member countries to commit to the second phase (2019-2023) of IODP before the end of 2018.

The first step of this process consisted in an evaluation of the ECORD activities that was conducted from January to June 2017 by an ECORD External Evaluation Committee (EEC) composed of Helmut Weissert (Chair, Switzerland), Maria Ask (Sweden), Adrian Immenhauser (Germany), Eystein Jansen (Norway), Ralf Littke (Germany), Patrick Pinet (France), Katherine Richardson (Denmark) and Johan Robertson (Switzerland). The report that was delivered soon after the general meeting that was held on June 6-8, 2017 at the MARUM, Bremen, Germany,

covers all aspects of ECORD activities (science, technology, management, education and outreach). The EEC's conclusions especially highlight the ECORD's scientific and operational excellence in the international research landscape during the first phase of IODP (2013-2018), the need to sustain this unique and global research structure, and the need for ECORD to maintain its strengths in being able to finance and implement high-profile MSP expeditions. This evaluation report also includes a series of recommendations concerning various fields (science, education, outreach) that the ECORD Council has considered at its spring meeting that was held on June 29, 2017 in Amsterdam, The Netherlands. Among these recommendations, the ECORD Council has decided that EMA and ESO will be administered by the Centre National de la Recherche Scientifique (CNRS) and the British Geological Survey (BGS) respectively, until the end of IODP.

The second step of this process has included a revision of the ECORD Memorandum of Understanding (MoU) managed by EMA and based on an internal reappraisal of ECORD functioning during the first phase of IODP, as well as recommendations made by the EEC. The different ECORD entities have revised their Terms of Reference and EMA has worked in close collaboration with the ECORD Council to produce the 2019-2023 ECORD MoU that will be distributed to the ECORD funding agencies for approval and signature in 2018.

The third step of the ECORD post 2018 renewal consisted of a revision of the MoU between ECORD and the NSF defining the financial and operational agreement regarding the ECORD's membership in the *JOIDES Resolution* (*JR*) Consortium and, in reciprocity, the access of our partners' scientists to MSP expeditions during the second phase of IODP. The discussions between EMA and the NSF led to a formal agreement that was approved by the ECORD Council at its 2017 spring meeting. Overall, there will be no significant change in ECORD scientists' participation to the *JR* expeditions during the second phase of the current programme since the agreed slight reduction in ECORD berths (7 vs 8 on each expedition) and incorporation of co-chief scientists in quota calculations will be compensated by the 10 months of *JR* operations that are planned annually until of the end of IODP.

The MoU linking ECORD and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and concerning the ECORD's participation to the *Chikyu* Program will not be revised as this MoU was signed in 2013 for the whole duration of IODP. The scheduling of an engineering riserless expedition (380 « NanTroSEIZE Frontal Thrust Borehole Monitoring System ») in early 2018 and of a riser drilling expedition (359 «NanTroSEIZE: Riser Hole at C0002») in late 2018-early 2019 respectively, will materialize a continuity in Chikyu operations throughout the renewal time window.

In parallel to the implementation of its renewal processes, ECORD has continued to develop significant efforts towards former ECORD member countries (e.g. Belgium, Israel) and other countries (e.g. currently Turkey and Greece) to extend the current size of the Consortium.

ECORD FY18 budget

ECORD is currently funded exclusively by its 15 member countries.

The expected total contributions for FY18 from the 15 ECORD member countries is about $17.667M (see table *below*).

The ECORD annual budget must be seen as a minimum budget as there are opportunities for IODP member and non-member countries to provide external co-funding and/or in-kind contributions (IKC) for MSP expeditions (i.e. direct operational facilities and services that ESO would normally pay for) in exchange of extra science party positions. ECORD intends to generalize in-kind and external co-funding to implement future MSP expeditions on an *ad-hoc* / expedition by expedition basis.

The contributions to the ECORD budget are unevenly distributed between the member countries, ranging from $5.6M to $28.5K (*below*). Based on their contributions, each ECORD member country receives a participation quota for all IODP expeditions. However, the participation of ECORD member countries to the ECORD educational programme is standard and not based on levels of financial contribution.

Austria	100,000
Canada	28,500
Denmark *	152,000
Finland	80,000
France *	4,600,000
Germany	5,600,000
Ireland *	111,000
Italy	500,000
Netherlands	500,000
Norway	1,100,000
Portugal	90,000
Spain *	177,000
Sweden	528,000
Switzerland	600,000
UK *	3,500,000
TOTAL	**17,667,000**

ECORD member country contributions for FY18 (USD)
The amount in US dollars will be based on exchange rates (when applicable) at the time of the payment by the relevant partner (1 € = 1.19 $ in this table).
(= countries paying their contribution in their own currency)*

The table below summarises the expected ECORD budget for FY18.

	FY18 Income (USD)	FY18 Expenses (USD)
FY 17 balance	**9,093,240**	
FY 18 contributions	**17,667,000**	
ECORD-NSF MoU		**7,000,000**
ECORD-JAMSTEC MoU		**0 ***
ESO		**2,000,000 ****
EMA		**300,600**
MagellanPlus		**100,000**
ECORD Outreach		**65,900**
ESSAC		**294,158**
BCR		**332,093**
TOTAL	**26,760,240**	**10,092,751**
FY 18 balance	**16,667,489**	

Exchange rate: 1 € = 1.19 $
The amounts in USD are subject to exchange rate fluctuations.
** Payment deferred to 2019*
*** Fixed operational costs*

ECORD FY18 Budget (in USD)

Mission-specific platform expeditions

Mission-specific platform expeditions are an ECORD's landmark since 2004 and ECORD is one of the three IODP Platform Providers since 2013.

From 22 October to 18 December 2017, ESO has successfully implemented the offshore phase of Expedition 381 Corinth Corinth Active Rift Development with Lisa McNeil (ECORD-UK) and Donna Shillington (USA) as Co-chief scientists and 14 ECORD scientists ; four Greek scientists were involved in the Science Party in compensation of the IKC provided by their country and as an incentive for a potential future Greek ECORD membership. Expedition 381 Corinth Corinth Active Rift Development was the fourth MSP expedition implemented by ECORD for IODP, after Expedition 347 Baltic Sea Paleoenvironment (2013-2014), Expedition 357 Atlantis Massif Serpentinization and Life (2015) and Expedition 364 Chicxulub Impact Crater (2016). The operational review of Expedition 364 Chicxulub Impact Crater was held on 20 June 2017 in Lisbon, Portugal. The operational review committee has congratulated the co-chief scientists and all the Science Party Members for this very successful MSP expedition, which was the first IODP expedition to drill the only intact crater peak ring.

In September 2017, ESO had regrettably announced the cancellation of Expedition 377 Arctic

Ocean Paleoceanography, which was scheduled for August to October 2018 as the expected Russian IKC related to additional ice breaking capability that was essential for the implementation of this expedition has not materialised. With this cancellation and the postponement to 2020 of Expedition 373 Antarctic Cenozoic Paleoclimate, the EFB will have to adjust the previously defined long-term MSP scheduling strategy (i.e. until the end of IODP) at its 2018 meeting (Venice, Italy on 6-7 March 2018). Such a long-term scheduling strategy will be largely based on the scientific excellence of drilling/coring proposals, the required drilling technology, and, importantly, the available annual budget for expeditions including opportunities for IKCs. ECORD anticipates that the implementation of future MSP expeditions will require a mix of in-kind and external co-funding, especially for complex and costly multi-platform expeditions, such as Expedition 377. ECORD will actively seek IKCs and also encourage the community to help ECORD in seeking these opportunities.

ECORD partnership : 2017 *JOIDES Resolution* expeditions

IODP expeditions (http://www.iodp.org/expeditions) provide ECORD scientists with an excellent opportunity to participate in international multidisciplinary ocean drilling projects and to have priority access to unique samples and data.

ECORD, as a contributing member of the *JR* consortium, is entitled to an average of eight scientists on every *JR* expedition with the exception of expeditions based on Complementary Drilling Proposal (CDP), such as the two South China Sea 2017 expeditions for which a reduced contingent of berths is available for scientists from ECORD member countries.

Thirty nine ECORD scientists, including two co-chief scientists and 51% of early career scientists, were invited to participate in five expeditions that were implemented in 2017 by the *JOIDES Resolution*:

- Expeditions 367 and 368 South China Sea Rifted Margin (7 February - 9 April 2017 and 9 April - 11 June 2017) aimed at understanding the mechanisms of lithosphere extension during continental breakup at a non-volcanic rifted margin;
- Expedition 371 Tasman Frontier Subduction Initiation and Paleogene Climate (27 July - 26 September 2017) to evaluate the potential link between a period of high-amplitude long-wavelength compression and the initiation of the Tonga-Kermadec subduction, or to identify alternative geodynamic processes;
- Expedition 369 Australia Cretaceous Climate and Tectonics (26 September - 26 November 2017) to understand the paleoceanography and tectonics of the Naturaliste Plateau and Mentelle Basin off SW Australia;
- Expedition 372 Creeping Gas Hydrate Slides (26 November 2017 - 4 January 2018) which aimed at investigating the relationship between gas hydrate and underwater landslides and at characterizing sediment and fault zone structures and physical properties associated with recurring shallow slow slip events along the Hikurangi subduction interface.

Anticipating next IODP expeditions

The distribution of the 89 active IODP proposals across the various IODP platforms is rather constant compared to 2016 despite a slight decrease in MSP proposals. There are 61 *JR* proposals (68.5%), 11 *Chikyu* proposals (12.4%), 11 MSP proposals (12.4%), and six multiple proposals (6.7%) involving the *JR* and the *Chikyu* (see figure below). Forty of these proposals are residing at the appropriate Facility Boards ready to be selected for drilling (26 for the JRFB, nine at the Chikyu IODP Board and five at the EFB).

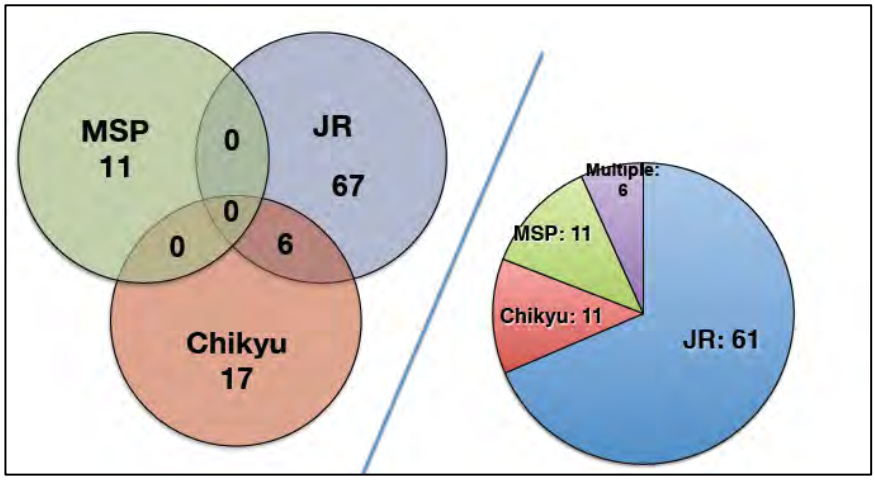


Fig - Distribution of IODP proposals by platforms (n = 89). Multiple proposals consist of combined Chikyu and JR drilling (Data provided by the IODP Science Support Office as of February 2018).

The eleven active MSP proposals that are residing at the EFB and the Science Evaluation Panel (SEP) may form partly the basis of the operational plan that will be defined for the second phase of the current programme. The objectives of the MSP proposals are quite diverse in terms of science topics (climate and sea-level change, geohazards, hydrogeology, deep biosphere), drilling systems (drill ships, jack-up rigs, seafloor drills, long piston coring) and geographical areas (Atlantic, Pacific, Arctic and Southern oceans, Mediterranean Sea, Japan Sea), thus demonstrating the great opportunities provided by the MSP concept to IODP. These proposals include an Amphibious Drilling Proposal (796-ADP NADIR: Nice Amphibious Drilling) whose scientific objectives can only be accomplished by combining land and shallow-water drilling, this exemplifies the necessary closer collaboration between ICDP and IODP, especially through ECORD given that most ADPs will likely involve MSP operations.

Proposal	Short_Title	PI / Count. – Cons.	Ocean	Drill platform
At EFB				
637 Full2	New England Shelf Hydrogeology	Person (USA)	Atlantic	Liftboat / jack-up rig
708 Full	Central Arctic Paleoceanography	Stein (ECORD)	Arctic	Drillship
716 Full2	Hawaiian Drowned Reefs	Webster (ANZIC)	Pacific	Geotech. rig / MeBo200
730 Full2	Sabine Bank Sea Level	Taylor (USA)	Pacific	MeBo200
813 Full	Antarctic Cenozoic Paleoclimate	Williams (USA)	Southern Ocean	RD2
At SEP				
796 ADP	NADIR: Nice Amphibious Drilling	Kopf (ECORD)	Mediterranean	Geotech. rig / MeBo
812 Pre	Ross Sea Glacial History	Wilson (USA)	Southern Ocean	Seafloor drill
863 MDP	ISOLAT Southern Ocean Paleoclimate	Peterson (USA)	Southern Ocean	Long-piston coring
866 Full2	Japan Trench Paleoseismology	Strasser (ECORD)	Pacific	Long-piston coring
915 Pre	N Atlantic Fjord Sediment Archives	Giraudeau (ECORD)	Atlantic	Long-piston coring (or *JR ?*)
931 Pre	East Antarctic Ice Sheet Evolution	Shevenell (USA)	Southern Ocean	*MSP tbd (or JR ?)*

Four of the six proposals residing at SEP, including a Multi-phase Drilling Proposal (863-MDP "ISOLAT Southern Ocean Paleoclimate") involving long piston-coring technology, did not get any action from their proponents since several years and could be deactivated soon. A higher MSP proposal pressure including different science themes and involving various potential drilling/coring systems in diverse environments would be desirable to provide additional scientific, operational and funding opportunities in the near future.

ECORD is providing a huge contribution to the scientific efforts within IODP, as ECORD has a leading role in proposal submission in IODP since 2014 with fairly constant percentage of unique proponents (37 to 40%). Currently, 428 ECORD scientists out of 1078 unique proponents (i.e. 40%), including 32 lead proponents, are proponents of active IODP proposals (see figures below). The wealth of ECORD-led active IODP proposals partly relies on the success of the ECORD-ICDP MagellanPlus Workshop Series Programme, which provides a substantial support to ECORD scientists to develop inovative drilling proposals concerning diverse scientific topics addressed by the three IODP platforms and the ICDP infrastructure.

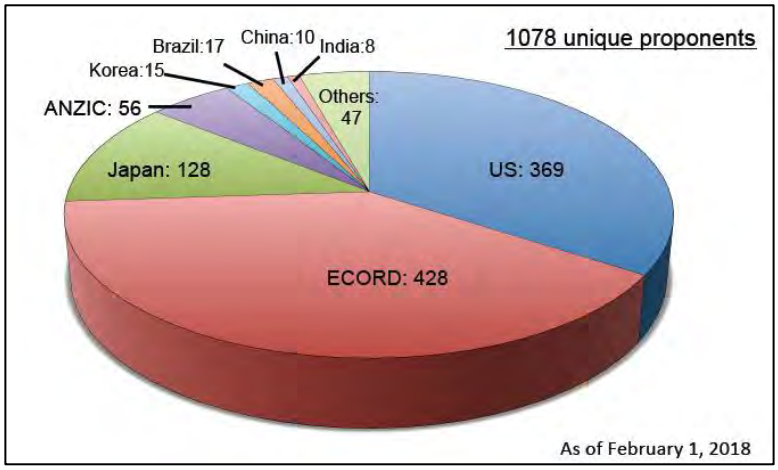


Fig. – Distribution of active proposals by proponents' member affiliation

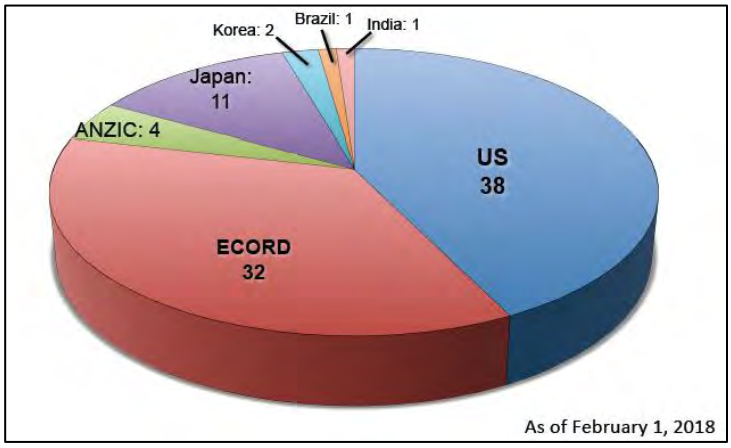


Fig. – Distribution of active proposals by lead proponents' member affiliation

Valorizing IODP science

The outstanding intellectual contribution of the ECORD scientists to IODP is also reflected by the valorization of cutting-edge results. With almost 8000 serial publications reported in the Scientific Ocean Drilling Bibliographic Database and related to the successive ocean drilling programmes from 1969 through June 2017 (Deep Sea Drilling Project, the Ocean Drilling Program, the Integrated Ocean Drilling Program, and the International Ocean Discovery Program), the ECORD science community demonstrates its leading role in the international geoscience landscape (*see table below*).

Member country or consortia	First authors of serials	Serial contributions by country	Serial contributions by author	Total contributions
Australia/New Zealand Consortium	298	273	330	628
Australia	173	180	205	378
New Zealand	125	93	125	250
Brazil	20	17	18	38
China	363	125	155	518
ECORD	3,967	3,073	3,941	7,908
Austria	13	18	18	31
Belgium	43	43	47	90
Canada	318	224	274	592
Denmark	48	70	74	122
Finland	8	6	6	14
France	595	496	694	1,289
Germany	940	620	814	1,754
Ireland	5	13	15	20
Israel	21	6	6	27
Italy	260	217	277	537
Netherlands	206	139	151	357
Norway	134	112	127	261
Poland	16	4	4	20
Portugal	10	26	29	39
Spain	137	141	177	314
Sweden	100	80	80	180
Switzerland	129	108	117	246
United Kingdom	984	750	1,031	2,015
India	168	33	34	202
Japan	651	537	1,260	1,911
Republic of Korea	42	45	50	92
United States	3,823	1,663	3,427	7,250
Total papers:	**9,332**			**18,547**

Table - Serial publication authorship by first author, contributing country, contributing authors, and total contributions (1969–2017)

The Program (Expedition Reports, post-expedition research data reports, and Scientific Drilling papers) and non-Program serial publications for all completed Integrated Ocean Drilling Program and IODP expeditions at the end of June 2017 (Expeditions 301–368; *see figure below*) demonstrate that the MSP expeditions, which represent by number less than 10% of all IODP expeditions, have generated a significant proportion of the peer-reviewed scientific publications arising from the programme. Furthermore, the list of the most-cited IODP expedition–related papers as of July 2017 illustrates the high-impact and high-quality science achieved by MSP expeditions (*see table below*). However, the figure and the table below do not yet include the high scientific return expected from the most recent MSP Expeditions 357, 364 and 381, which will further enhance the combined scientific output of MSP expeditions.

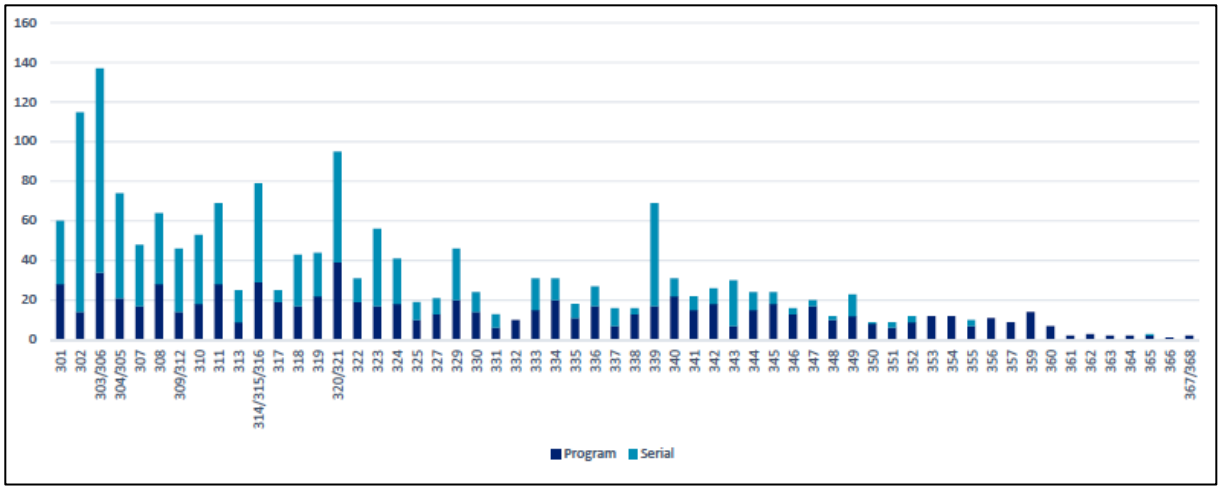


Figure 3. Publication records for Expeditions 301–368 (2003–2017) as of June 2017.
MSP expeditions are Expeditions 302, 310, 313, 325, 347, 357, 364

Expedition	Expedition-related paper (DOI)	Times cited
301	https://doi.org/10.1038/nature07174	417
302	https://doi.org/10.1038/nature04668	508
	https://doi.org/10.1038/nature04800	458
	https://doi.org/10.1029/2008GL033520	402
303/306	https://doi.org/10.1016/j.epsl.2005.06.020	276
304/305	https://doi.org/10.1093/petrology/egm021	249
309/312	https://doi.org/10.1126/science.1126090	153
310	https://doi.org/10.1038/nature10902	261
	https://doi.org/10.1126/science.1180557x	215
314/315/316	https://doi.org/10.1126/science.1147195	269
319	https://doi.org/10.1146/annurev-earth-040610-133408	149
323	https://doi.org/10.1073/pnas.1203849109	299

Table 3. Top cited IODP expedition–related papers as of July 2017.
Most of them are in the top journals by impact factor. MSP expeditions are Expeditions 302 and 310.

Managing knowledge-based resources

IODP and ECORD implement a sustainable sample and data curation management plan of data conservation and provision to the science community. Hundreds of kilometres of core, other types of samples (fluids, biota) and data have been acquired and stored in three core repositories (Gulf Coast Repository, College Station, USA; Kochi Core Center, Kochi, Japan; Bremen Core Repository – BCR -, Bremen, Germany) where they are made accessible to the international community. The BCR currently contains 156,18 km of deep-sea cores from 90 expeditions. All BCR samples (over 1.66 million samples/more than 6816 sample requests/over 4484 individual scientists, incl. samples taken earlier at the ECR for legacy cores that are now at BCR) are entered into a database that is accessible to the general public for post-moratorium samples. In 2017, a total of 32,706 samples were taken at the BCR for 249 requests including 131 requests submitted by ECORD-country scientists from ECORD country

members. ECORD has developed several databases in order to make available to the science community all the necessary information to the development of drilling proposals and to allow the scientists to get access to the data collected during the drilling expeditions and keep track of ECORD activities in IODP.

Engaging the community

The portfolio of science and educational activities that ECORD has developed over the last years has been very effective in 2017 with high demand from scientists, students, early career scientists and members from education.

The continuous funding of the ECORD-ICDP MagellanPlus Workshop Series Programme expresses the strong ECORD's support to its scientists to develop innovative drilling proposals concerning diverse scientific topics for any of the three IODP platforms and the ICDP infrastructure (http://www.ecord.org/science/magellanplus/)

Five workshops have been funded or co-funded by ECORD in 2017:

- 'Caldera Drilling – Campi Flegrei' (25-28 February 2017, Naples, Italy);
- 'Tyrrhenian Magmatism & Mantle Exhumation (TIME)' (5-7 June 2017, Bologna, Italy);
- 'Australasian Regional Workshop for building new IODP proposals' (13-16 June 2017, Sydney, Australia);
- 'Carbon cycling at the ultra-slow Arctic spreading ridge system' (6-8 September 2017, Bergen, Norway);
- 'Volcanic, tectonic and hydrothermal processes in an island-arc caldera environment: history, mechanisms, feedbacks and impacts: Initiation of a proposal to drill at the Santorini-Kolumbo marine volcanic system in Greece' (21-23 November 2017, Athens, Greece).

Two workshops have been already scheduled for 2018 :

- 'Fjord sediment archives in the northeastern North Atlantic' (April 7-8, 2018, Vienna, Austria)
- 'The North Atlantic Igneous Province continental break-up magmatism and impacts on global warming during the Paleogene' (May 29-30, 2018, Kiel, Germany)

Up to four additional workshops could be potentially also scheduled in 2018 or early 2019 depending on final decision of the MagellanPlus Scientific Committee:

- 'Understanding Greenland Ice Sheet evolution: Present and new drilling initiatives on the East and West Greenland margins' (dates to be determined, Copenhagen, Denmark);

- 'Temporal evolution of Arctic gas hydrate and methane seepage systems' (dates to be determined, Tromso, Norway);
- 'New Caledonia Peridotite Amphibious Drilling Project' (dates to be determined, Montpellier, France);
- 'Haiti active fault drilling' (dates and location to be determined).

The promotion of IODP scientific achievements to a large audience within universities and institutes has been actively conducted by four 'ECORD Distinguished Lecturers ' (http://www.ecord.org/education/dlp/) : Bridget Wade (UK), Mark Alexander Lever (Switzerland), Gretche, Früh-Green (Switzerland) and Marianne Conin (France) who gave 26 lectures in 8 ECORD countries in 2017.

A major goal of ECORD is to train the next generation of scientists from ECORD member countries. The portfolio of educational activities that ECORD has built over the last years and that was already developed in 2016 has been reconducted in 2017 and included funding or co-funding of 3 Summer Schools and a Training Course. Like in 2016, more than 150 students and early career scientists have participated to the ECORD Schools and Grants, and 14 of them received a Scholarship to attend one of these schools.

Three ECORD Summer schools were sponsored by ECORD in 2017 (http://www.ecord.org/education/summer-schools/) : the « 14th Urbino Summer School in Paleoclimatology on Past Global Change Reconstruction and Modelling Techniques" (July 13-28, 2017; Urbino, Italy), the "11th ECORD Bremen Summer School » (21 August-16 September 2017 ; Bremen, Germany) focused on " Current-Controlled Sea-Floor Archives: Coral Mounds and Contourites" and the 2nd ECORD Petrophysics Summer School (27 June -1 July, 2017 ; Leicester, UK).

The third ECORD Training Course (http://www.ecord.org/education/summer-schools/) has been held at the IODP Bremen Core Repository at MARUM, Bremen, on March 6-10, 2017. This one-week course aimed at providing a "Virtual Drillship Experience" for scientists from academia and industry through a basic training in IODP expedition and core-flow procedures. The high number of applications (61) demonstrates a high demand from accross both academia and industry.

Seven ECORD Research Grants (http://www.ecord.org/education/research-grant/) were awarded to PhD students and early career scientists to conduct research on core materials and/or data related to successive scientific ocean drilling programmes (DSDP/ODP/IODP).

Since 2015 ECORD has deployed significant efforts towards teachers through the participation of ECORD Education Officers to *JOIDES Resolution* IODP expeditions as part of the "Teachers at Sea" programme initiated by Ocean Leadership (http://www.ecord.org/education/teachers-at-sea/) and the funding of the ECORD School of Rocks to supports educational activities of teachers interested in IODP science. In 2017, three teachers

from ECORD countries sailed onboard the *JOIDES Resolution* and the ECORD School of Rocks was held in Brussels, Belgium, from 29 November to 1 December 2017.

Communicating

Promoting activities and accomplishments of IODP to various audiences, including scientists, classrooms and the general public, is a major goal of ECORD. ECORD constantly update and create communication and educational material that are distributed across the ECORD member countries.

In 2017, the ECORD outreach staff has promoted the IODP and ICDP programmes under the umbrella of 'Scientific Drilling' at major international (EGU, AGU) and national science conferences with the organization of joint ECORD-ICDP booths and a Townhall meeting at the EGU in Vienna.

The ECORD outreach staff has responded to the very significant media impact of Expedition 364 Chicxulub Impact Crater with interest from large and small outlets worldwide (Canada, USA, UK, Japan, the Netherlands, Austria, Spain and Mexico). Hundreds of items have appeared on radio, in print and online, including features by Science, Nature and the BBC. In parallel, outreach events regarding Expedition 381 Corinth Active Rift Development have been organized before the expedition set sail from the port of Corinth and received global interest.

Gilbert Camoin, ECORD Managing Agency Director

Related websites:
http://www.ecord.org
http://www.iodp.org

Chikyu IODP Board (CIB) #6 Meeting
18th – 20th March, 2018
Takigawa Memorial Hall, Kobe University, Kobe, Japan

Item 7: Other FB, IODP Forum, and Agency Activities

Item 7e: 'MEXT'-Japan

Tatsuya WATANABE, Mr
Director for Deep Sea-Earth Scientific Research
MEXT, Japan
(Ministry of Education, Culture, Sports,
Science and Technology – Japan)

Contents

1. Personnel Change in J-DESC and MEXT
2. Update from MEXT as a funding agency, MEXT of Japan
   – Budget allocation to JAMSTEC
3. Review Processes in Japan

JAMSTEC: The Japan Agency for Marine-Earth Science and TEChnology

1. Personnel Change

J-DESC:

The IODP Committee Chair of J-DESC (Japan Drilling Earth Science Consortium):

Prof. Hiroshi NISHI -> Prof. Harue MASUDA as on 24th May 2017.

MEXT:

The Director for Deep Sea-Earth Scientific Research (in charge of IODP & ICDP), Eisho SATO was replaced by Tatsuya WATANABE as on 1st April 2017.

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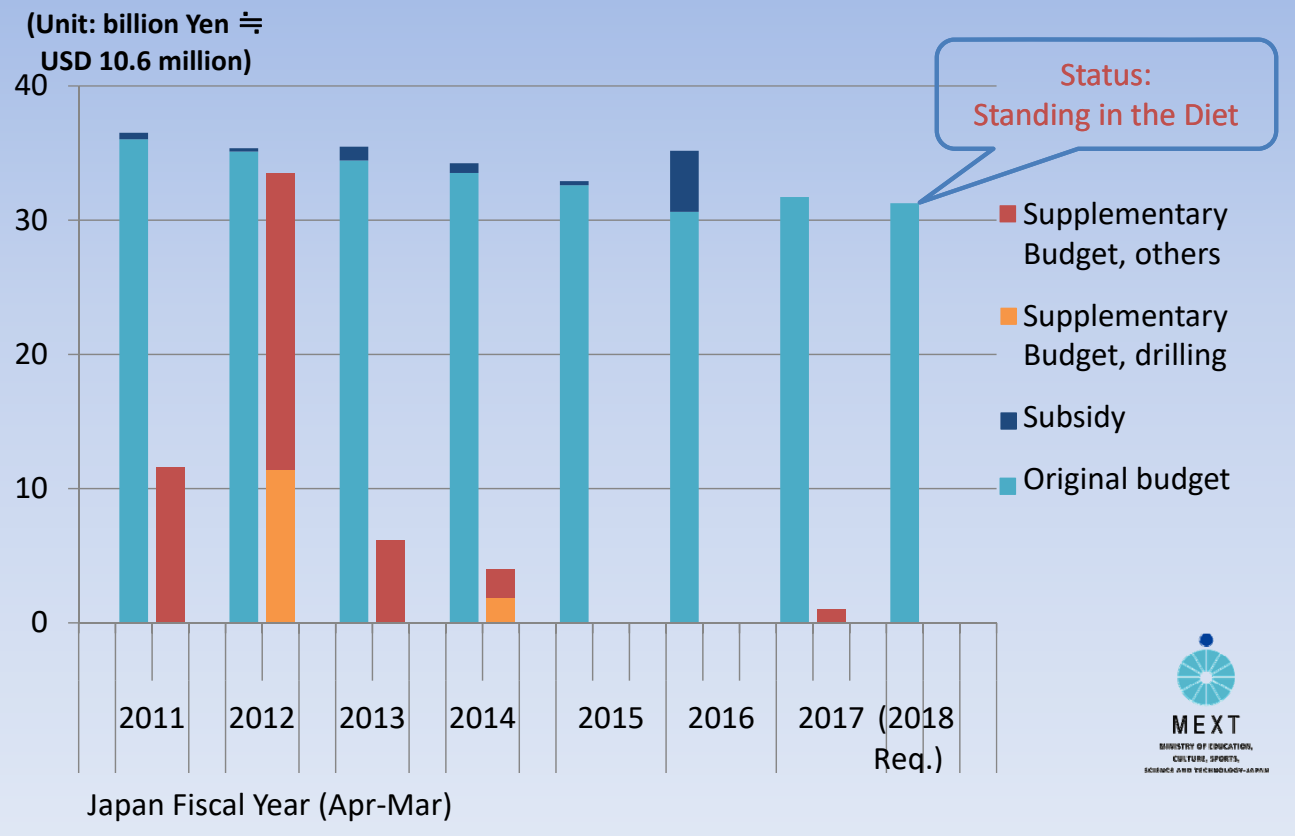
2. Budget Allocation to JAMSTEC



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MINISTRY OF EDUCATION, CULTURE, SPORTS, SCIENCE AND TECHNOLOGY-JAPAN

3. ‘Review’ Processes in Japan

- J-DESC (Japan Drilling Earth Science Consortium, a ‘community’ of scientists) is in streamlining process during 2017 and early 2018.
- The Basic Plan on Ocean Policy of Japan (2013) is under review and will be renewed as 3rd Plan (2018-) in early 2018.
- JAMSTEC 3rd Mid-term Targets and Activities Plan (FY 2014-2018) will be assessed and renewed in FY 2018. The 4th term commences at FY 2019-.

➢ Guidance, direction, and activities for 2019-2023 will emerge.

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Thank you!

Tatsuya WATANABE
Director for Deep Sea-Earth Scientific Research
Ocean and Earth Division
Research and Development Bureau
Ministry of Education, Culture, Sports, Science and Technology (MEXT)
Japan
tat-wat@mext.go.jp

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NSF/OCE/ODP Report to Chikyu IODP Board

March, 2018 Meeting

Kobe

NSF Budget

- **President's proposed FY2019 NSF budget same as actual FY2017 ($7.5B)**
  - Congress sets actual appropriation
  - Proposed FY2019 OCE/ODP funding same as actual FY2017
  - 2018 budget not yet set but likely flat
- **Financial situation for JR appears stable**
  - FY2018 APP JRSO budget is $66.8M
    - 10 months planned operations for both FY2018 and FY2019
    - Icebreaker support for JR operations is $1M additional (NSF/ODP pays)
    - Expensive year…
  - International Contributions to support FY2018 JR operations
    - $14.7M base contribution
    - South China Sea CPP Funds are a big help!

JR Facility Review

- 5-year Cooperative Agreement for JR operation requires annual and mid-award (3rd-year) reviews
- Reviews used in determination for renewal or re-competition of Cooperative Agreement, and for "mid-course" corrections
  - Are confidential and cannot be posted
  - NSF response is public
- NSF Panel met at JRSO February 28 – March 2, 2018 for FY2017 Review
  - U.S., European panel members
  - Received report from FY2017 co-chief review, held February 26-27

JR Facility Review Panel

- NSF selected Panel, in consultation with JRFB Chair and JOIDES Resolution Science Operation
  - 9 panelists, including Chair
  - 2 JR FB members
  - Facility experts within and outside scientific drilling
  - NSF pays panelist costs; panelists subject to NSF COI rules
- Panel Review and Scope follows NSF Large Facilities Office (LFO) Guidelines for Review of Large Facilities and the NSF JR CA Internal Management Plan
  - Report is to NSF
  - NSF ODP and IPS Management attended all proceedings
  - Operates under Federal Advisory Committee Act (FACA) and Freedom of Information Act (FOIA)
    - Part- Closed Meeting (Executive Sessions)
    - Open sessions included input from JR FB Chair (Koppers) and IODP Forum Chair (Austin)
    - Report is Confidential; will be shared with NSF Financial Partners and JRFB

Panel Report and NSF Response

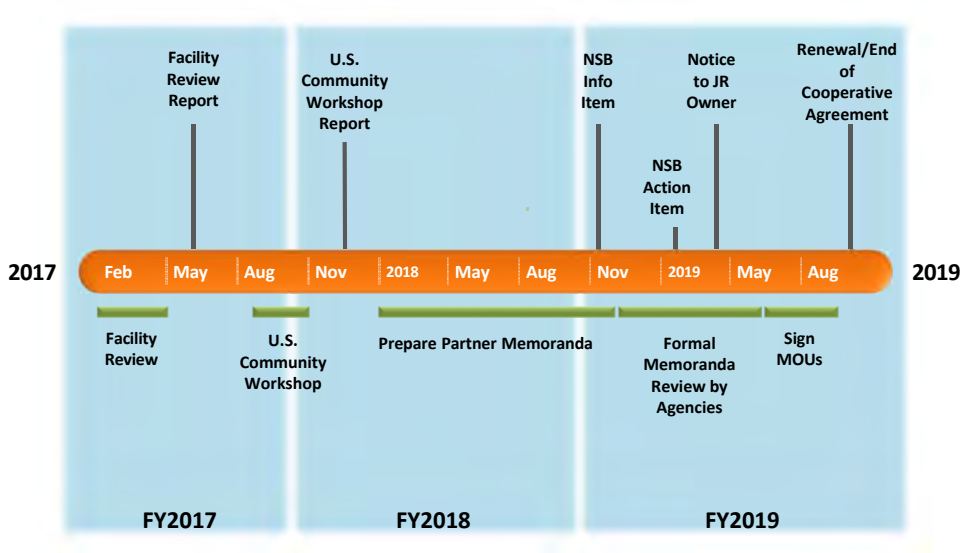
- NSF was pleased to receive the Executive Summary that states
  - **The JOIDES Resolution (JR) is a unique scientific research facility that permits Earth exploration and hypothesis-testing globally to tackle large-scale problems at the frontiers of our knowledge. No other platform offers its range of capabilities. The JOIDES Resolution Science Operator (JRSO) continues to perform the tasks of technical and scientific support to the world-wide research community in outstanding ways. The JR is an exceptional platform for research collaboration, with an outstanding track record of safety and operational efficiency that forges the development of international teams with diverse expertise that creates an enduring legacy. The JRSO Site Visit Panel concludes that the facility is being managed superbly well by the JRSO, with effective support from the JOIDES Resolution Facility Board and NSF, to meet the international scientific communities' Science Plan.**
- Panel Report gave both 3 challenges and 10 recommendations
  - No significant shortcomings identified
- NSF impressed with the Panel report and will write a response soon

JR Staffing

- 10 U.S. Party members on JR Expeditions
  - includes Onboard Outreach Program members
  - Will increase in FY2020
- Those sailing under Onboard Outreach Program are members of the Expedition Party
  - In shipboard party chain of command with Co-chiefs, EPM's
- Future Memoranda
  - Increase from $3M to $4M for full membership in JR Consortia
    - NSF would prefer minimal changes in language, Facility Board and panel membership numbers
    - NSF and ECORD agree on financial, staffing details
  - Co-chief scientists and Onboard Outreach members will be included in total quota rights- will treat all JR berths equally

JOIDES Resolution Facility Renewal

- NSF GEO Directorate will make decision soon as to whether to pursue facility renewal
  - 5-year is standard renewal (FY2020-FY2024)
  - National Science Board approves authorization for expenditure of funds for facility renewal, does not approve IODP Program
- Too early for NSF to speculate on post-International Ocean Discovery Program, including platforms or program(s)



NSF Seismic Solicitation

- Provision of Marine Seismic Capabilities to the U.S. Research Community (NSF17-563)
  - Up to $50M for 5 years or $10M/year, due Aug 21, 2017
  - One or more Proposals were received for a Cooperative Agreement to provide OCE with marine seismic support with or without R/V Marcus Langseth
  - Could allow commercial entity to work with academic or non-profit institution
  - Panel met November, 2017
  - NSF is determining a path forward, which will be announced shortly

Other NSF News

- William Easterling is the new Geosciences Assistant Director to NSF
  - Rotator from Penn State University; geographer and expert on climate change and food supply
- Larry Petersen new MGG rotator
- OCE has moved to the new Alexandria location
- More secure building
  - Public access limited to meeting room floors
  - Need escort to visit NSF staff-only spaces
- More panel meeting rooms

Agenda Item 8

JR Advisory Panels Report/Proposal Overview

a. Science Support Office

b. Science Evaluation Panel

IODP Science Support Office

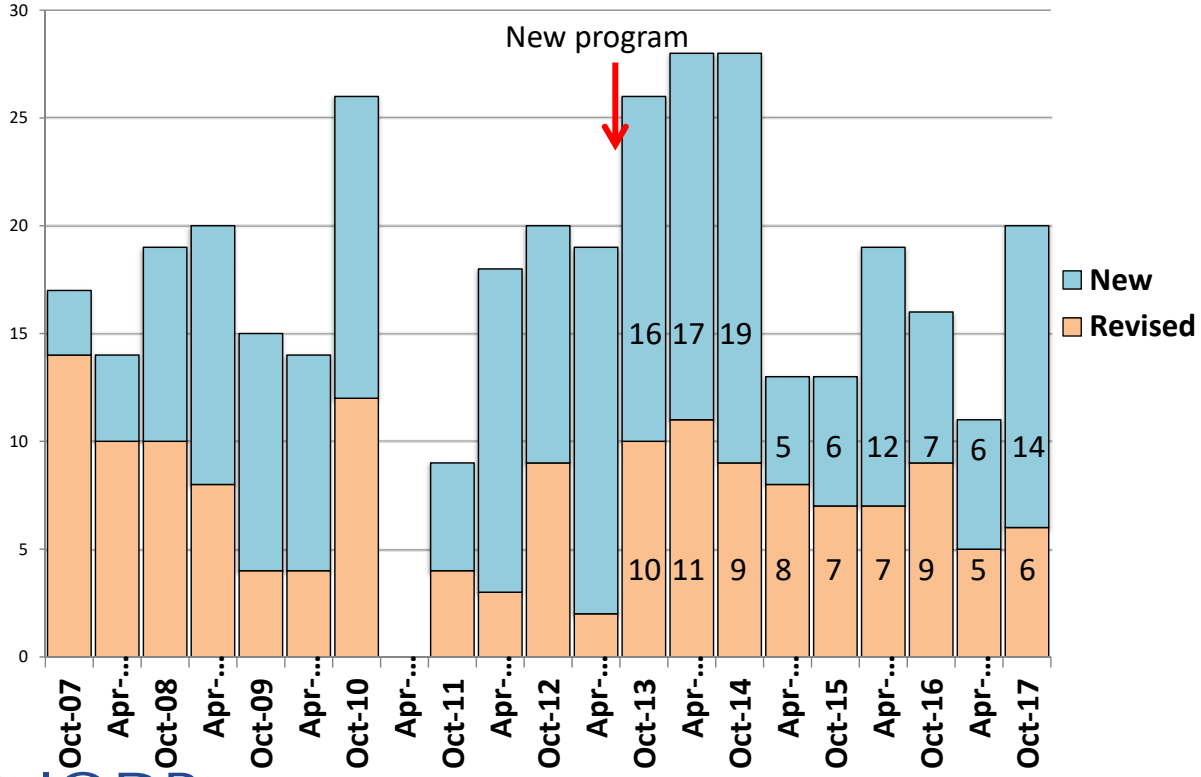
Chikyu IODP Board
19-20 March 2018
Kobe, Japan

Holly Given, Executive Director
Scripps Institution of Oceanography
University of California San Diego

SSO Cooperative Agreement Renewal

- Current award runs through 9/2018
- Accomplishment-based renewal proposal submitted 5/17; 7 reviews
- NSF states intent to award 1/2018
- Task work is essentially the same; anticipate SSDB refreshment
- New PI team includes Donna Blackman

Proposal Submission History



IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

Since International Discovery (October 2013):

- 101 NEW proposals
- 45% de-activated
- 37% still under active review
- 18% forwarded to FBs
  - –Of these, 12 scheduled or drilled

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

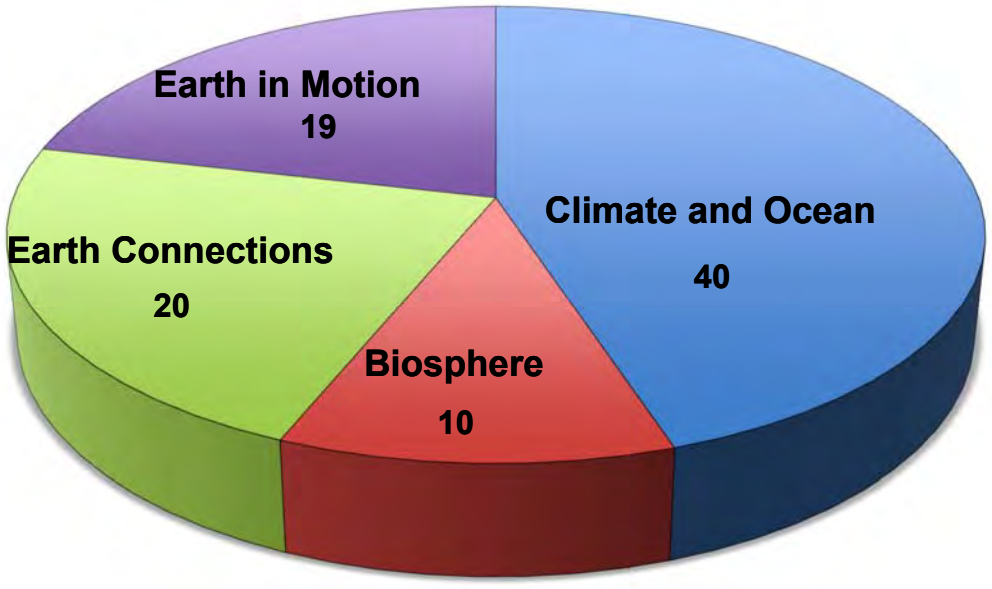
IODP Science Support Office • Scripps Institution of Oceanography • www.iodp.org

Proposal Outcomes, 2 SEPs

- 2 sent to Facility Boards (JRFB; one is APL)
- 6 sent to External Review (5 JR, 1 MSP)
- 4 sent to Holding Bin (all JR)
- 4 revision requests (3 JR, 1 MSP)
- 12 invited to develop Full proposals (8 JR, 1 Chikyu, 2 MSP)
- 7 de-activations (All JR)

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

Active proposals: 89
by science plan themes



As of February 1, 2018

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

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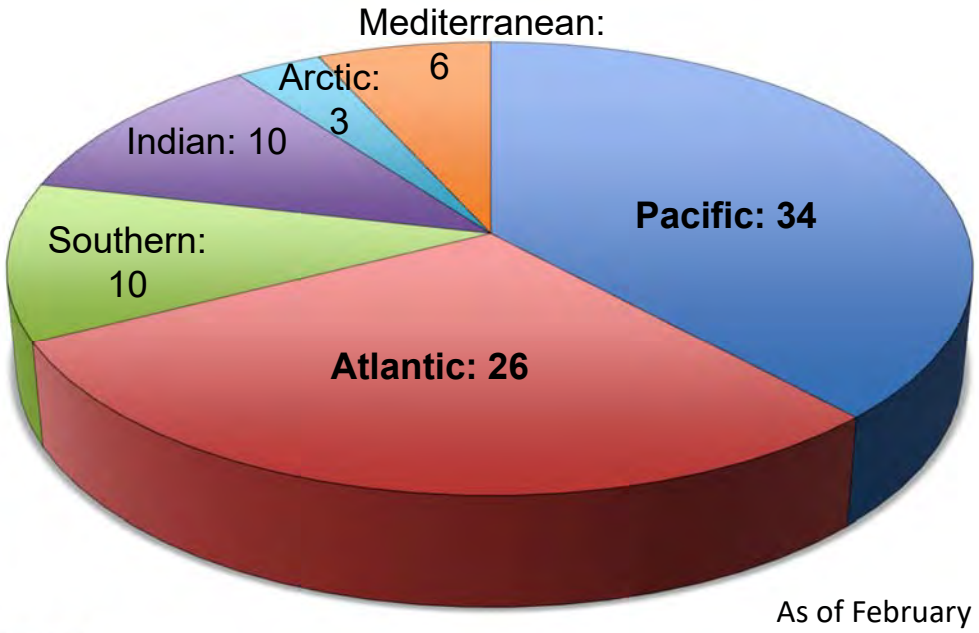
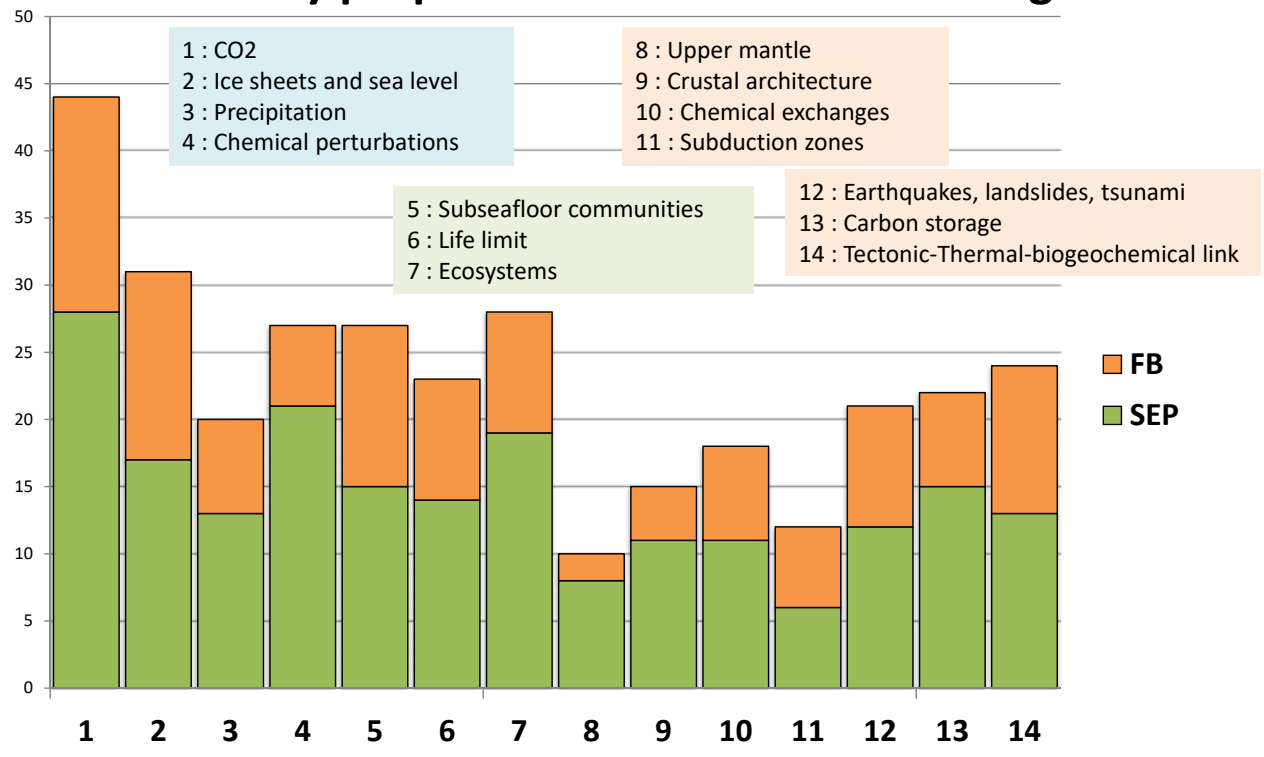
Active proposal status: 89

by target ocean



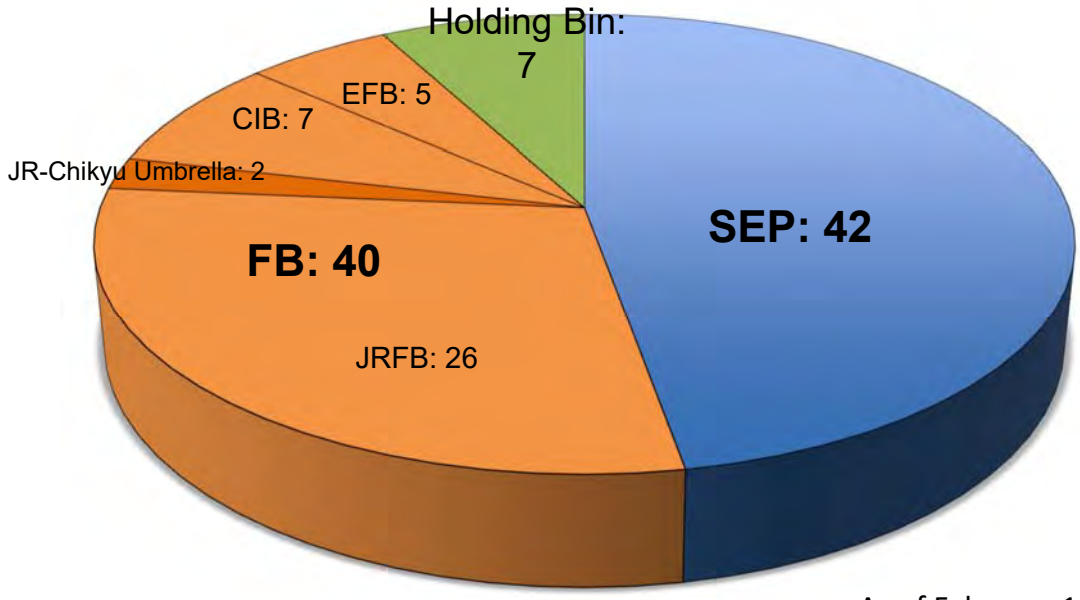
As of February 1, 2018

How many proposals address which challenges?



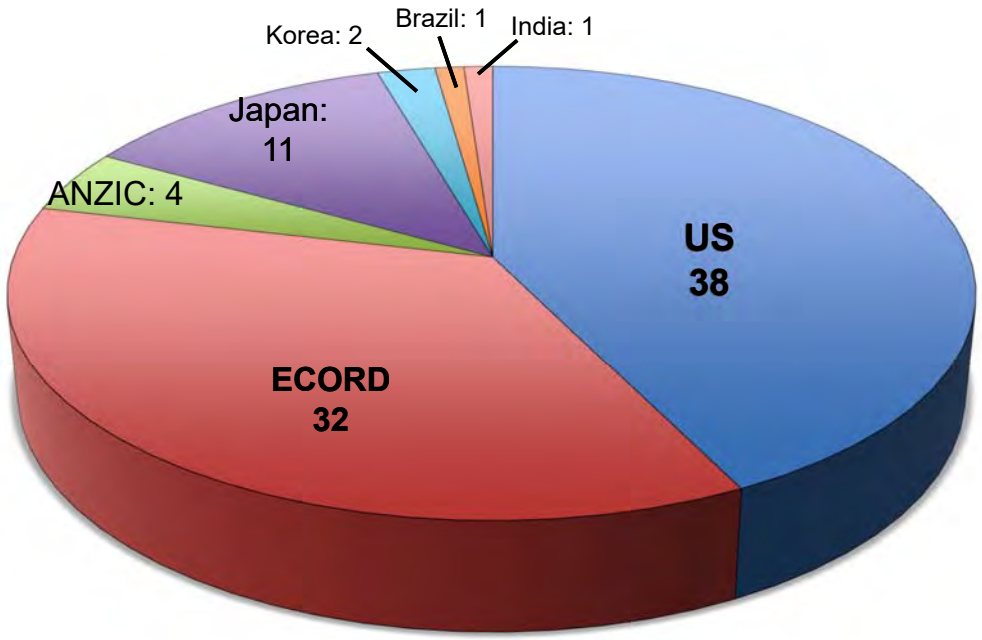
As of February 1, 2018

Active proposal status:89
by review stage



As of February 1, 2018

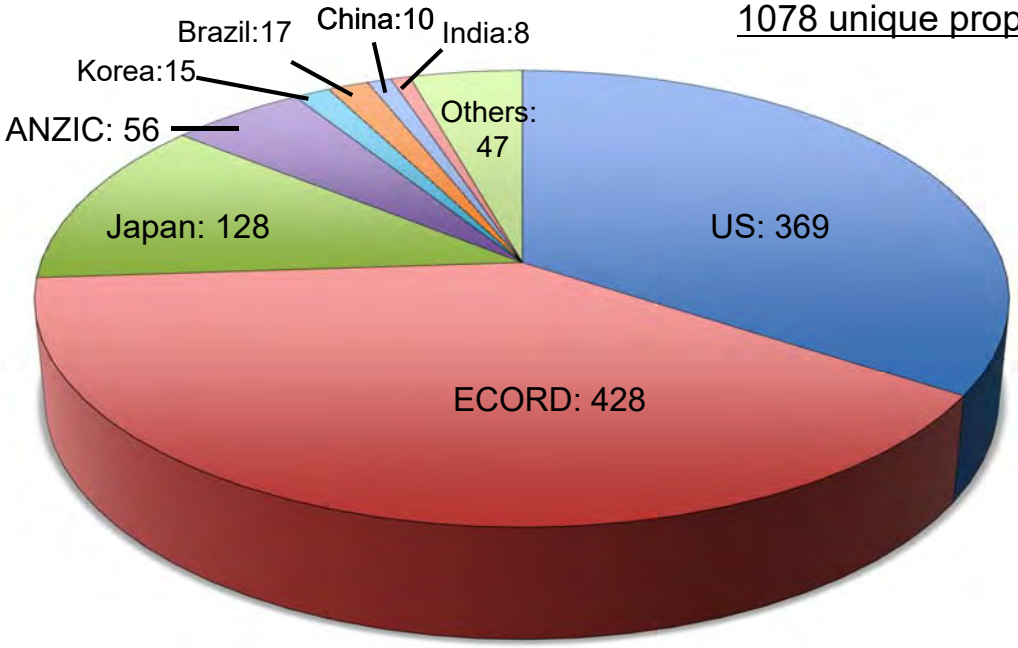
Active proposals: 89
by lead proponent's member affiliation



As of February 1, 2018

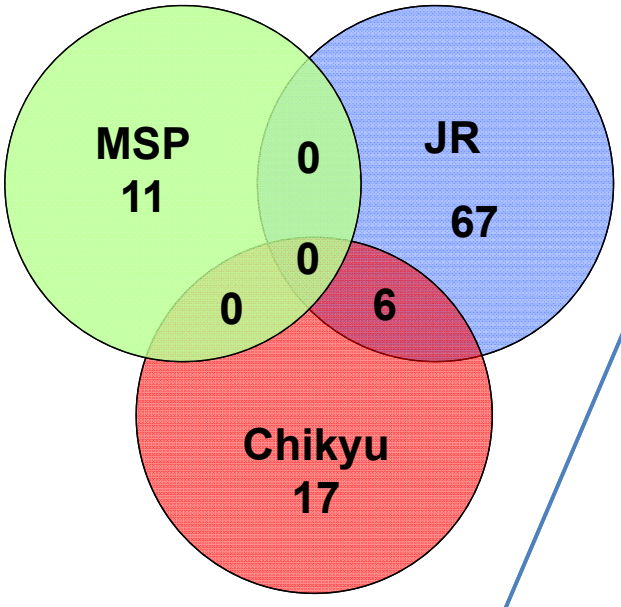
Active proponent distribution

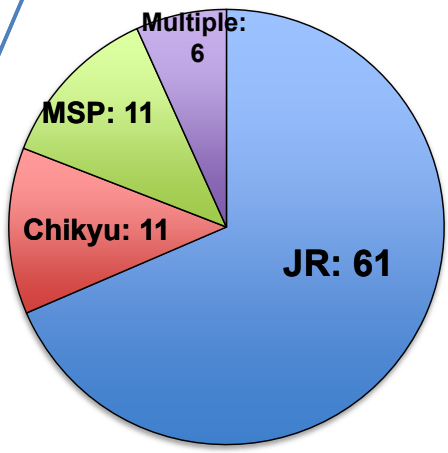
1078 unique proponents



As of February 1, 2018

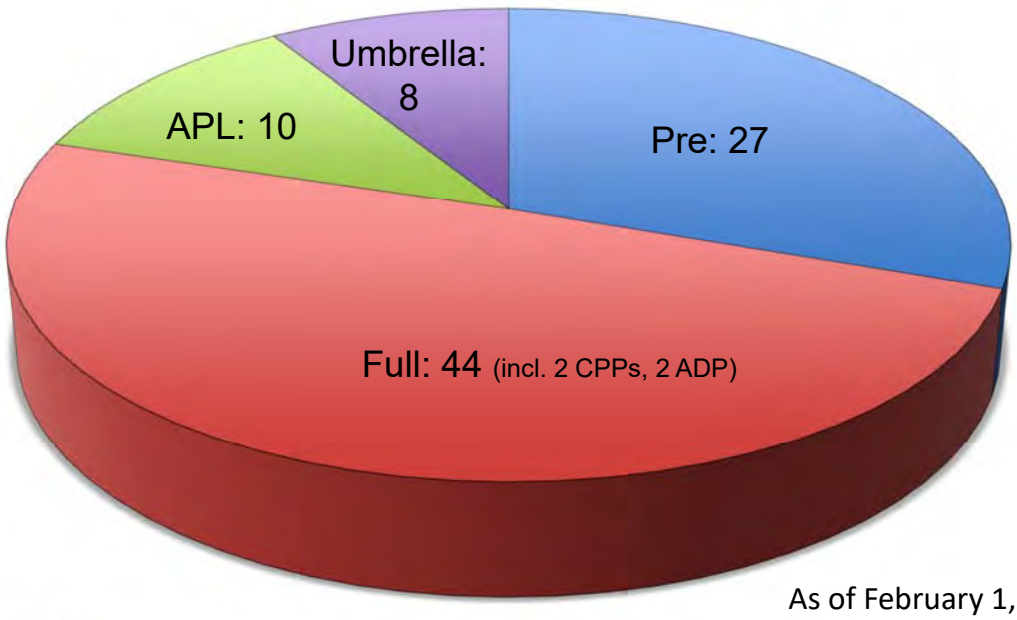
Drilling Platforms for 89 Active Proposals





As of February 1, 2018

Active proposals: 89
by proposal category



As of February 1, 2018

IODP
INTERNATIONAL OCEAN DISCOVERY PROGRAM

Agenda Item 9

a. Overall Chikyu Operation

b. NanTroSEIZE

   PCT report

   IODP Exp. 380 Results

   Core-Log-Seismic-Integration (CLSI)@Sea Program Results

   IODP Exp. 358 Planning

c. Lord Howe Rise Project

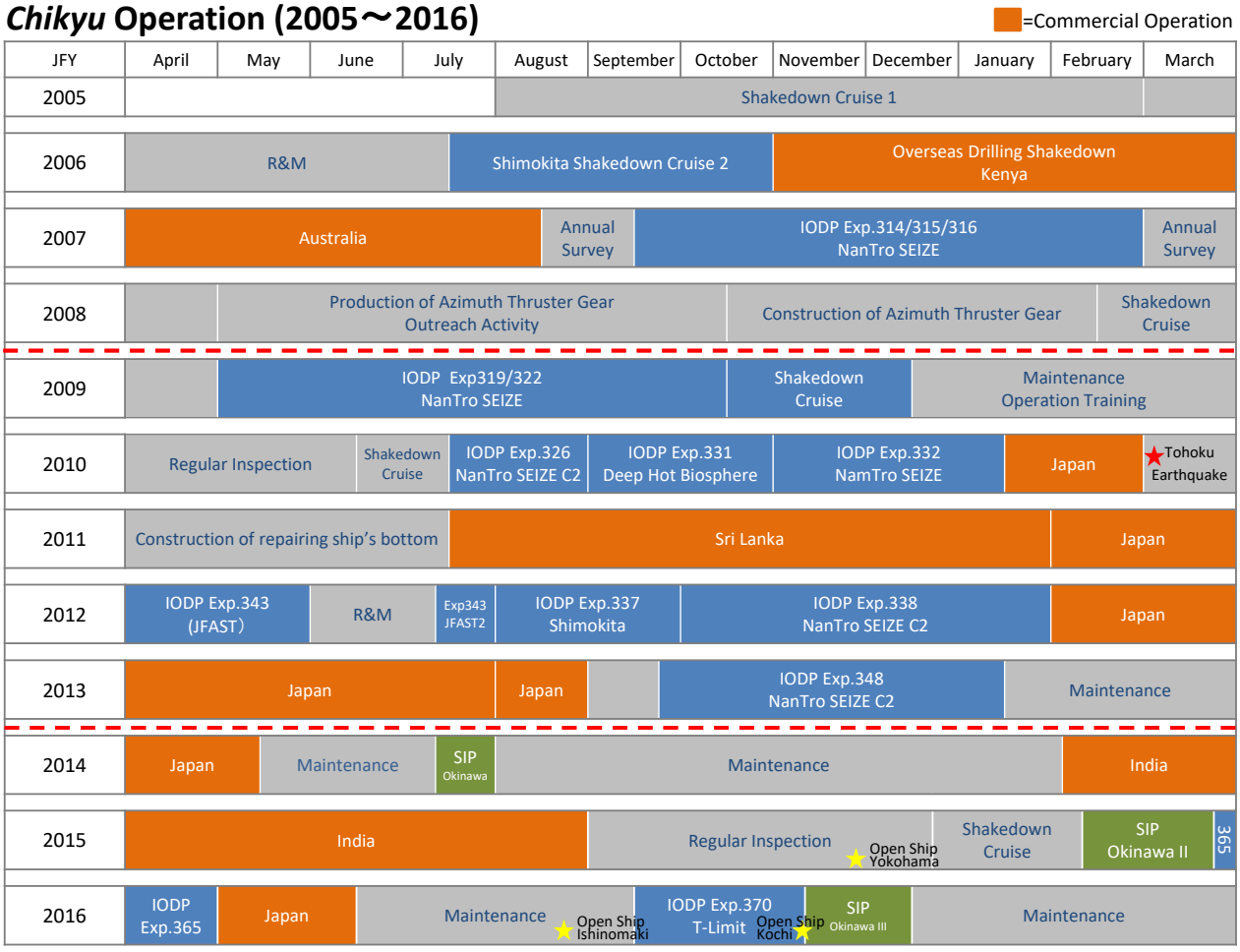
   Current Status

   PCT Report

9. *Chikyu* Operation/Status Update

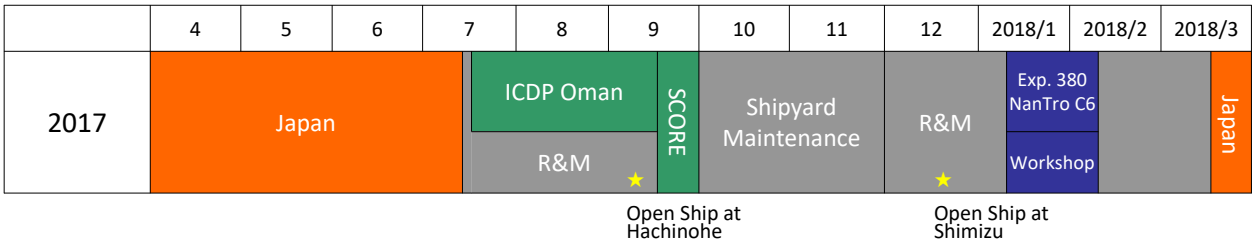
a. Overall *Chikyu* Operation

Chikyu Operation (2005～2016)



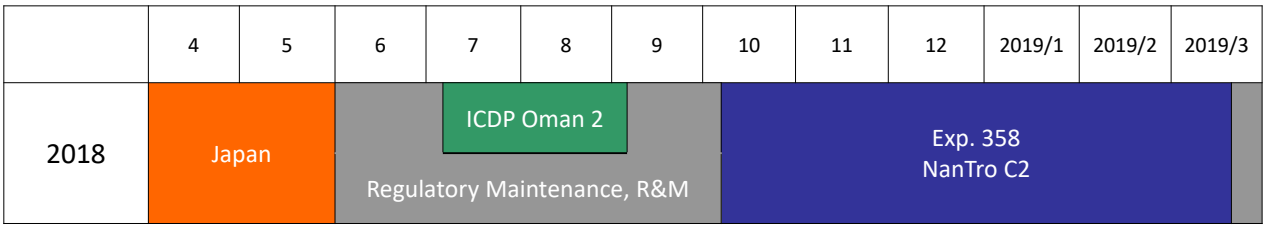
SIP: Cross-ministerial Strategic Innovation Promotion Program

Summary of *Chikyu* Operation JPFY2017



- Japan (Commercial operation)
- ICDP Oman drilling project, core analysis onboard *Chikyu* (15 July – 15 September, 2017)
- SCORE Exp. 910 (19 September – 23 September, 2017)
- IODP Exp. 380 (12 January – 7 February, 2017)
  "NanTroSEIZE Frontal Thrust Borehole Monitoring System "
- A Core-Log-Seismic Integration Investigation at Sea (Workshop) (12 January – 7 February, 2017)

Outlook of *Chikyu* Operation JPFY2018



- Japan (Commercial operation)
- ICDP Oman drilling project Phase 2, core analysis onboard *Chikyu* (Early July – Early September, 2018)
- IODP Exp. 358 (7 October, 2018 – 21 March, 2019)
  "NanTroSEIZE Deep Riser Drilling: Nankai Seismogenic/ Slow Slip Megathrust"

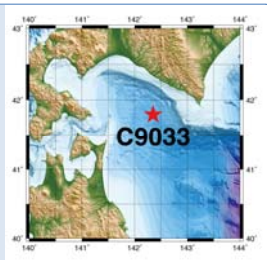
Chikyu Shallow Core Program (SCORE)

- A new program for shallow (about 100m below seafloor) and short period scientific drilling = increase scientific drilling opportunities
- Proposal format similar to IODP = train early carrier scientists
- Evaluation procedure similar to SEP = train potential members

1) Proposal application (through the year) 2) Scientific evaluation by J-DESC (two times a year) 3) Decision of implementation and scheduling by CDEX 4) Shallow core drilling using HPCS

Cape Erimo West off Drilling (Exp. 910)

- 19 September – 23 September, 2017
- 3 holes, 206.5m of cores in total
- To explore the impact of submarine landslides on the deep biosphere-evolution



ICDP Oman drilling project, core analysis onboard *Chikyu*

- ICDP "Oman drilling project" is aimed to drill the whole ophiolite sequence (crust and mantle) of the oceanic lithosphere

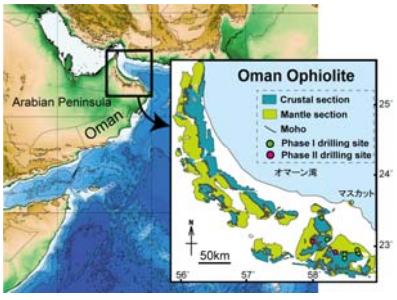
<Phase 1>

- Described and measured 1500m cores onboard *Chikiyu* using 20 methods
- 15 July – 15 September, 2017
- 71 Onboard Scientists from 14 countries
- CDEX gained experience for future *Chikyu* hard rock expeditions

<Phase 2>

- Description and measurement of cores including Crust–Mantle boundary onboard *Chikyu* is under consideration
- Early July – Early September, 2018?

icdp oman drilling project



Summary of CDEX/JAMSTEC activities

- CDEX/JAMSTEC successfully carried out IODP Exp. 380 (Agenda 9b) and the Expedition received high valuation from TAT (Agenda 10).
- IODP Exp. 358 is expected to be the culmination of the NanTroSEIZE. CDEX/JAMSTEC is steadily preparing for this ambitious and technically challenging operation (Agenda 9b, 10).
- CDEX/JAMSTEC is making efforts in collaboration with Geoscience Australia to secure budget for the Lord Howe Rise Project and is also preparing for the operation（Agenda 9c, 10）.
- Complementary Project Proposals (CPP) and new Chikyu members are always more than welcome to accelerate the execution of future IODP expeditions.

- In Agenda 16, please review IODP related activities (IODP Exp. 380 and other activities such as CLSI@Sea, technology development, outreach) carried out in JFY2017（Agenda 9b, 10, 13, 16).

Chikyu/IODP Performance Review

Points of Review:

To what extent have the following goals been achieved?

- Efficiently operate and share both facilities and equipment
- Improve and maintain research environment to attract outstanding researchers from domestically and internationally of Japan
- Contribute as a hub for international human resource exchanges
- Contribute to the promotion of advanced science and technology
- To widely disseminate news to the public about the marine scientific technology developments and contributions to society carried out by CDEX
- Contribute to improving the international recognition of “Chikyu”

Chikyu IODP Board #6
19-20 March 2018
Kobe, Japan

NanTroSEIZE: Project Coordination Team Update

CDEX Science Services Dept.
Sean Toczko

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

CDEX JAMSTEC

PCT #8: 10-11 Oct 2017

- Geomechanics Team (David, Demian, Harold, Sugihara)
- 358 Science leaders discussed, proposed
- 358 Staffing plan reviewed, numbers & specialties discussed
- Items for real-time mug-gas monitoring (He, CH4, etc.)
- Prioritize LWD/wireline items
- Coring protocols
- Evaluate and choose CLSI@Sea Researchers
- Need to share list of ‘important dates’

IODP 380 Discussion

- Planned 12 Jan - 24 Feb 2018 (40 days)
- Limited to installation of LTBMS (ONLY – no logging, no samples collected)
- Site C0006; Hole C0006G coordinates fixed.
- Complete 3-LTBMS transect:
  - Kumano Basin (C2) – Megathrust (C10) – Frontal Thrust (C6)
- 6 scientists
- Preparation status

IODP 358 Discussion

- Updated Operation plan
- Staffing outline/schedule
- Call for applications reviewed
- PMO support
- Logging & coring needs

PCT #8 Consensus Items - 358

- Rough dates for expedition science windows set. This needs to be included in call for application. Detailed table in prospectus. Applicants will be asked to identify windows they CAN'T sail. Detailed sailing dates & notification process to sail will be shared with successful applicants. Applicants need to submit "what they expect to contribute/learn from experience" letter.
- Science Leaders need to be selected. Dream team and then work from there. Max 9 members. Science coordinators can fill in science team slots as needed.
- Science Team members (rough numbers): Logging: 6, PP: 7, Struct: 7, Lith: 7, Mud Gas: 4.
- PMOs support HUET
- Call deadline: after AGU

PCT #8 Consensus Items – 380 & CLSI@Sea

- 14 applicants identified for selection. One (Gael Lymer) will be asked to revise/focus science targets. One (Hsiung) will be asked to extend to full program.
- Detailed program schedule needs to be developed by 31 October 2017. Therefore, shore-based science mentors can agree on a schedule for their presentations and support activities.
- Site C0012 logs and cores from upper section could be made available, if rationale is strong enough.
- A NanTroSEIZE bibliography (pdfs & references) should be assembled for the on board researchers.
- The 3D seismic data needs to be aboard.

PCT #8 Consensus Items – 380 & CLSI@Sea

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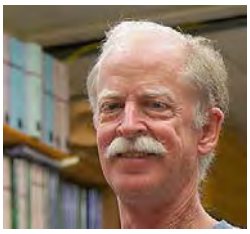
Chikyu IODP Board #6
19-20 March 2018
Kobe, Japan

IODP Exp 380: Frontal Thrust Long-Term Borehole Monitoring System

CDEX Science Services Dept.
Sean Toczko

Co-Chiefs, EPM, and SP members

Masa Kinoshita (CC)



Kier Becker (CC)

Sean Toczko (EPM)

Burhan Senyener

Alex Roesner

Yuya Machida

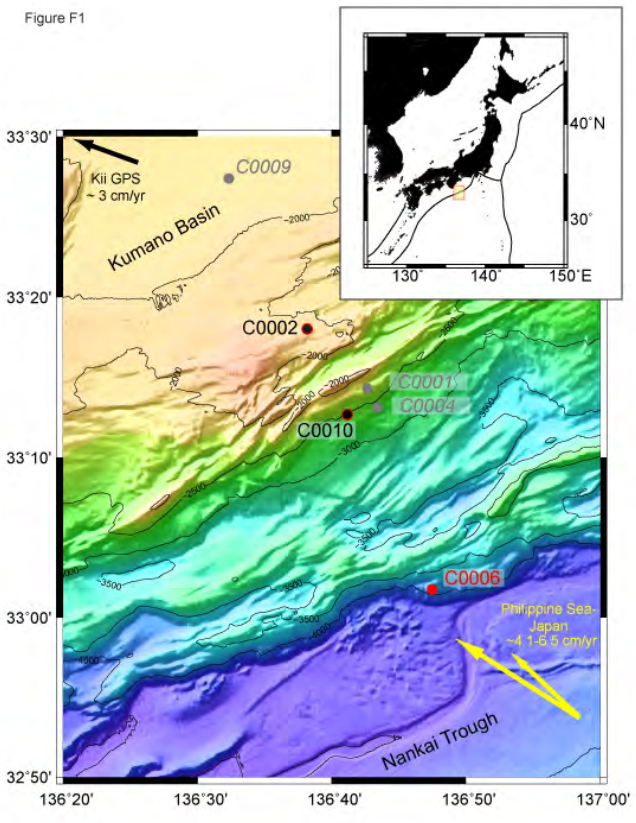
Tian Sun

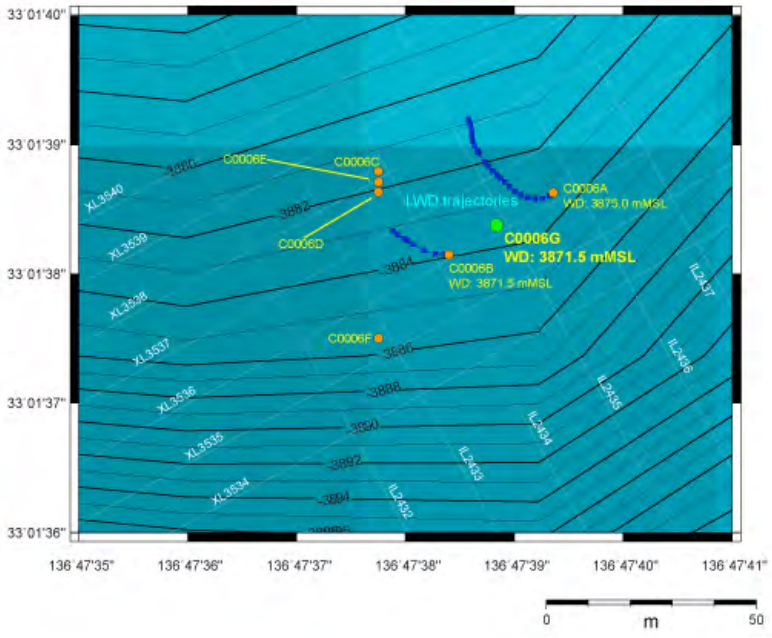
Toshinori Kimura

Josh Edgington

380 Science Objectives:

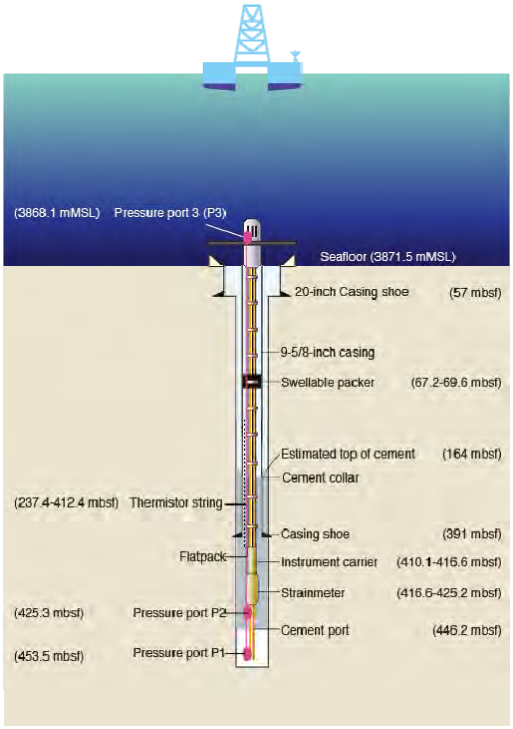
- Fundamental NanTroSEIZE science objectives include: characterizing fault slip & strain accumulation, fault & wall rock composition, fault architecture, & state variables throughout the active plate boundary system.
- Deploy long-term borehole monitoring system (LTBMS) in new cased hole at Site C0006 above the frontal thrust (previous location of logging-while-drilling and coring operations). The 3rd NanTroSEIZE LTBMS, & will extend existing LTBMS network seaward to the frontal thrust of the Nankai accretionary prism.





LTBMS at Hole C0006G

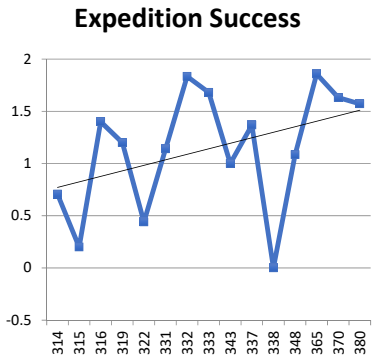
1. Pressure sensing unit
2. Strainmeter
3. Broadband seismometer
4. Tilt-combo
   - Tilt logger
   - Geophone
   - Accelerometer
   - Tilt meter
   - Thermistor string
5. Acoustic modem

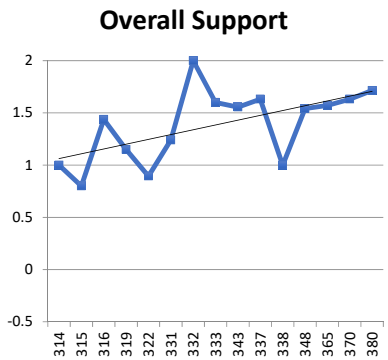


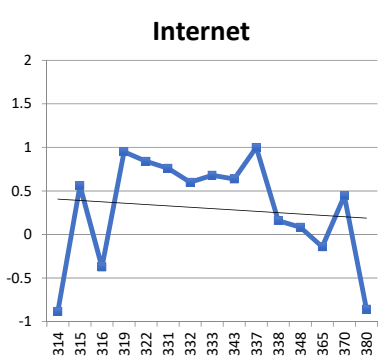
Summary

- Planned 12 Jan - 24 Feb 2018 (40 days)
- Limited to installation of LTBMS (ONLY – no logging, no samples collected)
- Site C0006; Hole C0006G
- Complete 3-LTBMS transect:
  - Kumano Basin (C2) – Megathrust (C10) – Frontal Thrust (C6)
- Completed in 27 days (!)
- No Kuroshio Current (!)

Evaluation:







- Overall success **high & improving** with every operation.
- Internet services becoming **worse**.

Some examples:

- Intranet & wifi unstable; “…keep being kicked off shared server...”
- Wifi network: of three ”available” networks, only one at a time worked, & one NEVER worked.
- Intranet printers: “...printer drivers old...”, “...could NEVER print to any network printer...”
- Internet & IP phone: “...connectivity at best, very poor...”
- NO onboard IT support

Solutions?

- Full/On-board IT support needed
  - Network Admin Specialist
  - Desktop support specialist
  - Hardware guru
- Expand current MWJ contract to specify these needs
- CDEX Science Services Support / Data Specialist/Manager

10. Chikyu Operation/Status Update

b. NanTroSEIZE

Core-Log-Seismic Integration at Sea Program

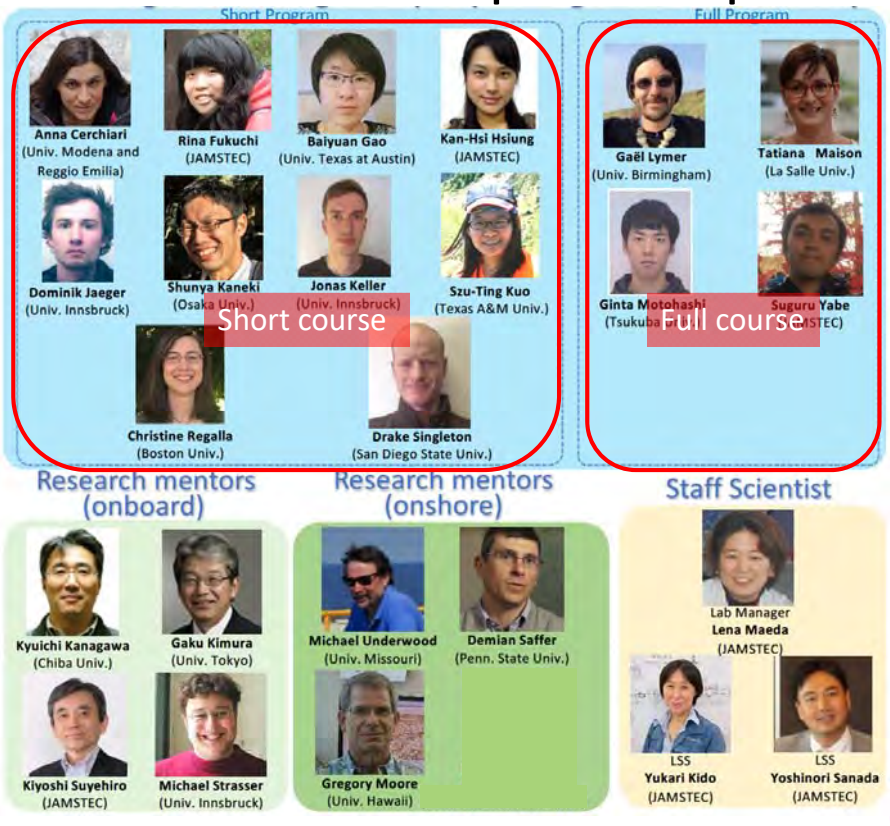
CLSI at Sea: Purpose

- Further investigation of the role of the Nankai Frontal Prism in past tsunamigenic earthquakes and slow slips
- Focus on cores and logging data in the frontal ramp thrust portion of the prism (Site C0006 & C0007) and input site (Site C0012)
- Find and publish original researches
- Promote studies of subduction zone by young career scientists and students

CLSI at Sea: Timeline

Time	Status
Feb 2017	• Started reviewing data to make plan
Mar 2017	• Presented the concept and got recommendation of CIB at CIB#5 meeting
May 2017	• Each PMO agreed on payment of travel and HUET for the participants • Presented the concept to NanTroSEIZE PCT
Jul 2017	• Released call by PMOs
Sep 2017	• Selected applicants by NanTroSEIZE PCT
Oct 2017	• Started making lecture plan and schedule adjustment with each science mentor
Jan 2018	• Start program

CLSI at Sea Workshop: Participants



CLSI at Sea: Schedule

Date	Contents
Jan 12	Embarkation
Jan 13	Lectures and VCD lecture
Jan 14 – Jan 19	Lectures, discussions for research plan and sample request, logging data instruction, lab instrument training
Jan 19 – Jan 22	Sampling and data analysis
Jan 23 – Jan 25	Measurements, data analysis, discussion
Jan 26	Disembarkation of short course participants
Jan 27 – Jan 28	Sampling and data analysis
Jan 29	Measurements and data analysis
Jan 30	Results overview and discussion
Jan 31 – Feb 6	Data analysis, meeting for report writing, writing report
Feb 7	Disembarkation

CDEX

CLSI at Sea: Lectures

Date	Lecturer	Title
Jan 13	Gaku Kimura	• History of NTS project
	Michi Strasser	• Short briefing for core flow and sedimentology VCD • Sedimentology VCD at Core Lab
	Kyu Kanagawa	• Short briefing for lithology and structure VCD • Lithology and structure VCD at Core Lab
Jan 14	Greg Moore (remote lecture)	• Regional tectonics and evolution of the Nankai Trough
	Mike Underwood (by Michi)	• Nankai-Shikoku lithostratigraphy • Sediment provenance, routing and depositional models



CLSI at Sea: Lectures

Date	Lecturer	Title
Jan 14	Michi Strasser	• Nankai sediment mass-transport, submarine landslides and paleoseismology
	Kiyoshi Suyehiro	• Earthquakes to a seismologist: how their seismological characterizations are made
Jan 17	Kiyoshi Suyehiro	• Earthquake modeling and observations: how to deal with probability of occurrence
Jan 19	Demian Saffer (remote lecture)	• Physical properties and hydrology overview
	Gaku Kimura	• Tectonics framework
Jan 20	Keir Becker	• History and overview of CORKs
Jan 22	Masa Kinoshita	• Thermal structure in the Nankai accretionary prism off Kumano, inferred from in-situ temperature

CDEX

CLSI at Sea: Lab Work

- Preparation
  - All shipboard data and IODP reports of NanTroSEIZE expeditions
  - Total ~2400 archive and working core sections and all sample residues of shipboard measurements collected at Site C0006/C0007/C0012
  - Techlog software license x 2
- Core
  - Sample request: 9
  - Collected samples: 519

Site	Hole	Number of sampled core section
C0006	C	11
	D	11
	E	321
	F	74
C0007	A	5
	B	11
	C	76
	D	103
C0012	A	281
	C	22
	D	18
Total		933

CDEX

CLSI at Sea: Lab Work

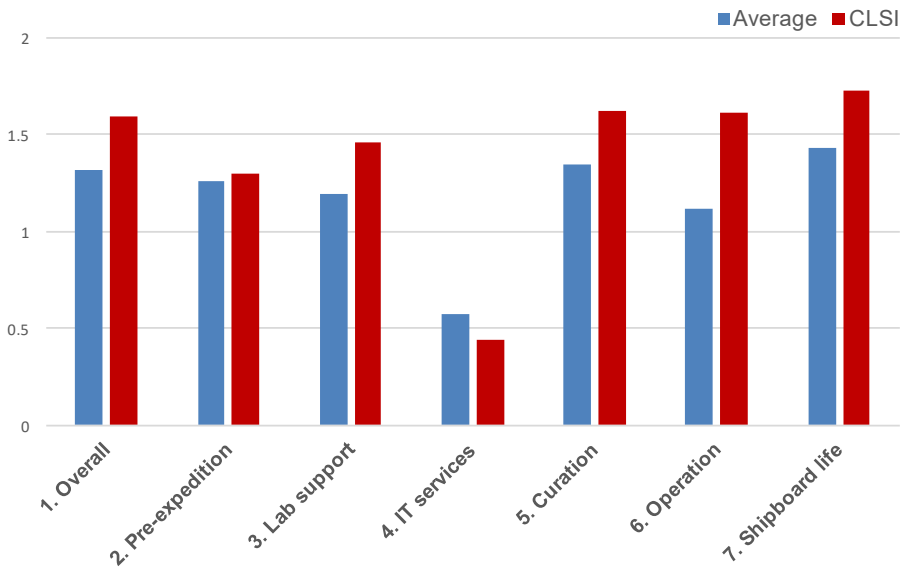
- Sample Preparation
  - For vitrinite reflectance and volcanic glass analysis
  - For micro-structure analysis
- Measurements
  - XRD: 437
  - Particle size analysis: 24
  - SEM-EDS on C0007D-29R-2

- Data analysis
  - Density vs XCT value
  - Physical properties vs Vp
  - Fractures from logging data and VCD/XCT images
  - Seismic data

Now preparing workshop report to submit EOS and Scientific Drilling

CDEX

CLSI at Sea: Evaluation



Rate: Excellent (2), Good (1), Adequate (0), Poor (-1), Unacceptable (-2)
15 votes from 18 scientists

CDEX

CLSI at Sea: Evaluation

Rated more than “GOOD” except IT service.

In particular,

Shipboard curation was rated high

The workshop participants appreciated lab curator and lab tech support for personal sampling.

IT service was rated low

In addition to internet connection issue, Wi-Fi to connect shipboard server was quite unstable. The participants faced difficulty to access/share files stored in the shipboard server.

CDEX

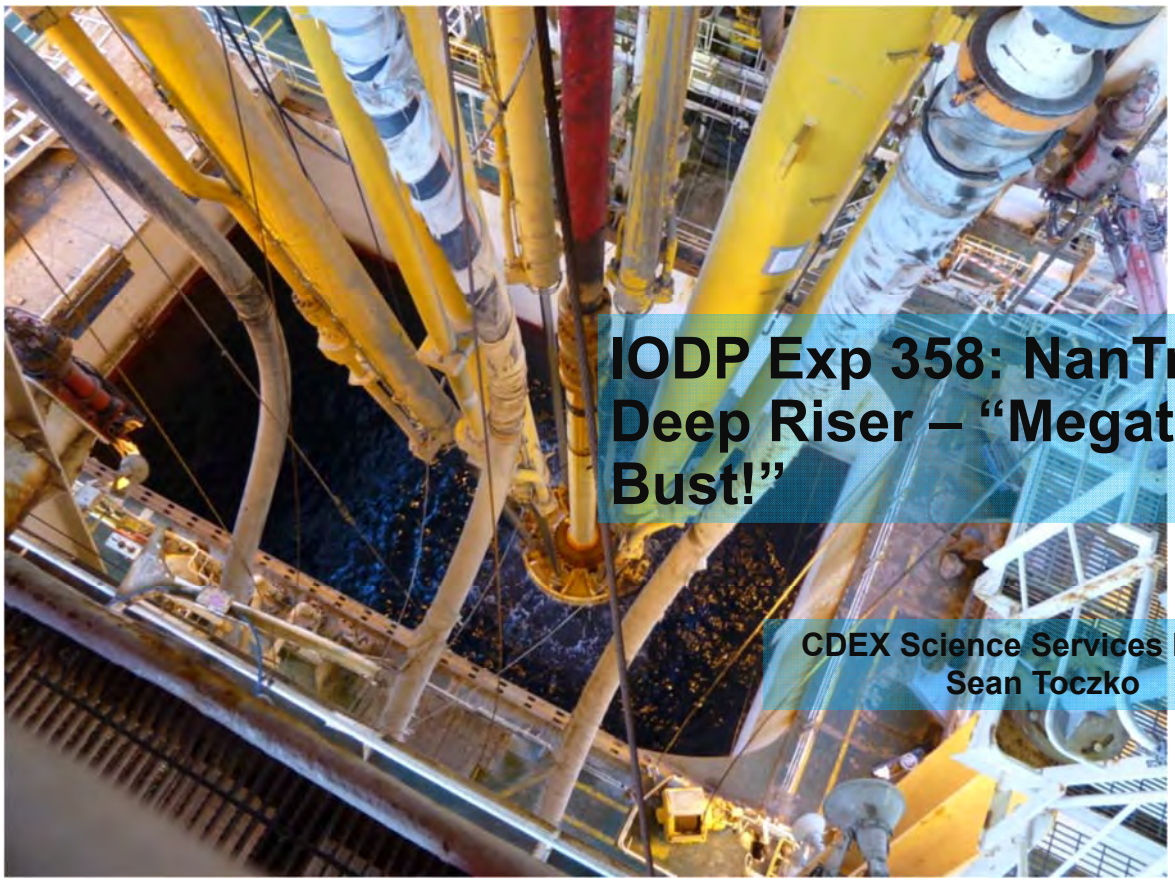
CLSI at Sea: Evaluation

Recommendations for the future workshop at sea

- To be distributed prior to the workshop
  - ✓ General outline of schedule/plan
  - ✓ Pre-cruise meeting (via web conference)
  - ✓ Bibliography of the target sites
  - ✓ Scanned images of working halves

- To be improved or solved
  - ✓ Wi-Fi and internet connection
  - ✓ Book collection for subduction zone
  - ✓ Low-priced software (instead of very expensive Petrel) for scientists to do seismic interpretation

CDEX



Chikyu IODP Board #6
19-20 March 2018
Kobe, Japan

IODP Exp 358: NanTroSEIZE Deep Riser – "Megathrust or Bust!"

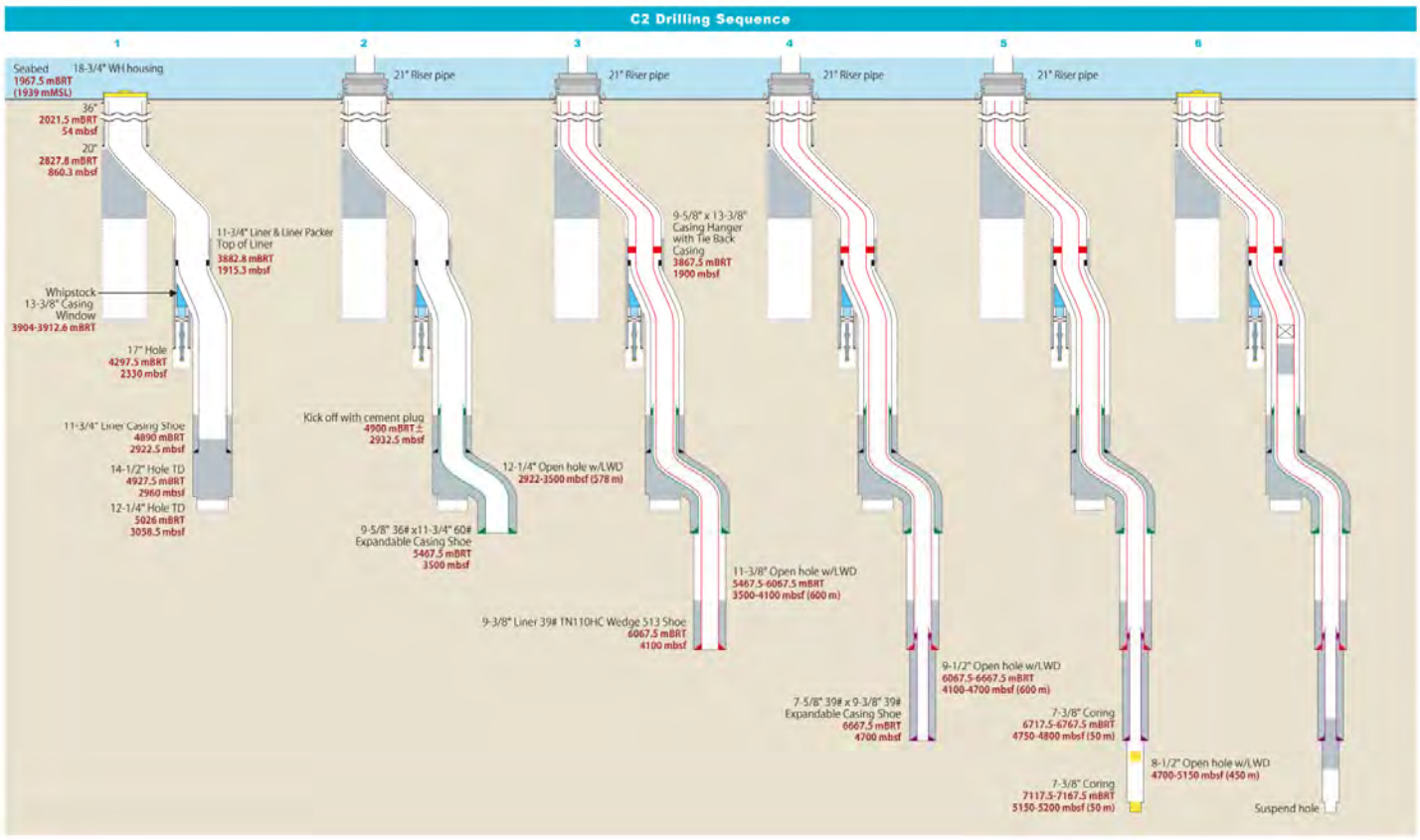
CDEX Science Services Dept.
Sean Toczko

IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

CDEX JAMSTEC

358 Science & Operational Objectives

- Extend riser Hole C0002P to & across main plate boundary fault
- Determined as high amplitude seismic reflector ca. 5000 mbsf
- Collect continuous:
  - LWD
  - cuttings
  - mud gas logging
  - limited coring (ca. 100 m)
- Leave hole cased and capped
- 7 Oct 2018 to 21 March 2019 (164 days)
- Final ship-board quay-side sampling science meeting



IODP 358 Operation Plan

Operation	Date Start	Operation Days	Contingency End Date	Date End
Portcall in Shimizu	7-Oct-18	3		10-Oct-18
Transit, Deploy Transponders, Recover corrosion cap, Preparation	10-Oct-18	3.5	33	13-Oct-18
Run & set BOP and Riser	13-Oct-18	11	33	24-Oct-18
CBL/USIT, Sidetracking from original well	24-Oct-18	29.5	33	23-Nov-18
Drill to 3500 mbsf with LWD, Set 9-5/8-inch x 11-3/4-inch Expandable Liner	23-Nov-18	15	33	8-Dec-18
Drill to 4100 mbsf with LWD, Set 9-3/8-inch Liner	8-Dec-18	16	33	26-Jan-19
Drill to 4700 mbsf with LWD, Set 7-5/8-inch x 9-3/8-inch Expandable Liner	24-Dec-18	19	33	14-Feb-19
Drill to 5200 mbsf with LWD (TD), Including Coring (50 m x 2 times)	12-Jan-19	25	33	11-Mar-19
Suspend hole	6-Feb-19	7	33	18-Mar-19
Set corrosion cap, Recover Transponders, Transit	13-Feb-19	2	33	20-Mar-19

358 Science Leaders

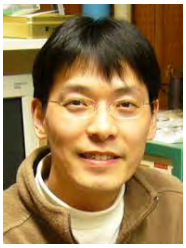
Harold Tobin

Demian Saffer

Hiroko Kitajima

Matt Ikari

Asuka Yamaguchi



Takehiro Hirose

358 Staffing Plan

- Science Leaders (not ‘co-Chiefs”)
- Science Party arranged in Teams by specialty (& Team Leaders)
- Make self AVAILABLE for time windows (2-3 months)
- Likely SAIL for 1 or more “2-4 week shifts”
- Participate in Final analysis and sampling meeting at expedition end (start ca. 21 Mar 2019)
- Helicopter Underwater Escape Training (HUET) required

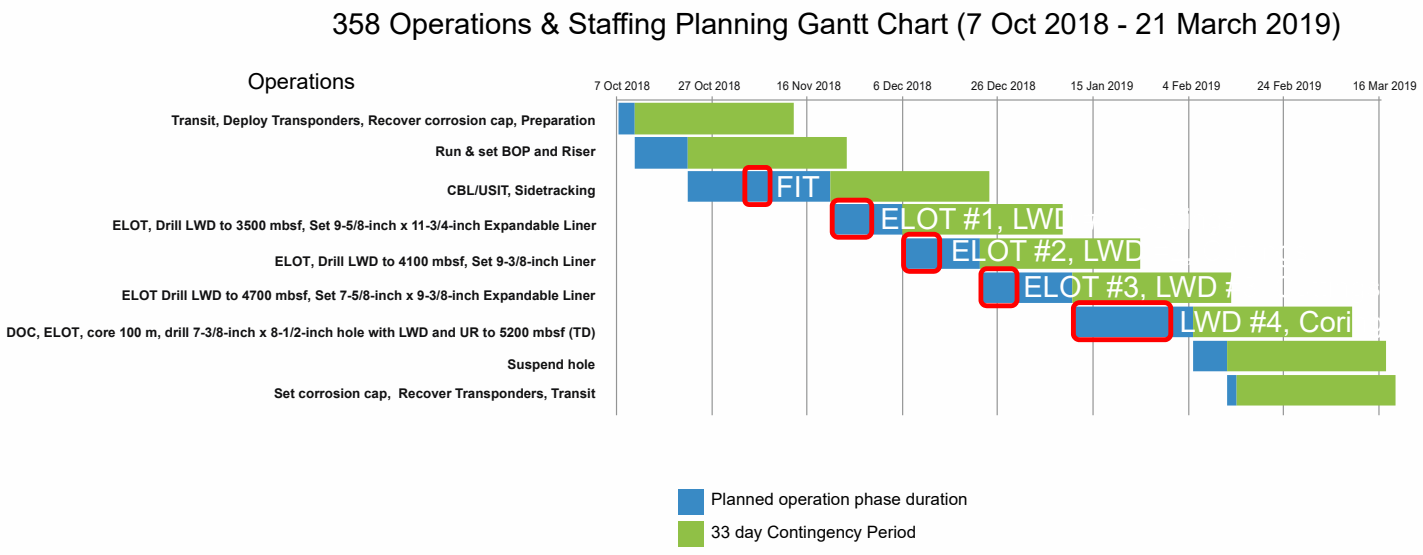
Science Operation Windows

Table 2. Updated staffing concept for IODP Expedition 358.

Science Operations	Estimated Start	Duration (days)	Potential end date*
LWD from kick-off (ca. 2900) to 3500 mbsf	19-Nov-18	7	29-Dec-18
LWD from 3500 - 4100 mbsf	6-Dec-18	7	15-Jan-19
LWD from 4100 - 4700 mbsf	22-Dec-18	9	2-Feb-19
Coring from 4750 - 4800 mbsf	8-Jan-19	5	15-Feb-19
LWD from 4800 to 5150 mbsf	15-Jan-19	10	27-Feb-19
Coring - from 5150 to 5200 mbsf	25-Jan-19	6	5-Mar-19

*Potential end dates includes 30 days contingency time.

Gantt Chart - Operations



Lord Howe Rise Project History:

Proposal 871 “Lord Howe Rise Continental Ribbon

- ✓ Pre Proposal Submission, October 2014
- ✓ SEP review, January 2015, “develop Full proposal”
- ✓ CIB preview, March 2015, “endorse workshop”
- ✓ CIB workshop proposal submission, April 2015
- ✓ Full proposal development workshop, August 2015
- ✓ Full proposal submission, October 2015
- ✓ SEP review, January 2016, “revise proposal”
- ✓ Revised full proposal submission, April 2016
- ✓ SEP review, June 2016, “send for external reviews”
- ✓ PRL & Addendum submission, October 2016
- ✓ SEP review, January 2017, “forward to CIB with EXCELLENT”
- ✓ TAT review, February 2017, this is basically “Logistic” project
- ✓ CIB review, March 2017, designate as “Chikyu Project” and create PCT.

Lord Howe Project; update

- GA-CDEX meeting (Feb., April, June, Aug., Sep.) to help GA to create “Business Case”.
- First PCT meeting held in June 2018.
- GA-JAMSTEC Friday morning Zoom Conference.
- Executing under 5 Collaborative Project Agreement between GA and JAMSTEC.
- 2nd Site Survey Cruise finished Jan. 2017.
- GA held a workshop with Department of Industry, Innovation in January 2018.
- If everything goes as planned, the expedition takes place in 2020.

Lord Howe Rise Project
#1 Project Coordination Team Meeting
@ Geoscience Australia, Canberra
8 – 9 June 2017
Draft Note v.1

Meeting Participants:
Kan Aoike (CDEX/JAMSTEC)
Marco Coolen (Life theme, Curtin Univ.)
Nobu Eguchi (CDEX/JAMSTEC)
Kliti Grice (Oceans/Climate theme, Curtin Univ.)
Jessica Gurney (GA)
Ron Hackney (PI, GA)
Andrew Heap (GA)
Fumio Inagaki (Life theme, ODS/JAMSTEC; alternate)
Junichiro Kuroda (Oceans/Climate theme, Univ. Tokyo; alternate)
Lena Maeda (CDEX/JAMSTEC)
Sanny Saito (Earth Theme, ODS/JAMSTEC; alternate)
Tomo Saruhashi (CDEX/JAMSTEC)
Jessica Whiteside (Oceans/Climate theme, Univ. Southampton; observer)
Yasu Yamada (Earth Theme, ODS/JAMSTEC)
Takehiko Yano (CDEX/JAMSTEC)

Day-1

1. Introduction

a. Meeting Logistics
b. Self-introduction around Table
c. Current Project Status and Management Plan
d. Goal of this Meeting

Heap made welcome remarks and he emphasized the importance of drill site selection at this meeting for making a drilling plan for the business case and funding proposal.
Eguchi introduced the draft agenda for this meeting and asked for any addition and/or modification, but no revision proposed.

LHR-PCT Consensus 1706-01: Approve meeting agenda.
LHR PCT approved #1 meeting agenda as is.

Meeting participants introduced themselves around the table.

Eguchi briefly introduced the current project status, including IODP proposal history, Technical Advisory Team (TAT) consensus, Chikyu IODP Board (CIB) consensus (see presentation slide p. 5 – 11 for details).

Yamada asked about why the TAT were interested in stratigraphic modeling, as he thinks that this should be a scientific issue, not an engineering concern. Eguchi answered that

the TAT recommended this stratigraphic modeling because it could help to sell the project to industry stakeholders and that the TAT will not carry out stratigraphic modeling themselves. Yamada asked the PCT if there was any problem with ODS carrying out this modeling, to which there was no objection. Currently GA is investigating options for undertaking stratigraphic modelling.

Eguchi briefly explained the terms of reference and the scope of work of this PCT (see presentation slide p. 12 – 18 for details). He emphasized that this project is a scientific collaboration project between GA and JAMSTEC and that CDEX/GA are considered the Implementing Organization for this expedition.

Then Eguchi explained the current project management scheme that includes GA-CDEX meetings (every two months) and Skype conference (every Friday). He also explained that this project is being executed under five collaborative project agreements between GA and JAMSTEC (see presentation slide p. 20 for details).

At the end of this agenda item, Eguchi introduced the goals of this meeting as below.

- ✓ Basic understanding of operation and science of this project.
- ✓ Share concerns and future timeline and action items of this project.
- ✓ Finalize riser/riserless sites selection.

2. Summary of GA-CDEX Meetings

Eguchi briefly explained the previous two GA-CDEX meetings. Meeting notes and list of action items were provided to the PCT members prior to the meeting via Basecamp. Hackney explained the "business case" being prepared for the Australian Government (see presentation slide p. 23 for details).

3. Introduction of Scientific Riser Drilling

Saruhashi introduced the differences between "riserless drilling" and "riser drilling". The big advantage of riser drilling is that it allows us to drill a deeper hole, although it is more expensive than riserless drilling (see presentation slide p. 2-3 for details).

4. Site Survey Update

Hackney introduced the first site survey cruise that was conducted April – May 2016 using JAMSTEC vessel RV Kairei. This cruise was operated for acquiring high-resolution data for drill planning and geotechnical work at potential drill sites and acquiring a deep-crustal seismic profile to constrain the crustal framework of the region to be drilled.

Aoike introduced the second site survey cruise that is scheduled for November – December 2017, also using the JAMSTEC vessel Kairei. This cruise aims to collect geotechnical data in support of the drilling operation as well as collecting data to support environmental permitting for the drilling operation.

Yamada asked about the likelihood of encountering shallow drilling hazards. Aoike responded that there is no real evidence of hazards in the ooze, but some indication of

high pressure at slightly greater depth. Despite this, shallow hazards are not expected to affect the drilling.

5. Scientific Background of the Project

a. Overall Scientific Scope of the Project
b. Specific Items for each Theme
    i. Earth Theme
    ii. Oceans/Climate Theme
    iii. Life Theme

Hackney summarized the proposed scientific objectives of the project before outlines of the specific scientific targets for each of the three themes: Earth Theme (Yamada), Oceans/Climate Theme (Grice), and Life Theme (Coolen).

Kuroda, Grice, and Whiteside are keen to recover the K/Pg boundary and OAE1 samples. This would need ~30–40 m of coring. One action item was made.

LHR-PCT ActionItem 1706-01: K/Pg boundary.
LHR PCT Oceans/Climate theme scientists examine K/Pg boundary horizon depth at selected drilling sites.

6. Tentative Operation Plan

a. Current Riser Hole Drilling Plan
b. Current Logistical Plan

Saruhashi explained the current operation plan for this project. He also raised several operational/logistical concerns for the project (see presentation slide p. 5-6 for details).

Then Saruhashi introduced the current CDEX riser operation plan for DLHR-5A, 4A, 3A, and 8A with full coring and wireline logging. He also explained the estimated cost for each site (see presentation slide p. 11 for details and summarized in the table below).

	DLHR-5A	DLHR-4A	DLHR-3A	DLHR-8A
Water Depth	1671 mMSL	1691 mMSL	1535 mMSL	1561 mMSL
Target Depth	2700 mbsf	3600 mbsf	2300 mbsf	2000 mbsf
Operation Days	161	204	125	113
Estimated Cost	121.1 MUS$	146.3 MUS$	99.4 MUS$	91.1 MUS$

He emphasized that 2/3 of estimated cost is for logistical items. He also introduced the drilling sequence for each site (see presentation slide p. 12-21 for details).

Saruhashi then proposed an alternate solution to reduce project cost. His proposal was to use logging while drilling (LWD) with a short interval of coring instead of complete coring with wireline logging strategy. He presented one example for the 9-5/8" casing section of DHLR-4A. The original operation duration of this section was 46 days, and it will reduce to 20 days with this new proposal, although the coring interval of this section would be reduced to 50 m (see presentation slide p. 22 for details). He summarized the potential

effect of this LWD solution on budget size at each site. For example, the original cost for DLHR-5A operation (121.1MUS$) became 93.8MUS$ (LWD with 50 m coring) and DLHR-4A (146.3MUS$) became 100.9MUS$ (see presentation slide p. 25 for details).

Although it can obviously reduce the cost of the operation, the PCT science team expressed concern about this new solution. The issues raised included LWD data resolution is worse than wireline logging, and only 50 m of coring could easily miss important target horizons. However, all the PCT members understood that decisions on coring and logging strategy will be made later based on the actual budget size. Heap said that GA might make a budget request based on the current cost estimate of DLHR-5A (121.1 MUS$).

LHR-PCT ActionItem 1706-02: coring strategy.
Science team to consider a spot coring strategy that will allow coring of key horizons.

LHR-PCT ActionItem 1706-03: coring strategy.
CDEX to examine in more detail the costs associated with wireline logging versus LWD.

Yamada questioned if it would help cost cutting by undertaking crew changes by boat instead of by helicopter, with helicopter operations restricted to emergency situations. Saruhashi answered that there are no cost advantages in transferring crew by boat whilst maintaining helicopter operations for emergencies. This is because for an emergency situation, we still need to prepare an offshore helicopter base (e.g., a large supply boat) for helicopter refueling since no helicopter can fly 800 km without stopping to refuel. Also helicopter landing at sea requires a rescue boat on standby around the helicopter base. Therefore at least two boats need to be on stand-by at all times. Arrangement and mobilization of those boats would take at least a couple of days, meaning that it is impossible to quickly arrange these ships in time of emergency. Therefore, if emergency helicopter operations are to be maintained, there is no advantage to using boat transportation for crew change as a cost reduction.

Day-2

Based on Heap's request, the second day of the PCT meeting started from Saruhashi's explanation of Project cost comparison with industry. There has been a significant drop of average day rates for Chikyu-class drilling vessels (5th generation and above) since 2014: 500,000US$/day (2014) vs. 200,000US$/day (2017). Also if the project used an industry drilling vessel, we need to secure a science support vessel, and its cost is roughly 100,000US$/day at least. Saruhashi examined those day rates with mobilization cost for DHLR-3A case (125.5 days) and concluded that using a commercial drilling vessel instead of Chikyu would add 99.5 MUS$ (2014 day rate) or 56.1 MUS$ (2017 day rate) to the project cost. This means that in comparison to using an industry drilling vessel, using Chikyu is an inexpensive option for Australia.

Heap stressed that it is very important for CDEX to quantify equivalent commercial costs as a way to demonstrate JAMSTEC's significant in-kind contribution to the Project.

7. Site Selection

a. Riser Site Selection
b. Riserless Site Selection

Eguchi clarified that the purpose of this site selection discussion is mainly for determining the plan for site survey 2 and the cost estimate in the business plan for funding to the Australian government.

Hackney explained each of the riser and riserless sites and showed an overview table for prioritization discussion. His recommendation based on the following conditions was DLHR-5A as the primary riser drilling site:

- ✓ Deep riser sites will probably intersect "layered" basement
  - o but possibly bland basement in south (DLHR-3A, 6A, 7A, 8A)?
- ✓ DLHR-4A/5A have the highest certainty that the complete Cretaceous and older stratigraphic section will be intersected
  - o syn-rift sediments
  - o layered pre-rift/early syn-rift sediments/volcanics
- ✓ (Quick) OBS modelling does not resolve ambiguity in basement depth at DLHR-3A
  - o gravity data also suggest the possibility of deeper basement

Yamada pointed out that the pre-rift formation is very important for the Earth theme, therefore DLHR-5A and 4A are preferable, but not DLHR-3A nor 8A. Grice and Kuroda were concerned that the K/Pg boundary or OAE1 may not found in DLHR-3A or 8A. Inagaki expressed that the older formation is required for the Life theme due to the increased likelihood that coals are present. Whiteside explained how OAE1 was important for the Ocean/Climate theme. Coolen agreed with the importance of K/Pg boundary and OAE1 formation. Kuroda asked whether there were any issues for drilling related to the presence of structure (faults) in the north, but not in the south. Aoike said that there is no real concern about this structure and pointed out the clearer stratigraphic layering in the north.

Hackney asked everyone which site is preferable for an alternate (compromise) site. Yamada repeated that sites in the south area are unattractive for the Earth theme. Whiteside and Coolen commented that the southeast riserless sites which possibly include volcanic formations might be interesting for their research. Yamada proposed a new solution for DLHR-4A as an alternate site. His idea was to reduce the target depth of this site to slightly deeper than the boundary between syn-rift sediment and layered pre-rift strata (e.g., 2100 mbsf) and visit nearby BLHRB-N2 (riserless contingency site) for the basement sampling. Gurney summarized the site prioritization idea on a white board. Riserless sites BLHRB-1B and BLHRV-1B were selected as primary riserless sites. DLHR-3A and riserless sites in the southern area were selected as the second alternative site. The summary was agreed by all the PCT members.

LHR-PCT Consensus 1706-02: LHR project site prioritization.
The PCT agreed the following site prioritization for drilling operation.
Riser primary site; DLHR-5A

Riser alternate site -1; Shallower penetration (e.g., 2100 mbsf) at DLHR-4A plus riserless basement coring at BLHRB-N2
Bland basement riserless site BLHRB-1B; volcanic basement riserless site BLHRV-1B
Riser alternate site -2; DLHR-3A plus BLHRB-S2

Kuroda explained that the Ocean/Climate theme needs cores from shallow depth and CDEX proposed to core the shallower section while Chikyu drilled the "pilot hole" prior to the riser operation.

8. Any Other Business

Addendum submission and EPSP review
The Science team of the project will submit an Addendum to IODP that explains newly proposed riser contingency sites, BLHRB-N2 and BLHRB-S2 (to be renamed to meet IODP requirements). All the riserless sites need to be reviewed by IODP's Environmental Protection and Safety Panel (EPSP), so the timing of Addendum (1 Oct. 2017 or 1 Apr. 2018) is linked to timing of the next EPSP meeting.

LHR-PCT ActionItem 1706-04: EPSP meeting.
Check the timing of next EPSP meeting (Eguchi at SEP meeting).

Industrial collaboration
Industrial collaboration such as stratigraphic modeling and petroleum systems modelling etc. was encouraged to help generate interest in extra funding support, though currently no clear policy or rules for industrial collaboration are in place. Eguchi asked the PCT members to let GA/CDEX know if any opportunity was found.

Review paper
Hackney will submit a review paper on the project to JpGU journal Progress in Earth and Planetary Science (by November). He requested support from PCT members and the proponent team in preparing this paper.

Next PCT meeting schedule
The next PCT meeting will be held around late February or early March 2018 when data from Site Survey 2 are available and the funding situation should become clearer. A detailed schedule will be announced in August or September. Either representative from each theme can be a representative at PCT meetings if one is not available.

Meeting adjourned around 12:30 on 9th June 2017.

Agenda Item 10

TAT Report

CDEX Technical Advisory Team Meeting #4 Agenda
February 26-27, 2018, JAMSTEC-Yokohama

26th February

09:00-09:10	**Safety Instruction and Logistics**	**T.Nawate**
09:10-09:20	**1. Greetings, Introduction and Declaration of Conflict of Interests**	**S. Kuramoto**
09:20-09:25	**2. Approval of Agenda and Confirmation of Last Meeting Minutes**	**Chair**
09:25-10:00	**3. CDEX Chikyu Updates**	
	a. Summary of Chikyu Operation in JPFY2017	**N. Eguchi**
	b. Outlook for the Future Chikyu Operation	
	c. Technology Topics	**N. Kyo**
	d. JAMSTEC Advisory Board	**S. Kuramoto**
10:00-10:15	**4. Report from CIB #5 and Other Communities**	
	a. CIB Report	**N. Eguchi**
	b. Chikyu IODP Proposal Summary	**N. Eguchi**
10:15-10:45	**Break**	
10:45-12:30	**5.Operational Review 1, IODP Expedition 380, (Prompt Report)**	
	a. Scientific Objectives, Science Party Evaluation	**S. Toczko**
	b. Operation Summary	**T. Nakamura**
	c. Related Technology Development	
	New Developed Running Tool	**T. Yokoyama**
	Under Water TV	**J. Ishiwata**
	Long Term Borehole Monitoring System (LTBMS)	**K. Akiyama**
	d. Core-Log-Seismic Integration at Sea (CLSI)	**R. Maeda**
12:30-13:30	**Lunch Break**	
13:30-15:00	**6. Future Project Review 1-1, IODP Expedition 358, NanTroSEIZE Deep Riser**	
	a. Scientific Proposal	**S. Toczko**
	b. Draft Drilling Plan	**T. Saruhashi**
	c. Related Technology Development	
	Non Stop Driller	**N. Sakurai**
	Coring Tool	**Y. Shinmoto**
15:00-15:30	**Break**	
15:30-17:30	**7. Future Project Review 1-2, IODP Expedition 358, NanTroSEIZE Deep Riser**	
	d. Real-Time Geomechanics Analysis outline	**D. Castillo**
17:30	**Adjourn**	

27th February

9:00-9:15	**8. Dry Docking Report and Maintenance Plan**	**J. Ishiwata**
9:15-10:00	**9. Future Project Review 2, IODP proposal 871, Lord Howe Rise**	
	a. Project Update	**N. Eguchi**
10:15-10:45	**Break**	
10:45-12:30	**10. Hard Rock Drilling**	
	a. Report from Deep Crustal Drilling Engineering Work Group	**C. Neal**
	b. Related Technology Development	
	Turbine Driven Coring System (TDCS)	**Y. Shinmoto**
	c. J-DESC Report	**S. Saito**
	ICDP Oman Ophiolite Drilling	
	Lab Improvement Request	
12:30-13:30	**Lunch Break**	
13:30-14:00	**11. Mantle Project**	
	a. Project Update	**Y. Namba**
	b. Related Technology Development	
	CFRP Riser	**E. Miyazaki**
14:00-14:30	**12. Any Other Business**	
	a. TAT Membership	
	b. Next TAT Schedule	
14:30-15:00	**Break**	
15:00-17:30	**13. Final Thoughts and Review of Consensus Recommendations**	
17:30	**Adjourn**	

List of #4 CDEX Technical Advisory Team (TAT) meeting Consensus

TAT Consensus 0218-01: TAT approves the agenda for its 4th meeting to be held 26-27 February, 2018, at JAMSTEC Yokohama Institute for Earth Sciences.

TAT Consensus 0218-02: TAT approves the revised minutes of its 3rd meeting held 20-21 February, 2017, at JAMSTEC Yokohama Institute for Earth Sciences.

TAT Consensus 0218-03: CDEX Technological Developments. TAT was very pleased about the progress in ongoing CDEX technology developments:

- Newly developed Running Tool (patent pending), consisting of a Drill Ahead Tool + Activation Kit for deep water (>3,000 m) operations;
- Underwater TV system that was successfully used during Expedition 380 and is related to the operation of the new running tool;
- Long Term Borehole Monitoring System, which was successfully deployed during Expedition 380;
- Non-Stop Driller that allows borehole pressure to be maintained during addition of pipe sections etc., which will be critical for the implementation of Expedition 358 through maintaining the integrity of the C0002 hole;
- Turbine-Driven Coring System, which will be deployed during Expedition 376 to Brother's Arc to improve core recovery in relatively high temperature hard rock drilling;
- Carbon Fiber Reinforced Plastic (CFRP) Riser development, which has undergone tensile strength testing of a 1/5 scale model 6 times, and now has funding for similar testing of an actual size riser model.

TAT was impressed that several of these new technologies have been or will be implemented and may have applications in industry, and applauds the cooperation with the JOIDES Resolution Science Operator in the upcoming Expedition 376.

TAT Consensus 0218-04: TAT commends the success of the recently completed Expedition 380 that installed the Long-Term Borehole Monitoring System at Site C0006. Despite issues with releasing the Drill Ahead Tool and the LTBMS, the LTBMS testing system, and the failure of the bi-center bit for drilling out cement, the expedition finished 17 days ahead of schedule. Based upon the experience gained, TAT urges the update and implementation of a best practices document for 3rd party tools used on the *Chikyu*.

TAT Consensus 0218-05: NanTroSEIZE Expedition 358 (riser drilling to deepen C0002 to the megasplay fault at ~5200 mbsf) represents one of the most ambitious and technically challenging projects ever attempted in either industrial or scientific drilling. TAT strongly endorses the concepts presented at this meeting for (1) activating a real-time geomechanics (RTG) team before and throughout Exp. 358 primarily to advise the CDEX drilling team, and (2) conducting a carefully focused drilling the well on paper (so-called DWOP') exercise in summer of 2018. The rationale for these two concepts is summarized in the attached statement from insight GeoMechanics (iGM). Forming, training, and implementing the RTG and defining the scope of the DWOP' by themselves

represent a significant new approach that should be of major benefit to future riser drilling projects (science or industry). Therefore TAT recommends that CDEX identify as soon as possible an experienced project manager to focus solely on defining and implementing the RTG and DWOP' from the present through the aftermath of Exp 358. TAT members stand ready to assist in helping to define the type of expertise required for both the RTG and DWOP' and potential nominees to serve on each.

TAT Consensus 0218-06: TAT was pleased to note the extensive work carried out by CDEX in collaboration with Geoscience Australia to mature the business case for the Lord Howe Rise Project. In particular, CDEX having acted on the advice to treat the proposed expedition primarily as a logistics project, TAT commended the quality of the work done so far on options for logistical support, including crew change arrangements and identifying available choices for medical evacuation. TAT advises caution in basing the proposed mud weight program on seismic data alone. CDEX could consider reviewing the data from Site U1506 with a view to constraining the regional stress environment to reach a preliminary determination of mud weight. Attention is drawn to the active intra-plate seismic activity in the area, which implies a high differential stress environment.

TAT Consensus 0218-07: TAT endorses the recent formation of the CDEX M2M Task Force Team (M2M-TFT) to focus technical and engineering planning for an eventual full penetration to mantle. This is consistent with previous TAT consensus statements suggesting formation of a mantle project working group, for a staged approach to achieving eventual full crustal penetration, and for exploring all technical options to the drilling challenges. TAT encourages CDEX to involve representatives of the JRSO in the M2M-TFT as appropriate, and to consult with the scientific community associated with deep ocean crustal drilling to date.

TAT Consensus 0218-08: The main focus of the next TAT meeting should be an operational review of Expedition 358; additional agenda items should include planning for Lord Howe Rise, the Mantle Project, and TDCS progress. This meeting is tentatively scheduled for the week of June 3-7, 2019. TAT asks CDEX to consider whether TAT members should be involved shortly before Expedition 358 in review of the output of the DWOP' recommended in TAT Consensus 0218-05.

insight GeoMechanics

Insight GeoMechanics Pty. Ltd. ABN 98 158 420 869

8 Joffre Road • Trigg, Western Australia 6029 • phone: +61 (0) 408 82 6824 • email: castillo@insightgeomechanics.com

Date: February 27, 2018

To: Keir Becker, John Thorogood and Clive Neal

From: David Castillo, Insight GeoMechanics, Pty. Ltd.

Subject: Consensus Summary of Real-Time Geomechanics Planning Concepts

Insight GeoMechanics Pty Ltd (Insight) presented an overview summary of a Real-Time Geomechanics (RTG) concept that has been proposed to JAMSTEC/CDEX to successfully drill and complete the side-track in the NanTroSEIZE C0002P well during Expedition 358 (Exp 358). The objective of the RTG during Exp 358 would be to provide real-time information to the CDEX Drilling Group regarding the impact that mud weight and mud rheology would have on hole stability while drilling the accretionary prism. The RTG Team during Exp 358 will be solely committed to supporting drilling operations, by performing real-time analyses, interpretations, and modeling of subsurface stresses and structure. These analyses will be performed using LWD data (e.g., image, drilling mechanics, petrophysics), cavings/cuttings data, and drilling experiences information. Results may include confirmation of mud performance specific to hole stability or recommendations to modify the mud weight program to ensure hole stability if the need arises for each of the four (4) hole sections.

There are many uncertainties associated with the C0002 well approaching the mega-splay in the accretionary prism that are difficult to remove based on data from Exp 348 and the 3D seismic data. These uncertainties include stress magnitudes, pore pressure, stress azimuth, rock properties and structure. It is because of these circumstances and challenges while drilling to the mega-splay in four-section that mandates a robust RTG workflow. The process of systematically creating this RTG workflow includes;

1) Designing a real-time workflow to provide ongoing support to the CDEX Drilling Team. Given the urgency to confirm and verify new mud weight information for the Drilling Team, based on real-time geomechanical interpretations, there would be value in having a strong interacting relationship with the Exp 358 Science Leaders. Designing efficient communication protocols will be very important in this task.

2) Training RTG Team to become confident in advanced geomechanical concepts and analyses processes. Training would include revisiting Exp 348 experiences, analyzing case studies in other complex geologic settings, and practicing various aspects of geomechanical modeling to gain confidence and develop expertise. It would be important to occasionally include various members of the Science Team, and perhaps, Drilling Group to ensure all parties are aware of the RTG process. Several training sessions are envisioned.

3) Executing and implementing a RTG analysis during Exp 358. This final and most important step will systematically focus on each of the planned hole sections at various real-time time-scales. Time scales of hours includes analysis of real-time LWD data (e.g., image, drilling mechanics, petrophysics), cavings/cuttings analysis, and drilling experiences. Time-scale of a few days would include a rapid turnaround postmortem of

each hole section performed during the 2-4-day casing operations to document the geomechanical model for the previous hole section and forecast a mud weight program for the next hole section.

Drilling-Well-On-Paper

A conventional Drilling-Well-On-Paper exercise is typically a pre-drill exercise that may or may not have geologic-related contributions. For Exp 358, a Drilling-Well-On-Paper-Prime (DWOP') should be performed with contributions from the RTG Team and the Science Leaders Team to 1) better acquaint themselves with details of the drilling plan and 2) highlight to the CDEX Drilling Team the possible geologic scenarios that could be encountered during Exp 358. These geologic scenarios include rapid changes in stress magnitudes, rapid changes in pore pressure, pore pressure kicks, stress azimuth rotations, dynamic losses through faults and natural fracture systems, and changes in bedding plane/fracture orientations.

Agenda Item 11

Chikyu Proposals（update and discussion）

a. Potential Chikyu Proposals at CIB and SEP

b. Workshop Proposal

IODP Proposal 898-Pre “Fore Arc Mohole-to-Mantle”

Full-proposal Development Workshop

Chikyu IODP Proposal Summary as of March 2018

At CIB:

Number Type	Short Title	Lead Proponent	Affiliation	Platform	Status
537 CDP7	Costa Rica Seismogenesis Project Overview	von Huene	USA	Chikyu+JR	
537 Full4	Costa Rica Seismogenesis Project Phase B	Ranero	ECORD-Germany	Chikyu	~~PCT~~
603 CDP3	NanTroSEIZE Overview	Kimura	Japan	Chikyu	
603C Full	NanTroSEIZE Phase 3: Plate Interface	Tobin	USA	Chikyu	PCT
603D Full2	NanTroSEIZE Observatories	Screaton	USA	NR-Chikyu	PCT
698 Full3	Izu-Bonin-Mariana Arc Middle Crust	Tatsumi	Japan	Chikyu	~~PCT~~
781 MDP	Hikurangi Subduction Margin	Wallace	ANZIC: New Zealand	Chikyu+JR	
781B Full	Hikurangi: Riser	Wallace	ANZIC: New Zealand	Chikyu	
835 Full	Japan Trench Tsunamigenesis	Kodaira	Japan	NR-Chikyu	
871 CPP2/Add	Lord Howe Rise Continental Ribbon	Hackney	ANZIC: Australia	Chikyu	PCT

At SEP:

707 CDP3	Kanto Asperity Project Overview	Kobayashi	Japan	Chikyu+JR	
800 MDP	Indian Ridge Moho	Dick	USA	Chikyu+JR	
805 MDP	MoHole to the Mantle	Umino	Japan	Chikyu	
857 MDP2	DREAM: Mediterranean Salt Giant	Camerlenghi	ECORD: UK	Chikyu+JR	
866 Full2	Japan Trench Paleoseismology	Strasser	ECORD: Austria	MSP/Chikyu?	
876 Pre	Bend-Fault Serpentinization	Phipps Morgan	ECORD:UK	Chikyu+JR	
886 Pre	NW Pacific Bend-Fault Hydrology	Morishita	Japan	Chikyu	
898 Pre	Fore Arc Mohole-to-Mantle	Michibayashi	Japan	Chikyu	
925 Pre	Blanco FZ Earthquake Triggering	Mori	Japan	Chikyu	

Received 7 Feb 2006

IODP Proposal Cover Sheet

537-CDP7

☐ **New** ☒ **Revised** ☐ **Addendum**

Please fill out information in all gray boxes

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Title:	CRISP- Costa Rica seismogenesis project: investigating convergent margin seismogenesis		
Proponent(s):	Baumgartner, Peter, Bilek, Susan, Brueckmann, Warner, Castillo, Pat, Clift, Peter, Deyhle, Annette, Dixon, Tim, Fehn, Udo, Fisher, Donald, Fulthorpe, Craig, Harris, Robert, Kastner, Miriam, Kinoshita, Masa, Lewis, Jonathan, Matsumoto, Takeshi, McIntosh, Kirk, Morgan, Jason, Morris, Julie, Patino, Lina, Schwartz, Susan, Snyder, Glen, Ranero, Cesar, Scholl, David, Vannucchi, Paola, von Huene, Roland		
Keywords: *(5 or less)*	Seismogenic zone, Subduction factory, subduction erosion	Area:	Costa Rica

Contact Information:

Contact Person:	Roland von Huene		
Department:	Geology		
Organization:	University of California, Davis and Geomar, Kiel		
Address	2910 North Canyon Rd., Camino, California 95709		
Tel.:	001 530 644 6078	Fax:	530 644 4948
E-mail:	rhuene@mindspring.com		

Permission to post abstract on IODP-MI Web site: ☒ Yes ☐ No

Abstract: (*400 words or less)*

CRISP is a project to understand the initiation of large earthquakes and seismic rupture by drilling on either side of the updip limit of seismogenesis. The shallow dip of the subduction zone off southern Costa Rica and relatively high subducting plate temperature cause this seismogenic environment to rise to drilling depth. Materials, temperature, lithification, fluid flow and chemical changes that occur down the subduction zone are hypothesized to cause the transition from stable to unstable slip that ultimately results in great earthquakes. Along the erosional convergent margin of Costa Rica the seismogenic plate interface is surrounded by eroded debris rather than by trench sediment.

CRISP involves the only known erosional end-member of convergent margins within reach of scientific drilling. Samples of the fault rock and observations of dynamics will be integrated with laboratory experiments to test 5 principal hypotheses as stated below in the scientific objectives. CRISP is structured in 2 programs that systematically lead to deep riser drilling of the seismogenic zone. The non-riser drill Program A will provide cores to characterize lower plate igneous basement rock and its hydrology. Paleo-depth indicators will allow a first estimation of eroded debris and trench sediment thickness input by the subduction channel into the seismogenic zone. Instruments will be deployed in the holes to record microseismicity and monitor fluid pressure. Program B involves 3.5-km and 6.0-km-deep holes that are engineered from results of Program A. Program B riser drilling samples the subduction channel along the plate interface and characterizes conditions in the zone of **stable slip** and then conditions in the zone of **unstable** slip. This provides observations to determine physical and mineralogical transformations and dynamic changes causing unstable slip. The riser-drilling sites are in 500m and 1000m deep water and in an area of optimum operating conditions nearly year around. Osa Peninsula provides the opportunity to expand investigation farther down the seismogenic zone with land drilling to ~7km should that become attractive in the future. With a low sediment supply, fast convergence rate, abundant seismicity, subduction erosion, and a change in subducting plate relief along strike, CRISP offers excellent opportunities to learn causes of earthquake nucleation and rupture propagation. It complements other deep fault drilling (SAFOD and NantroSeize) and investigates the first order seismogenic processes common to most faults and those unique to erosional margins.

537-CDP7

Scientific Objectives: (*250 words or less*)

The proposed drilling and accompanying geophysical programs will acquire data to test 5 key hypotheses:

1) Landward of the frontal sediment prism the transition from stable to unstable slip is accomplished by a transition from a fluid-rich broad fault-damage zone to a thinner and drier slip zone.
2) Fluid pressure gradient and fluid advection localize locking of erosional plate boundaries temporarily and spatially
3) Fault mechanics associated with the transition from stable to unstable slip are influenced by lithology, physical properties, and structure of eroded materials in the subduction zone
4) Fluid chemistry, P-T conditions and residence time affect the state of eroded basement material through alteration, diagenesis, and low-grade metamorphism influencing the transition from stable to unstable slip.
5) Variability in subducted plate relief and subduction channel thickness, affect material properties and fluid distribution triggering seismicity and controlling rupture propagation.

The deployment of observatories will provide capability to monitor any near-field precursory signals that indicate the stage of a rupture zone in an earthquake cycle. A physical properties map along the plate interface derived from seismic attributes and calibrated with the drill holes will indicate whether areas of locking offshore and potential hazardous earthquake locations can be identified from remote geophysical information.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	

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IODP Proposal Cover Sheet

537B-Full4

☐ **New** ☑ **Revised** ☐ **Addendum**

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Title:	CRISP Program B: The Transition from Stable to Unstable Slip at Erosional Convergent Plate Boundaries
Proponent(s):	C. R. Ranero, C. Marone, S. Bilek., U. Barckhausen, P. Charvis, J-Y Collot, H. DeShon, G. Di Toro, T. Dixon, L. Dorman, S. Galeotti, I. Grevemeyer, R. Harris, S. Husen, M. Kastner, M. Kinoshita, T. Matsumoto, K. McIntosh, J. Morgan, J. Morris, C. Mueller, S. Neben, C. Reichert, D. Scholl, S. Saito, S. Schwartz, V. Spiess, E. Suess, P. Vannucchi, H. Villinger, S. Vinciguerra, R. von Huene, W. Wallmann.
Keywords: *(5 or less)*	Seismogenic zone, fluid flow, subduction erosion
Area:	Central America off Costa Rica

Contact Information:

Contact Person:	César R. Ranero		
Department:	Marine geodynamics		
Organization:	IFM-GEOMAR		
Address	Wischhofstrasse 1-3, 24148, Kiel, Germany		
Tel.:	49-431-6002279	Fax:	49-431-6002922
E-mail:	cranero@ifm-geomar.de		

Permission to post abstract on IODP-MI Web site: ☒ Yes ☐ No

Abstract: (*400 words or less)*

CRISP is designed to investigate the processes leading to seismogenesis at erosional convergent margins in 2 Programs. Each Program will involve sampling, downhole observatories, and laboratory experiments on the recovered materials. Program A focuses on the incoming oceanic plate, the decollement at the margin's front where slip is aseismic, and shallow structure of the overriding plate. Program B will investigate the plate boundary in the transition from stable slip to unstable slip by drilling and monitoring at two sites. One site is located updip, but near, the end of the seismogenic zone, and a second site is drilled into the seismogenic zone.

At least 50% of the world's subduction zones are erosional margins. Erosional convergent margins have a subduction channel containing material removed from the overriding plate mixed with sediment from the incoming plate. The nature and physical properties of this material are currently unconstrained. Similarly, the volume, distribution and chemistry of fluids at erosional plate boundaries are poorly known.

In Program B we propose a detailed investigation of subduction earthquake processes and to sample and monitor the plate boundary where temperatures range ~100-200°C. Previous work indicates that key processes become active in that temperature range and control the onset of seismicity. Drilling will for the first time sample eroded material and fluids in the subduction channel and investigate plate boundary fault mechanisms during tectonic erosion. CRISP Program B will provide the core material for detailed laboratory experiments designed to isolate the processes and physical conditions that control the onset of seismogenesis.

Four Major Goals of Program B Drilling, Monitoring and Laboratory Experiments are:

1) Quantify effective stress and plate boundary migration via focused investigation of fluid pressure gradient and fluid advection across the erosional plate boundary.

2) Determine the structure and fault mechanics of an erosional convergent margin and identify the processes that control the updip limit of seismicity.

3) Constrain how fluid-rock interaction affect seismogenesis by studying fluid chemistry and residence time, basement alteration, diagenesis, and low grade metamorphism.

4) Obtain physical properties of a 3-D volume that spans the seismogenic zone.

The subduction zone offshore Osa Peninsula provides the tectonic setting to reach CRISP goals. The shallow subduction angle and high temperatures bring to shallow depth processes that elsewhere occur at greater depth, beyond the reach of drilling.

537B-Full4

Scientific Objectives: (*250 words or less*)

CRISP Program B will sample and monitor the plate boundary environment to study physical conditions and material properties in the transition into the seismogenic zone. The scientific objectives of Program B are to test five main hypotheses central to understanding structure and seismogenesis at erosional plate boundaries:

1) Landward of the frontal sediment prism, the transition from stable to unstable slip parallels the transition from a fluid-rich and broad fault zone, with distributed slip, to a narrower zone of active deformation with localized shear and fluid compartmentalization.

2) Fluid pressure gradients and fluid advection affect the migration and coupling of erosional plate boundaries both temporally and spatially.

3) The lithology, physical properties, and structure of eroded materials influence fault mechanics and the transition from stable to unstable slip at subduction interfaces.

4) Fluid chemistry, P-T conditions and residence time affect the state of eroded material through basement alteration, diagenesis and low-grade metamorphism.

5) Lateral variability in subducted plate relief, subduction channel thickness, material properties and fluid distribution affect seismogenesis and rupture propagation.

These hypotheses will be tested by A) direct observation of the lithology, physical properties and structure of the plate boundary and surrounding rock, B) monitoring temperature, stress, pore-fluid pressure and chemistry, and seismicity, C) laboratory experiments on core samples, and D) dedicated geophysical surveys designed to expand regionally the results from drilling and monitoring.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Riser drilling
Drilling at >100°C and <200°C will require development of tools.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
CRIS-03A	84° 4.77852 W 8° 35.23956 N	530	700	2850	3550	Drilling and monitoring the plate boundary and subduction channel in the area of transition between aseismic and seismic slip and temperatures between 100°-150°C, updip, but near, the end of the seismogenic zone.
CRIS-06A	84° 9.77076 W 8° 45.16602 N	500	1920	4080	6000	Drilling and monitoring the plate boundary and subduction channel in the seismogenic zone at temperatures between 150°-<200°C.

Received 1-October-2003

IODP Proposal Cover Sheet

603-CDP3

☐ **New** ☑ **Revised** ☐ **Addendum**

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Title:	**NanTroSEIZE: The Nankai Trough Seismogenic Zone Experiment Complex Drilling Project**		
Proponent(s):	**Gaku Kimura, Harold Tobin, and the NanTroSEIZE Working Group (24 Co-Proponents)**		
Keywords: *(5 or less)*	**Seismogenic zone, earthquakes, tsunamigenesis, fault mechanics**	Area:	**Southwest Japan margin**

Contact Information:

Contact Person:	**Harold Tobin**		
Department:	**Earth and Environmental Science Department**		
Organization:	**New Mexico Tech**		
Address	**Socorro, NM 87801, USA**		
Tel.:	**+1-505-835-5920**	Fax:	**+1-505-835-6436**
E-mail:	**tobin@nmt.edu**		

Permission to post abstract on iSAS Web site: ☑ Yes ☐ No

Abstract: (*400 words or less)*

This Complex Drilling Project (CDP) proposal describes the rationale and scientific objectives for an integrated program of geophysical and geologic studies, non-riser drilling, and riser drilling designed to investigate the aseismic to seismic transition of the megathrust system and the processes of earthquake and tsunami generation at the Nankai Trough subduction zone. **Our fundamental goal is the creation of a distributed observatory spanning the up-dip limit of seismogenic and tsunamigenic behavior.** This will involve sampling and instrumenting key elements of the active plate boundary fault system at several locations off the Kii Peninsula, where the plate interface and active mega-splay faults – implicated in tsunamigenesis – are accessible to drilling within the region of coseismic rupture in the 1944 Tonankai M8 great earthquake. The most ambitious objective is to access and instrument the Nankai plate interface within the seismogenic zone to advance our knowledge of fundamental aseismic and seismic faulting processes and controls on the transition between them. The strategy of NanTroSEIZE differs fundamentally from that of other proposed deep fault drilling programs because we will document the evolution of fault zone properties by trading time for space along the dipping plate boundary.

We propose 3 distinct phased IODP drilling efforts: **Phase 1** – *Inputs to the seismogenic zone system*, investigating variations in the sediments, oceanic crust, and fluids input to the plate boundary system; **Phase 2** – *Mega-splay (OOST) fault drilling* to sample and instrument thrusts which splay from the basal décollement up through the forearc, in order to characterize fault properties transecting the aseismic to seismic transition from 1 to 3.5 km depth shallow; and **Phase 3** – *Sampling and instrumenting the plate interface* (décollement) at ~ 6 km below seafloor, in a region predicted to be within both the zone capable of generating seismogenic behavior and in the zone of co-seismic slip in the 1944 great earthquake. Long-term monitoring of a wide range of phenomena will be a major part of the effort, to detect signals of fault zone processes in the near-field. In addition, ongoing seismological and geodetic arrays in the vicinity as well as in the deep boreholes, geologic studies, laboratory and modeling efforts are all integral components of the NanTroSEIZE project, essential to success in achieving project objectives.

603-CDP3

Scientific Objectives: (*250 words or less*)

The principal scientific objective of the proposed drilling is to acquire data bearing on and testing the following key hypotheses:

1. Systematic, progressive material and state changes control the onset of seismogenic behavior on subduction thrusts.

2. Subduction zone megathrusts are weak faults.

3. Within the seismogenic zone, relative plate motion is primarily accommodated by coseismic frictional slip in a concentrated zone.

4. Physical properties, chemistry, and state of the fault zone change with time during the earthquake cycle.

5. The mega-splay (OOST) thrust fault system slips in discrete events which may include tsunamigenic slip during great earthquakes.

Proposed **NanTroSEIZE** efforts will test models for the frictional behavior of fault rocks across the aseismic – seismogenic transition, the composition of faults and fluids and associated pore pressure and state of stress, partitioning of strain spatially between basal interface and splays, temporally between coseismic and interseismic periods, and between infraseismic and aseismic events vs. seismic events. Long-term borehole observations potentially ultimately will test whether interseismic variations or detectable precursory phenomena exist prior to great subduction earthquakes.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

In various combinations, the following non-standard measurements are desired for sites covered by this CDP:

During Drilling and Casing Installation: Logging/measurement while drilling, drill stem & wireline pressure/permeability tests, cross-hole hydrologic tests, offset/walkaway vertical seismic profiling, cross-hole seismic.

Long-Term Borehole Observatory Monitoring: Array temperature measurement, pressure measurement in packer-isolated intervals, array measurement for short-period, three-component seismometry, bottom-hole broadband and strong motion seismometry, bottom hole strain, multi-level tilt, and long-term fluid collection for biological and geochemical measurements. Many of these measurements will need to be made at temperatures of ~ 80 – 150+ C.

Proposed Sites:

SEE INDIVIDUAL PROPOSALS FOR EACH PHASE FOR SITE DESCRIPTIONS

Received 1 April 2004

IODP Proposal Cover Sheet

603C-Full

☑ New ☐ Revised ☐ Addendum

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Title:	**NanTroSEIZE Drilling and Observatory Phase 3: A Window into the Seismogenic Zone**		
Proponent(s):	**Kiyoshi Suyehiro, Harold Tobin, Eiichiro Araki, Susan Bilek, Tadanori Goto, Pierre Henry, Gaku Kimura, Aitaro Kato, Masa Kinoshita, Chris Marone, Greg Moore, J. Casey Moore, Demian Saffer, Arito Sakaguchi, Masanao Shinohara, Ralph Stephen, Akito Tsutsumi, Kohtaro Ujiie, Kelin Wang**		
Keywords: *(5 or less)*	**Seismogenic zone, fault mechanics, borehole observatory, tsunamigenesis**	Area:	**Southwestern Japan margin**

Contact Information:

Contact Person:	**Harold Tobin**		
Department:	**Earth and Environmental Science Department**		
Organization:	**New Mexico Tech**		
Address	**Socorro, NM 87801 USA**		
Tel.:	**505-835-5920**	Fax:	**505-835-6436**
E-mail:	**tobin@nmt.edu**		

Permission to post abstract on iSAS Web site: ☑ Yes ☐ No

Abstract: (*400 words or less)*

The principal goal of NanTroSEIZE is to understand seismogenesis and rupture propagation along subduction plate boundary faults by direct testing of key hypotheses related to the mechanics of subduction megathrusts. **NanTroSEIZE Phase 3 represents the culmination of the Seismogenic Zone Initiative: drilling into, sampling, and monitoring of the subduction zone plate interface at depths of coseismic slip.** This proposal centers on the deepest drilling effort in the NanTroSEIZE project: sampling a single site across the entire plate interface into the top of the subducting Philippine Sea plate. The proposed borehole will penetrate a major splay fault (~4 km bsf) potentially implicated in coseismic slip, as well as the master decollement (~6 km bsf), at a location of shallow large slip during the 1944 Tonankai Mw 8.2 earthquake.

The goal of this proposal is to address two key questions by a combination of logging, coring, down-hole experiments, and long-term monitoring:

(1) What controls the nature of fault slip and its spatial variability (i.e. the updip transition from aseismic to seismogenic slip)?

(2) What processes control temporal changes in slip behavior on a given fault?

Specifically, this proposal is aimed at testing hypotheses explaining controls on unstable slip, and documenting the roles of fault zone state (stress, fluid pressure, fabric) and composition in controlling frictional rheology. Down-hole and monitoring observations, core analyses, and post-cruise laboratory studies will provide direct tests of existing hypothesis for fault zone frictional behavior. One focus of Phase 3 will be on documenting the material properties and ambient conditions at each of the two faults, and comparing results with findings from shallower portions of the plate boundary system sampled during Phases 1 and 2 to rigorously characterize controls on fault slip behavior in an active megathrust system.

Proposed activities include (1) drilling, LWD, and casing of a main hole - with drillstem tests performed at casing set points, (2) creation of a sidetrack coring hole with continuous coring from 4000-6200 mbsf, and (3) well tests in perforated casing and installation of an observatory system for continuous monitoring of pore fluid pressure, temperature, strain, tilt, and seismicity. The borehole observatories, along with surface arrays of measurements, and regional geodetic and seismic monitoring, will provide critical data toward understanding the slip distribution, temporal variability, and controlling mechanisms of seismogenic faulting along the plate boundary system.

603C-Full

Scientific Objectives: (*250 words or less*)

The scientific objectives of NanTroSEIZE Phase 3 drilling are to use *direct observation* to rigorously evaluate the following hypotheses, which are central to understanding earthquake mechanics along subduction megathrusts:

(1) Systematic, progressive material and state changes control the onset of seismogenic behavior on subduction thrusts; (2) Subduction zone megathrusts are weak faults; (3) Within the seismogenic zone, relative plate motion is primarily accommodated by coseismic frictional slip in a concentrated zone; (4) Physical properties, chemistry, and state of the fault zone change systematically with time throughout the earthquake cycle; and (5) The mega-splay (OOST) thrust fault system slips in discrete events which may include tsunamigenic slip during great earthquakes. These hypotheses will be evaluated by detailed characterization – in fault zones and in the surrounding rock volume – of the lithology, structural geology, and physical properties of the rock; the geochemistry of pore fluids; the microbiological activity; the distribution of temperature, stress, and pore fluid pressure in space and time; the seismicity in the near-borehole environment and downdip; the temporal evolution of the strain field; and the evolution of physical properties in the volume around the borehole.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Essentially all technologies to be used are non-standard. These will include, but are not limited to:
Riser-based drilling, LWD suite, DVTP-P, active hydrofracturing tests (wireline packer test), VSP.
A borehole observatory with multi-level packers and perforated intervals, Geodetic (strain/tilt), seismic and hydrologic (P,T) sensors and other instruments will be installed for a long-term borehole observatory.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
NT3-01A	33°17.6'N, 136°38.6'E	1950	6000	200	6200	Study the progressive change in the fault properties by intersecting the splay fault at ~4.5km and the seismogenic fault at 5.8 to 6km depth
NT3-02A	33°12.9'N, 136°27.4'E	2100	6000	200	6200	Alternate site for NT3-01A

Received 1 April 2005

IODP Proposal Cover Sheet

603D-Full2

☐ **New** ☒ **Revised** ☐ **Addendum**

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Title:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites		
Proponent(s):	Elizabeth Screaton, Michael Underwood, Demian Saffer, Kelin Wang, Geoff Wheat, Koichiro Obana, Greg Moore, Kevin Brown, Juichiro Ashi		
Keywords: *(5 or less)*	Subduction inputs; hydrogeology; long-term observatories	Area:	Nankai Trough Shikoku Basin

Contact Information:

Contact Person:	Elizabeth Screaton		
Department:	Department of Geology		
Organization:	University of Florida		
Address	PO Box 112120, 241 Williamson, Gainesville FL 32611 USA		
Tel.:	(352) 392-4612	Fax:	(352) 392-9294
E-mail:	screaton@ ufl.edu		

Permission to post abstract on IODP-MI Sapporo Web site: ☒ Yes ☐ No

Abstract: (*400 words or less)*

The NanTroSEIZE Complex Drilling Plan describes a multi-phase strategy to get at the root cause of the transition from stable sliding to stick-slip fault behavior -- by intersecting the "seismogenic conveyor belt" of Nankai Trough on either side of its up-dip limit of seismicity. With a campaign of coring, logging, downhole measurements, and long-term observatory science, NanTroSEIZE will test hypotheses concerning the onset of seismogenic behavior and locking of subduction thrusts. Characterizing the inputs to the seismogenic zone through examination of reference sites is a vital component of NanTroSEIZE. This revised full proposal outlines scientific rationale and plans for installation of long-term borehole observatories at NantroSEIZE reference sites. Monitoring at these observatories serves two distinct purposes. First, the observatories will provide information on material properties and background geophysical and geochemical conditions. The state of stress and strength of coupling on the plate-boundary fault are acutely sensitive to 3-D variations in pore pressure, and these pore pressures will be greatly affected by the distribution and permeability of turbidites and the permeability of the ocean crust. Second, observatories allow us to detect temporal changes in the geophysical or geochemical conditions and even the material properties. Temporal changes include the gradual stress build-up during the interseismic period. Associated variations in the thermal and hydrological regimes, and episodic seismic and aseismic strain events, could show how the seismogenic zone adjusts to new conditions caused by the stress build-up, which elevates predictive understanding of the seismogenic zone. Two reference sites in Shikoku Basin, on a basement high and basement plain, will show how stratigraphy, basement topography, and thermal structure affect the physical and hydrologic properties of subduction inputs. Each will require a pair of screened intervals: one targeting open basement and one targeting the overlying sediment. A site located 7 km seaward of the deformation front will indicate how far pressure and chemistry anomalies are transmitted seaward of the deformation front. CORK monitoring at the toe of the accretionary prism will isolate temperature and pressure signals in the frontal décollement from signals in the subducting turbidites. A second shallow observatory at the prism toe will monitor micro-seismicity and strain. An observatory in Kumano Basin provides an important complement to background and transient data obtained within and seaward of the mega-splay system. This monitoring network will provide a vital context for observations within the plate boundary fault system.

603D-Full2

Scientific Objectives: (*250 words or less*)

Coring, logging, and conventional downhole measurements will commence at four reference sites during Phase I and II of the Nankai Trough Seismogenic Zone Experiment. This proposal describes scientific objectives for long-term borehole observatories to be installed at four of these sites and one additional site. The fundamental objectives of the proposed observatory science are to map background properties of the incoming sediment and crust and to monitor temporal changes associated with the seismic cycle. Specific objectives include:
(1) Monitor the differences in hydrologic properties and fluid-flow signals where basement highs are subducting versus where basement plains are subducting.
(2) Determine if, where, and why compartments of excess pore pressure develop seaward of the deformation front; if present, determine their effect on early-subduction fault dynamics.
(3) Compare hydrologic properties and fluid-flow signals in turbidite sand bodies before and after they have passed beneath the toe of the accretionary prism Assess the role of these turbidite sand bodies in drainage of deeper sediments, and impacts of drainage on plate boundary strength.
(4) Monitor hydrologic properties and fluid-flow signals within the frontal décollement zone for rigorous comparison against properties and flow in subducted sand lenses beneath the décollement.
(5) Determine how basement fluid flow influences margin-scale patterns of heat flow and fluid flow.
(6) Monitor micro-seismicity, strain, and fluid flow response to tectonic events.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
NT1-01A	Lat: 32° 44.8878'N Long: 136° 55.0236'E	3540	460m	40m	500m	One CORK hole with screened interval in position equivalent to turbidites and sealed basement. Companion CORK hole with fully cased sediment & open basement.
NT1-02A	Lat: 32° 47.4996'N Long: 137° 09.2784' E	4210	730m	40m	770m	One CORK hole with screened interval in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement.
NT1-03A	Lat: 33° 01.23258'N Long: 136° 47.9485'E	4125	1200m	0m	1200m	CORK monitoring of décollement and turbidites; will not extend to basement. Monitor micro-seismicity and strain.
NT1-05A	Lat: 33° 01.3482'N Long: 137° 3.3432'E	4310	1528m	40m	1568m	One CORK hole with screened intervals in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement.
NT1-06A	Lat: 32° 51.35'N Long: 137° 17.58'E	4200	990m	40m	1030m	Alternate to NT1-02A. One CORK hole with screened interval in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement.
NT2-04A	Lat: 33° 23.4'N, Long: 136° 34.6'E	1990	1400m forearc basin	40m acoustic basement	1440m	One CORK hole with screened intervals in sediments. Monitor micro-seismicity and strain.

Received 28 September 2010

IODP Proposal Cover Sheet

☐ New ■ Revised ☐ Addendum

698-Full3

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Please check if this is Mission proposal ☐

Title:	Continental Crust Formation at Intra-Oceanic Arc: Ultra-Deep Drilling to the Middle Crust of the Izu-Bonin-Mariana Arc
Proponent(s):	Yoshiyuki Tatsumi, Katherine Kelley, Richard Arculus, Makoto Arima, Susan Debari, James B. Gill, Osamu Ishizuka, Yoshiyuki Kaneda, Jun-ichi Kimura, Shuichi Kodaira, Yasuhiko Ohara, Julian Pearce, RobertJ. Stern, Susanne M. Straub, Narumi Takahashi, Yoshihiko Tamura, Kenichiro Tani
Keywords: *(5 or less)*	Intra-oceanic arc, upper crust, middle crust, continental crust, magmatism
Area:	Izu-Bonin

Contact Information:

Contact Person:	Yoshiyuki Tatsumi		
Department:	Institute for Research on Earth Evolution		
Organization:	Japan Agency for Marine-Earth Science and Technology		
Address	Natsu-shima, Yokosuka 237-0061, Japan		
Tel.:	81-46-867-9760	Fax:	81-46-867-9625
E-mail:	tatsumi@jamstec.go.jp		

Permission to post abstract on IODP Web site: ■ Yes ☐ No

Abstract: (*400 words or less)*

This proposal is for the ultra-deep drilling site of a series of IODP proposals in the Izu-Bonin-Mariana (IBM) arc that aim at comprehensive understanding of arc evolution and continental crust formation. We propose to drill a deep hole that penetrates through a complete sequence of intra-oceanic arc upper crust and into the *in situ* middle crust that may be a nucleus of continental crust. The average continental crust possesses an intermediate composition (~60 wt.% SiO_2), which raises the question of how intra-oceanic arcs produce continental crust if the dominant product of mantle wedge melting and a major proportion of intra-oceanic arc lava are basaltic (50 wt.% SiO_2). There is no pre-existing continental crust in the IBM upper plate, yet recent seismic studies of this arc reveal a thick middle crust layer with 6.0-6.8 km/s *Vp* that is hypothesized to be intermediate in composition. The primary goals of sampling the *in situ* arc crust through drilling are: (1) to identify the structure and lithologies of the upper and middle crust, (2) to test seismic models of arc crustal structure, (3) to constrain the petrologic and chronological relationship of the middle crust to the overlying upper crust, (4) to establish the evolution of arc crust by relating this site with other regional drill sites and exposed arc sections, and (5) to test competing hypotheses of how the continental crust forms and evolves in an intra-oceanic arc setting. These objectives address questions of global significance, but we have specifically identified the IBM arc system as an ideal locale to conduct this experiment. The composition of the pre-subduction upper plate was normal oceanic crust, and the tectonic and temporal evolution of this arc system is well-constrained. Moreover, the IBM system is considered as the best-studied intra-oceanic arc on Earth by extensive sampling of the slab inputs and arc outputs through field studies and drilling, and by a series of recent, focused geophysical surveys. We propose returning to the region of ODP Site 792 to drill, *via.* Eo-Oligocene upper crust, to the middle crust at proposed site IBM-4. The mid-crustal layer in this area is shallow enough to be reached by drilling, and heat flow is low enough for drilling to proceed at mid-crustal temperatures. Samples recovered from IBM-4 will complement the drilling objectives at other proposed sites in Eocene (IBM-2) and Neogene (IBM-3) arc crust and pre-arc oceanic crust (IBM-1), which are proposed separately.

698-Full3

Scientific Objectives: (*250 words or less*)

Petrologic objectives focus on (1) identifying the lithology, bulk composition, and structure of the rocks that comprise the *in situ* upper and middle crust beneath the Eo-Oligocene IBM arc; (2) establishing the age and thermal/petrologic history of the IBM middle crust and its temporal and petrologic relationship to the upper crust overlying it; (3) relating the petrology, structure, and composition of this mature arc crustal section to equivalent sequences from older (Eocene; IBM-2) and younger (Neogene; IBM-3) arc crust from the same system, to upper- and mid-crustal rocks exposed in accreted arc terranes, and to rocks that represent middle and bulk continental crust; and (4) testing models of the formation of arc middle crust, i.e., simple fractionation of mantle-derived basalt or andesite magmas vs. partial melting of mafic arc crust. The main geophysical objective focuses on using the recovered rocks and borehole data from this deep crustal site to evaluate geophysical models of the seismic velocity structure of the IBM arc crust, i.e., a layered structure with relatively homogeneous velocities within each layer *vs.* a gradational crustal velocity structure.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
IBM-4	32°24'N 140°23'E	1798	800	4700	5500	2000m penetration into the middle crust. 886 m of the necessary sampling at the IBM-4 Site has already been done by ODP Leg 126 Site 792

IODP Proposal Cover Sheet

Kanto Asperity Project: Overview

707 - MDP

Title	Kanto Asperity Project: Geological and Geophysical Characterization of the Source Regions of Great Earthquakes and Slow Slip Events
Proponents	R. Kobayashi, Y. Yamamoto, T. Sato, T. Nishimura, C. Moore, M. Shishikura, D. Curewitz, N. Hayman, E. Shalev, P. Henry, T. Hirono, T. Hori, K. Koketsu, P. Malin, M. Matsu'ura, S. Nakao, T. Sagiya, H. Sato, R. Stein, W. Thatcher, N. Takahashi, K. Ujiie, K. Wang, M. Tanahashi, B. Shibazaki, S. Lallemant, J. Beavan,
Keywords	Earthquakes, Slow Slip, Monitoring, Asperity
Area	Central Japan margin

Contact Information

Contact Person:	Reiji Kobayashi			
Department:	Graduate School of Science and Engineering			
Organization:	Kagoshima University			
Address:	1-21-35 Korimoto	Kagoshima		890-0065
Tel.:	+81-99-285-8149	Fax:	+81-99-285-8149	
E-mail:	reiji@sci.kagoshima-u.ac.jp			

Abstract:

The Kanto Asperity Project proposes a drilling and long-term monitoring program in the southern Kanto region of southeastern Japan with the aim of determining the characteristics of the plate boundary in and around the source regions (asperities) of great earthquakes and slow slip events (SSEs). This region (Tokyo Metropolitan Area) is a densely populated economic center that has been subjected to repeated great earthquakes.

Recent progress in supercomputer technology has enabled numerical simulations of the generation cycles of earthquakes and SSEs, but the parameters are not based on scientific data, and are not sufficiently reliable to assess the hazards associated with future earthquakes. The establishment of a realistic earthquake-generation model is of crucial importance in mitigating the danger posed by earthquake geohazards.

Three different types of slip events have occurred at similar depths; the 1923 Taisho Kanto earthquake, 1703 Genroku earthquake, and SSEs off Boso Peninsula. In the cases of Nankai and Cascadia, SSEs occur at deeper levels than the asperities, and the location can be controlled by temperature and pressure. The Boso SSEs occur at the same level as the asperities, raising the possibility that the conditions (materials, fluids, or surface roughness) in the Kanto region are different to those encountered at Nankai and Cascadia.

Our main objectives are to understand why the different types of events occur side by side at almost same depth (Objective 1) and to establish realistic earthquake-generation models using data on each step of the process of SSEs and data on frictional experiments (Objective 2).

This Multi-phase Drilling Project consists of the three programs. Program A proposes ultra-deep drilling to intersect plate boundaries in the Boso SSE region and the Taisho asperity to compare the geological materials at the two sites. Coring and logging at plate boundaries would also yield realistic frictional properties and effective normal stress, as derived from experiments and from measurements of pore pressure, respectively. Program B proposes long-term monitoring (borehole observatories) for recording in detail crustal deformations and seismicity during 2-3 cycles of Boso SSEs, enabling testing of the hypothesis that SSEs can be used to assess the validity of earthquake generation models. Program C proposes drilling at four sites to recover input materials from the Philippine Sea Plate. The cores, and the results of frictional experiments using the core materials, will be used to test the hypothesis that the different types of slip arise from different input materials.

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Scientific Objectives

We propose two main objectives to be achieved.
Objective 1: To understand why the three different types of events occur laterally, at similar depths in the Sagami Trough.
Objective 2: To establish realistic earthquake-generation models using data obtained at each step of the generation cycle of natural earthquakes.
To achieve these objectives, three programs A-C will test the following hypotheses.
For Objective 1:
Hypothesis 1-1: The different types of slips arise from different input materials.
Coring and logging at four sites on the Philippine Sea Plate just before subduction to identify and characterize the input materials (Program C).
Hypothesis 1-2: Coupling strength depends on elapsed time after subduction.
Ultra-deep drilling to intersect plate boundaries in the Taisho asperity and the SSE region to compare core materials, diagenetic and metamorphic conditions, pore-water chemistry. (Program A).
For Objective 2:
Hypothesis 2-1: The Boso SSEs can be used to assess models of earthquake generation.
Long-term monitoring for recording in detail of tilt, pressure, and seismicity during 2-3 cycles of Boso SSEs, to establish physical model of SSE cycle so as to interpret the observed spatio-temporal behavior (Program B). The model of SSEs is applied to that of earthquake generation.
Hypothesis 2-2: Constitutive parameters obtained from fault zone materials and pore pressure in a fault zone can be incorporated into numerical simulations of earthquakes.
Ultra-deep drilling to intersect plate boundaries to yield realistic frictional properties and pore pressures, as derived from experiments on recovered materials and by logging, respectively (Program A).

Non-standard measurements technology needed to achieve the proposed scientific objectives.

Extensive logging (Vp, Vs and anisotropy), in situ experiment, such as pore pressure, hydraulic properties and stress tensor, VSPs, and oriented cores are necessary for the initial values for geodetic and seismic monitoring. Long-term monitoring observatories will require tiltmeters, broadband seismometers, accelerometers, and pressure gauges installation.

Proposed Sites

Site Name	Position (Lon, Lat)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	

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Received 1 October 2011

IODP Proposal Cover Sheet

781-MDP

■ **New** ☐ **Revised** ☐ **Addendum**

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	Please check if this is Mission proposal ☐
Title:	**Multiphase Drilling Project: Unlocking the Secrets of Slow Slip by Drilling at the Northern Hikurangi Subduction Margin, New Zealand**
Proponent(s):	**Laura Wallace, Stuart Henrys, Philip Barnes, Demian Saffer, Harold Tobin, Nathan Bangs, Rebecca Bell, and the Hikurangi margin working group**
Keywords: *(5 or less)*	slow slip events, subduction margin, Hikurangi, fault mechanics, fluids — Area: New Zealand

Contact Information:

Contact Person:	Laura M. Wallace		
Department:	Natural Hazards Group		
Organization:	GNS Science		
Address	1 Fairway Drive, PO Box 30368, Lower Hutt, New Zealand		
Tel.:	+64 4 570 4534	Fax:	+64 4 570 4600
E-mail:	l.wallace@gns.cri.nz		

Permission to post abstract on IODP Web site: ■ Yes ☐ No

Abstract: (*400 words or less*)

Over the last decade, the discovery of episodic slow slip events (SSEs) at subduction margins around the globe has led to an explosion of new theories about fault mechanics and subduction interface deformation mechanisms and rheology. ***The northern Hikurangi margin is the only place on Earth where well-documented SSEs occur on a subduction interface within range of existing drilling capabilities.*** Drilling, down-hole measurements, sampling, and monitoring of the northern Hikurangi SSE source area provides a unique opportunity to definitively test hypotheses for the properties and conditions leading to SSE occurrence, and ultimately, to unlock the secrets of slow slip. Furthermore, ***northern Hikurangi SSEs recur every two years***, and thus provide an excellent setting to ***monitor changes in deformation rate, in situ conditions, and rock physical properties*** within and surrounding the SSE source area throughout a slow slip cycle.

We propose to drill the northern Hikurangi SSE source area with a 3 phase approach:
(1) Seven shallow (~400-1200 m below the seafloor) riserless sites to collect samples and geophysical logs of the overriding and subducting plates, and strategically install observatory equipment to monitor near-surface changes in deformation, seismicity and physical properties throughout a SSE cycle and characterize the distribution of SSE slip with very high fidelity.
(2) A deep riser hole (~6 km below the sea floor) that penetrates the subduction interface and ***directly samples rocks from the SSE source region***, collects logs across the fault zone(s), and measures temperature, fluid pressure and chemistry, and stress.
(3) Installation of a long-term borehole ***monitoring*** system to detect changes in deformation rate, and physical and chemical properties ***at the SSE source*** during a complete SSE cycle.

Sampling material within the SSE source area and incoming plate section (protolith for fault zone rock deeper down) ***will reveal the frictional, lithological and structural character*** of the interface in an active SSE source region. Observatory facilities to monitor changes in hydrology, strain rate and seismicity near and above the SSE source area throughout a two-year SSE cycle will elucidate the role that short-term variations of physical conditions play in the occurrence of aseismic vs. seismic slip. Comparison of properties of the interface at northern Hikurangi (dominated by aseismic creep and moderate, shallow subduction thrust events) and the Nankai margin (where stick-slip behaviour over large regions produces great megathrust earthquakes) may help solve the mystery of why some subduction margins rupture in megathrust earthquakes while others do not.

781-MDP

Scientific Objectives: (*250 words or less*)

Drilling, sampling, downhole logging and measurements, and instrumenting the proposed riserless and riser sites will resolve competing hypotheses and key questions regarding the generation of slow slip and the mechanics of subduction interface thrusts. **Major questions that will be addressed are:**

(1) Do slow slip events (SSEs) occur under highly elevated fluid pressures? **(2)** What is the role of fault strength and rock frictional properties in facilitating slow slip? **(3)** What are the rock compositions and fault zone architecture associated with slow slip? **(4)** Do short-term hydrological variations facilitate SSEs or is there no relationship? **(5)** How do fluid chemistry, pressure, temperature, and fluid flux (near the surface and at the SSE source) vary in response to SSEs? **(6)** What control does temperature have on the down-dip limit of the seismogenic zone and the depth to slow slip events? **(7)** Is the structural character and frictional properties of the subduction interface dominated by aseismic slip and moderate subduction thrust earthquakes (i.e., Northern Hikurangi) fundamentally different from that of subduction interface faults characterized by stick-slip behaviour and great megathrust earthquakes (such as Nankai)?

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Completion of the objectives will require development of one or more long-term borehole monitoring systems, based on existing CORK and LTBMS designs for both JOIDES Resolution and Chikyu drilling. Non-standard downhole measurements using the MDT (Modular Dynamic Tester) or similar for in situ pore pressure, stress, and permeability data may be required.

Proposed Sites:

SEE INDIVIDUAL PROPOSALS FOR EACH PHASE OF THE PROJECT FOR SITE DESCRIPTIONS

IODP Proposal Cover Sheet

Hikurangi: Riser

781B - Full

Title	Unlocking the secrets of slow slip by drilling at the northern Hikurangi subduction margin, New Zealand: Riser drilling to intersect the plate interface
Proponents	L. Wallace, Y. Ito, S. Henrys, P. Barnes, D. Saffer, S. Kodaira, H. Tobin, M. Underwood, N. Bangs, A. Fagereng, H. Savage, S. Ellis, .. The Hikurangi Margin Working group,
Keywords	SSEs subduction Hikurangi earthquakes fluids
Area	New Zealand

Contact Information

Contact Person:	Laura Wallace		
Department:	Institute for Geophysics		
Organization:	University of Texas		
Address:	J.J. Pickle Research Campus,	Austin	78758
Tel.:		Fax:	
E-mail:	lwallace@ig.utexas.edu		

Abstract

Over the last decade, the discovery of episodic slow slip events (SSEs) at subduction margins around the globe has led to an explosion of new theories about fault rheology and slip behavior along subduction megathrusts. The northern Hikurangi margin is the only place on Earth where well-documented SSEs occur on a subduction interface within range of scientific drilling capabilities. Drilling, down-hole measurements, and sampling of the northern Hikurangi SSE source area provides a unique opportunity to definitively test hypotheses for the physical conditions and rock properties leading to SSE occurrence, and ultimately, to unlock the secrets of slow slip.

This proposal is for the deep, riser drilling component of a recently submitted Multi-phase Drilling Project (781-MDP) proposal for IODP drilling to discern the mechanisms of subduction zone slow slip events (SSEs) by scientific drilling in the region of shallow SSEs at northern Hikurangi. The primary aims of the riser phase are to sample, log, and conduct downhole measurements in the hanging wall and across the plate interface where SSEs occur.

Here, we propose a single riser borehole intersecting the plate interface at 5-6 km bsf, to collect samples, geophysical logs and make downhole measurements at the source of SSEs. The riser borehole is designed to address two fundamental scientific objectives: (1) characterize the composition, mechanical properties, and structural characteristics of the megathrust in the slow slip source area; and (2) characterize hydrological properties, thermal regime, stress, and pore pressure state above and within the SSE source region. Together, these data will test a suite of hypotheses about the fundamental mechanics and behavior of slow slip events, and their relationship to great subduction earthquakes. Without direct sampling of rocks from the SSE source and in situ measurements of physical properties (as proposed here), geoscientists are limited to speculation regarding the mechanisms that lead to SSEs.

We also expect that comparisons between cores and logs from deep, riser drilling of the subduction interfaces at both north Hikurangi and Nankai (the NanTroSEIZE project) will address the mystery of why some subduction zones rupture in Great earthquakes (e.g., Nankai), while others are dominated by aseismic creep (e.g., N. Hikurangi).

781B - Full

Scientific Objectives

Drilling, coring, geophysical logging, and downhole measurements will resolve competing hypotheses and key questions regarding the generation of slow slip and the mechanics of subduction interface thrusts. Major questions that will be addressed are:

(1) What control does temperature and pressure have on the down-dip limit of the seismogenic zone and the depth of slow slip events? (2) Does high fluid pressure at the plate interface influence the occurrence of SSEs, and what role do mineralogical dehydration transformations play in the supply of fluids to the SSE source area? (3) What are the lithologies hosting slow slip, and do they promote conditional stability? If so, do fast seismic slip and slow aseismic slip occur in the same location on the interface? Do SSEs represent prematurely arrested normal earthquakes, as is suggested from dynamic weakening in laboratory friction tests? (4) Are the structural character and frictional properties of a subduction interface dominated by slow, aseismic slip and moderate subduction thrust earthquakes (i.e., Northern Hikurangi) fundamentally different from that of subduction interface faults characterized by stick-slip behaviour and great megathrust earthquakes (such as Nankai)?

Non-standard measurements technology needed to achieve the proposed scientific objectives.

LWD tools: As complete a suite as is possible and practical for logging-while-drilling LWD) should be employed. At a minimum azimuthal resistivity imaging, sonic velocity, density and neutron porosity, gamma, and annular pressure logging are requested.

In situ pore pressure and stress measurements: a packer-based or similar wireline or LWD tool that can be used to conduct pumping and drawdown tests and mini-frac experiments (one example is the Schlumberger modular dynamic tester, or MDT, tool) is important to measure both stress and hydrogeologic state of the slow slip environment and upper plate.

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
HSM-01B	-38.727283, 178.614233	994	6000	0	6000	1.Coring and logging to assess physical properties and rock composition within and above the upper plate above SSE source region 2. Case and install temporary SSE observatory hole between drilling phases 3. Case and install long-term borehole observatory when the hole is completed

IODP Proposal Cover Sheet

SloMo

800 - MDP

Title	Nature of the Lower Crust and Moho at Slower-spreading Ridges
Proponents	H. Dick, J. Natland, S. Arai, P. Robinson, C. MacLeoc, M. Tivey, I. Benoit, G. Ceuleneer, D. Teagle, K. Ozawa, M. Godard, J. Miller, R. Tribuzio, H. Kumagai, M. Kurz, J. Koepke, S. Miyashita, J. Maeda, R. Pedersen, J. Canales, G. Hirth, J. Lisenberg, A. Yoshinobu, H. Zhou, W. Bach, J. Snow, K. Edwards, V. Edgecomb, Y. NIu, A. Sanfilippo, . France, F. Klein, M. tominaga, T. Schroeder, N. Abe, B. Payot, M. Python, Y. Harigane, V. LeRoux,
Keywords	Moho Crust
Area	Southwest Indian Ridge

Contact Information

Contact Person:	Henry J. B. Dick		
Department:	Geology and Geophysics		
Organization:	Woods Hole Oceanographic Institution		
Address:	McLean Laboratory, MS#8	Woods Hole	02543
Tel.:	1-508-892-2590	Fax:	
E-mail:	hdick@whoi.edu		

Abstract:

This multi-phase drilling proposal is to drill through the Atlantis Bank gabbroic massif into mantle 2.2 km NE of 1.5-km deep Hole 735B to 500-m below Moho. There are 2 major objectives. First to recover the lowermost gabbros and crust-mantle transition to understand the processes creating Mid-Ocean Ridge Basalt – the most abundant magma type on Earth, and second, resolve the controversy as to whether the Moho at slow spreading ridges can be a serpentinization front. Based on geologic mapping, geochemistry, and seismic refraction the igneous crust-mantle boundary below Atlantis Bank is believed ~2.5 km above Moho. This is an ideal location, then, to test the serpentinization front hypothesis for Moho. If successful in penetrating serpentinized mantle, the drilling may not only extend the limits for life, but also document an entire new planetary biosphere below the ocean crust.

The drill site is at the center of the 700-km2-gabbro massif where the crust-mantle transition is most fully developed at the likely point of focused melt delivery from the mantle. This will test competing hypotheses for MORB petrogenesis: one supported by experimental petrology that it segregates at depths of 10 to 30 km where MORB melts would be last in equilibrium with the olivine and two pyroxene mantle assemblage, and then transported to the crust with little additional mantle interaction. The alternative hypothesis is that MORB aggregates and pools in the mantle at the base of the crust, where melt-rock reaction with the mantle and lower crust, significantly modifies the melt composition prior to intrusion to higher levels and eruption to the seafloor. The latter process has two major implications: 1) the assumed composition of primary magmas, based on compositions calculated assuming that MORB is produced by simple fractional crystallization of a parental melt is incorrect, and that 30 years of experimental petrology has used the wrong composition and model in predicting mantle-melt equilibrium, and 2) that mantle hybridized by melt-rock reaction at the base of the crust contributes significantly to the bulk composition of the crust. The results will profoundly affect understanding of magma generation and the linkages between the mantle, melt, and crust.

Combined with the existing holes the drilling will produce a transit spaced at ~ 1-km intervals to look at lateral heterogeneity of the crust, test the nature of magnetic reversals in plutonic rock, and document the stress-strain evolution of a plate boundary undergoing asymmetric seafloor spreading.

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800 - MDP

Scientific Objectives

There are two principle objectives:
I. Test the hypothesis that the Moho beneath Atlantis Bank is a serpentinization front.
II. Recover the igneous lower crust and the crust-mantle transition at an average melt flux for slow and ultraslow-spreading ridges.
From this we seek to understand:
• The igneous stratigraphy of the lower crust
• How much mantle material is incorporated into the lower crust.
• How melt is transported through and emplaced into the lower crust
• How the lower crust and shallow mantle shapes the composition of mid-ocean ridge basalt, the most abundant magma on Earth?
• The primary modes of accretion of the lower crust.
• Lateral heterogeneity of the lower crust at magmatic time scales.
• The distribution of strain in the lower crust and shallow mantle in the shallow lithosphere during asymmetric seafloor spreading.
• The nature of magnetic anomaly transitions in the lower crust.
• The role of the lower crust and shallow mantle in the global carbon cycle.
• Life in the lower crust and hydrated mantle.
This drilling will:
Provide an important step towards a full penetration in the Pacific by providing critical needed experience in deep drilling in lower crustal and mantle rock.
Create a laboratory for hole-to-hole and ship-to-hole experiments for in-situ determination of the seismic character of lower crust and mantle rock at a seismically appropriate scale.

Non-standard measurements technology needed to achieve the proposed scientific objectives.

biogeochemical tools

Proposed Sites

Site Name	Position (Lon, Lat)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
AtBk-3	57.29166, -32.6716	700	0	1000	1000	AtBk-3 lies on the northernmost lip of the Atlantis Bank Platform and has the objective of examining the shallow igneous and high-temperature detachment deformation history at a significantly later point in its history (~500,000 yrs) than at either AtBk-1 or 1105A or 735B. We would occupy this location in the event that we were unsuccessful in spudding in at AtBk-2.
AtBk-2	57.339166, -32.68333	1700	3	1000	1003	Drill the dike-gabbro transition in ultraslow spread crust to examine the history of alteration, deformation and intrusion
AtBk-1a	57.28516, -32.7125	700	0	6000	6000	I. Test the hypothesis that the Moho beneath Atlantis Bank is a serpentinization front. II. Recover the igneous lower crust and the crust-mantle

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Received 25 March 2012

IODP Proposal Cover Sheet

805-MDP

☒ **New** ☐ **Revised** ☐ **Addendum**

Please fill out information in all gray boxes

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Please check if this is Mission proposal ☐

Title:	MoHole to Mantle (M2M)		
Proponent(s):	Susumu Umino, Benoît Ildefonse, Peter B. Kelemen, Shuichi Kodaira, Katsuyoshi Michibayashi, Tomoaki Moroshita, Damon A.H. Teagle, and the MoHole proponents (full list inserted after the reference list)		
Keywords: *(5 or less)*	Mantle, Moho, oceanic lithosphere, oceanic crust, Mid-Ocean Ridge processes, hydrothermal cooling, carbon cycle, ultradeep drilling	Area:	Central/East Pacific

Contact Information:

Contact Person:	Katsuyoshi Michibayashi		
Department:	Institute of Geosciences		
Organization:	Shizuoka University		
Address	Ohya 836, Suruga-ku, Shizuoka, 422-8529, Japan		
Tel.:	+81 542384788	Fax:	+81 542380491
E-mail:	sekmich@ipc.shizuoka.ac.jp		

Permission to post abstract on IODP Web site: ■ Yes ☐ No

Abstract: (*400 words or less)*

The M2M project will sample for the first time upper mantle peridotites that in the near geological past resided in the convecting mantle, and recently (~20 to 100 Myrs) underwent partial melting at a fast-spreading mid-ocean ridge. This will be achieved by drilling through intact fast-spread oceanic crust, and ~500m into the mantle lithosphere. This first in-situ sampling of fresh upper mantle rocks will provide hitherto unattainable information on the chemical and isotopic composition (including fluid mobile elements K, U, C, S, H2O, noble gases), physico-chemical conditions (e.g., fO2, fS), seismic velocities and magnetic signatures, physical properties deformation and rheology, and the scales of chemical and physical heterogeneity of the uppermost mantle. This information is essential to understand the formation and evolution of Earth, its internal heat budget, planetary differentiation and reservoir mixing by mantle convection, mantle melting, and melt focusing and transport at mid-ocean ridges.

On the descent to the mantle, the ultradeep hole (MoHole) will sample fast spreading ocean crust, and make the first in situ observations of the geological nature of the Mohorovičić Discontinuity (Moho), the uppermost primary seismic boundary in the Earth, assumed to be the crust-mantle boundary. Fast spreading ocean crust is targeted because it exhibits relatively uniform bathymetry and seismic structure, and is the great majority of crust recycled back into the mantle by subduction during the past 200 Myrs. Sampling a section of intact oceanic crust will test models of magmatic accretion at mid-ocean ridges, quantify the geometry and vigor of hydrothermal cooling and geochemical exchanges with the oceans, identify the limits of life in the sub-seafloor biosphere and its functions, and ground-truth remote geophysical observations.

This proposal provides the scientific justification for drilling a >6000 m borehole to the mantle. The rationale has been developed by six workshops since 2006, and summarizes the scientific state-of-the-art, and the current vision for engineering and technology development, and operations. M2M directly addresses Challenges 6, 8, 9 and 10 of the 2013-2023 IODP Science Plan. A site for mantle drilling has yet to be selected, but three potential target regions await additional site surveys.

Drilling into the mantle will be the most ambitious undertaking ever achieved by the geoscience community and must engage the full spectrum of scientific expertise. Observations of pristine upper mantle will transform our understanding of the evolution of our planet and challenge the fundamental paradigms that are the foundations of Earth science.

805-MDP

Scientific Objectives: (*250 words or less*)

The M2M project echoes long-term goals of Earth scientists since the late 1950's, to understand the oceanic lithosphere. With a MoHole, we will address first-order questions about the composition and structure of the Earth's convecting mantle, the geological nature of the Moho, the formation and evolution of oceanic crust, and the deep limits of life. Specific objectives of M2M are to:

• Determine the in-situ composition, structure and physical properties of the uppermost mantle, and the physics and chemistry of mantle melting and melt migration processes,

• Determine the scales of physical and chemical heterogeneity of the uppermost mantle,

• Determine the geological meaning of the Moho in fast-spread lithosphere,

• Determine the bulk composition of the ocean crust to establish the relationship between lavas at the seafloor and the melts that separated from their mantle sources,

• Determine the mode of magmatic accretion at fast spreading ridges,

• Understand the extent and intensity of hydrothermal exchange between ocean crust and seawater, and estimate the chemical flux returned to the mantle by subduction,

• Determine the contribution of the lower ocean crust and upper mantle to global geochemical cycles, including carbon and water,

• Establish the limits, and controlling factors of life in the ocean lithosphere.

• Calibrate regional seismic measurements against core samples and borehole experiments, including long-term geophysical and microbiological monitoring,

• Understand the origin of marine magnetic anomalies and quantify the contribution of lower crustal rocks to the magnetic signature of the ocean crust.

Please describe below any non-standard measurements technology needed to achieve the proposed scientific objectives.

Continuous mud circulation (water depth > 3500 m); coring, logging, and fluid/gas sampling in a high temperature (≥ 200°C) environment; specialized drill bits for abrasive, hard, hot rocks; specialized drill string with high tensile strength; low weight, special drilling mud for use at high temperature; new casing and cementing materials and strategies; …

Proposed Sites:

Site Name	Position	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
Cocos Plate	6.7-8.7°N 89.5-91.9°W	3400-3650	250-300	>6000	>6000	
Off Southern/Baja California	20-33°N 120-127°W	Mostly 4000-4500	80-130	>6000	>6000	**MoHole site is yet to be determined, and other options may be considered**
NE Hawaiian Arch	22.9-23.9°N 154.5-155.8°W	4050-4500	~200	>6000	>6000	

IODP Proposal Cover Sheet

835 - Full 2

Japan Trench Tsunamigenesis

Received for: 2016-04-01

Title	Tracking Tsunamigenic Slips Across and Along the Japan Trench (JTRACK): Investigating a new paradigm in tsunamigenic megathrust slip with very deep water drilling using the D/V Chikyu
Proponents	Shuichi Kodaira, Jim Sample, Michael Strasser, Kohtaro Ujiie, Jamie Kirkpatrick, Patrick Fulton, Jim Mori, Demian Saffer, Takehiro Hirose, Weiren Lin, Kelin Wang, Yasu Nakamura, Matt Ikari, Ken Ikehara, Marta Torres, Liz Screaton, Rachel Lauer, Chris Goldfinger, Toshiya Kanamatsu, Paola Vannucchi, Jan Behrmann, Virginia Toy, Achim Kopf, Tim Byrne, Saneatu Saito, Greg Moore, Brian Boston, Hung-Yu (Sonata) Wu, Tsuyoshi Ishikawa, Emily Brodsky, Ryota Hino, Asuka Yamaguchi, Toshiya Fujiwara, Anja Schleicher, Christine Regalla, Kentaro Omura, Marianne Conin
Keywords	Tsunami, Earthquake, Subduction, Paleoseismology, Fault
Area	Japan Trench

Proponent Information

Proponent	Shuichi Kodaira
Affiliation	JAMSTEC-CEAT
Country	Japan

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Abstract

Understanding the huge slip and associated devastating tsunami of the 2011 Tohoku-oki earthquake is a high priority challenge for IODP with important societal impacts. JTRACK investigates spatial and temporal aspects of physical, hydrological, and chemical properties of the fault zone to elucidate key factors that can control large (and small) slip on the megathrust. These results may be used to explain the 2011 earthquake, past tsunamigenic events along the Japan Trench, and possibly other great subduction earthquakes world-wide. Planned drilling includes a variety of investigations targeting the fault zone and associated structures. Geologic studies will focus on structure and physical properties, especially frictional characteristics for components of the input pelagic sediments, such as the abundant smectite recognized during previous drilling of the megathrust. Hydrological and chemical effects in and around the fault zone are largely unknown, but likely contribute to earthquake processes. We plan analyses of interstitial water to evaluate the role of fluids during faulting, along with investigations of the local permeability structure. The evolving stress state following the earthquake will be studied with borehole breakouts and temperature/pressure monitoring in a borehole observatory. JTRACK has the unique opportunity to study fault healing after a large earthquake. The strategy for this proposal consists of two 2-hole transects across the Japan Trench in the region of the shallow plate boundary fault that ruptured in 2011. One transect is an area of large slip (>50 m) and the other of smaller slip (1/3~1/2 of the large slip). Each transect has an Inner trench slope'site mainly targeting the plate boundary fault zone, and an Input'site seaward of the trench as a reference site. The borehole sites have largely independent science objectives and there are few logistical constraints on the order or timing of drilling. This may be advantageous for scheduling since operations can be done during several expeditions of short duration.

Scientific Objectives

Our primal objective is to define spatially-varying physical and chemical properties and conditions of the sediments and fluids of the near-trench megathrust that contribute to huge fault displacements and very large tsunamis. Following recommendations from the IODP Science Evaluation Panel and community input at the JTRACK Workshop (May 17-19, 2014, Tokyo), this proposal focuses on the 2011 Tohoku-oki rupture zone by drilling two transects across the Japan Trench in regions of large and small coseismic slip. We will investigate the detailed geologic structures and rock properties of the fault zone, especially frictional and strength characteristics. Permeability and chemical studies will be used to infer the local hydrological structure and its effect on the earthquake rupture. Combining these observations and using comparisons of similar measurements for areas of high and low slip during the 2011 earthquake, we will try to infer key factors that control the amount of displacement during large earthquakes. In addition, time-dependent observations will be carried out to study fault healing after a large earthquake. These will focus on how the local hydrological and stress conditions change during the few years following the large fault displacement during the earthquake.

Non-standard measurements technology needed to achieve the proposed scientific objectives

835 - Full 2

Proposed Sites (Total proposed sites: 5; pri: 4; alt: 1; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
JTNT-02A (Primary)	38.5272 144.1992	7115	520	0	520	Obtain sample and logging data of a reference section on the incoming plate seaward of the small slip area of the 2011 Tohoku earthquake as a baseline for comparison with sediments in the prism, plate-boundary décollement and underthrust section. Investigate the role of fluids in the reference input section with geochemical and physical property data from continuous cores. Measure the stress state in the incoming sediment section from borehole and sediment property measurements.
JTNT-04A (Alternate)	38.5171 144.0254	7300	1080	0	1080	Continuously core the frontal prism, fault zone and subducted plate to oceanic basement in the small slip area of the 2011 Tohoku earthquake to obtain representative fault and surrounding rock samples and logging data for structural analyses and laboratory experiments. Investigate the role of fluids in slip with geochemical and physical property data from continuous cores. Measure the prism stress state from borehole and sediment property measurements. An alternate site of JTNT-01A
JTNT-01A (Primary)	38.552 144.0355	7400	980	0	980	Continuously core the frontal prism, fault zone and subducted plate to oceanic basement in the small slip area of the 2011 Tohoku earthquake to obtain representative fault and surrounding rock samples and logging data for structural analyses and laboratory experiments. Investigate the role of fluids in slip with geochemical and physical property data from continuous cores. Measure the prism stress state from borehole and sediment property measurements.
JTCT-02A (Primary)	37.9267 144.0688	6945	450	0	450	Obtain sample and logging data of a reference section on the incoming plate seaward of the large slip area of the 2011 Tohoku earthquake as a baseline for comparison with sediments in the prism, plate-boundary décollement and underthrust section. Investigate the role of fluids in the reference input section with geochemical and physical property data from continuous cores. Measure the stress state in the incoming sediment section from borehole and sediment property measurements.
JTCT-01A (Primary)	37.9389 143.9135	6930	950	0	950	Continuously core the frontal prism, fault zone and subducted plate to oceanic basement in large slip area of the 2011 Tohoku earthquake to obtain representative fault and surrounding rock samples and logging data for structural analyses and laboratory experiments. Install a long-term fault zone observatory to monitor pore pressure and temperature near the previous JFAST temporary temperature observatory. Investigate the role of fluids in slip with geochemical and physical property data from continuous cores. Measure the prism stress state from borehole and sediment property measurements and long-term observatory monitoring.

IODP Proposal Cover Sheet

DREAM: Mediterranean Salt Giant

857 - MDP 2

Title	Uncovering a Salt Giant: Umbrella proposal of the multi-phase drilling project (MDP)		
Proponents	A. Camerlenghi, G. Aloisi, S. Cloetingh, H. Daigle, G. DeLange, R. Flecker, D. Garcia-Castellanos, Z. Gvirzman, C. Hübscher, W. Krijgsman, J. Kuroda, J. Lofi, S. Lugli, V. Manzi, T. McGenity, A. Moscariello, M. Rabineau, M. Roveri, F. Sierro, Y. Makovsky, N. Waldmann, A. Maillard-Lenoir,		
Keywords	Messinian, Salt, Deep Biosphere, Mediterranean	Area	Balearic Margin, Provençal Basin,

Contact Information

Contact Person:	Angelo Camerlenghi		
Department:			
Organization:	OGS Istituto Nazionale di Oceanografia e di Geofisica Sperimentale		
Address:	Borgo Grotta Gigante 42/C	Sgonico	34151
Tel.:	00390402140447	Fax:	
E-mail:	acamerlenghi@ogs.trieste.it		

Abstract

About 6 million years ago the Mediterranean Sea became an enormous saline basin where more than one million cubic kilometres of salt accumulated, locally exceeding a thickness of 3 km in the deep basins. This extreme, but geologically brief event (640 ka; the so-called Messinian salinity crisis, MSC), changed the chemistry of the global ocean and had a permanent impact on both the terrestrial and marine ecosystems of a huge area surrounding the Mediterranean. Drilling the MSC salt giant represents a unique opportunity to understand the sedimentary history, stratigraphy, biosphere and fluid dynamics of a salt giant in a state close to its original depositional configuration, and to understand the responsiveness of a land-locked oceanic basin to planetary dynamics.

The MDP proposal "Uncovering a Salt Giant" originates from a series of workshops and international initiatives carried out since 2006, when riser-drilling technology was introduced in IODP in 2004.

Four site-specific drilling proposals are conceived under this umbrella:

- DREAM: Deep-Sea Records of the MSC;
- Deformation and fluid flow in the MSC salt giant;
- Probing the Salt Giant for its Deep Biosphere secrets;
- Probing deep Earth and surface connections;

addressing four overarching questions:

- What are the causes, timing and emplacement mechanisms of the MSC salt giant?
- What are the factors responsible for early salt deformation and fluid flow across and out of the halite layer?
- Do salt giants promote the development of a phylogenetically diverse and exceptionally active deep biosphere?
- What are the mechanisms underlying the spectacular vertical motions inside basins and their margins?

The pre-proposal "Probing deep Earth and surface connections" (857A-Pre, Rabineau et al.) has already been submitted within this MD proposal, while the remaining three pre-proposals will be submitted following the response of SEP.

Two deep basin sites will be proposed for riser drilling, one each in the Western and Eastern Mediterranean basin (West-to-East transect), aiming at the recovery of the complete Messinian sequence. One of these, in the Western Basin, will be extended down to basement. Four intermediate basins sites are located at shallower water depths and target the recovery of MSC records to reconstruct a shallow-to-deep transect.

The planning of complementary continental drilling within ICDP is in progress.

857 - MDP 2

Scientific Objectives

What are the causes, timing and emplacement mechanisms of the MSC salt giant?
- establish the chronology of the MSC
- test existing hypotheses for Mediterranean evaporite formation
- develop unifying models for the MSC salt giant
- reconstruct paleoclimate conditions during the MSC and investigate the impact on global climate

What are the factors responsible for early salt deformation and fluid flow across and out of the halite layer?
- understand syn-sedimentary salt tectonics and halite creep
- constrain post-depositional salt deformation and its consequences on sedimentary mass wasting
- to understand the physical and mineralogical conditions that allow fluids to migrate in and through thick tabular salt sequences

Do salt giants promote the development of a diverse and exceptionally active deep biosphere?
- determine whether evaporitic sulfate minerals are fuelling the Mediterraneanʼs deep biosphere
- establish whether the interaction between limiting factors and a highly variable chemical environment has produced a novel deep biosphere community
- use the biomarkers and surviving microbes trapped within brine inclusions to reconstruct the depth, photic and oxic conditions of ancient, hypersaline depositional environments

What are the mechanisms underlying the spectacular vertical motions inside basins and their margins?
- quantify the consequences of base-level change on river behaviour, sediment erosion, supply, transport, karstification and

Non-standard measurements technology needed to achieve the proposed scientific objectives.

Riser drilling, sidewall coring, LWD

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	

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866 - Full 2

Japan Trench Paleoseismology

Received for: 2017-10-02

Title	TRACKing past earthquakes in the sediment record along the Japan Trench: Testing and developing submarine Paleoseismology in the deep sea (JTRACK-Paleoseismology)
Proponents	Michael Strasser, Ken Ikehara, Toshiya Kanamatsu, Shuichi Kodaira, Cecilia McHugh, Yasuyuki Nakamura, Antonio Cattaneo , Timothy Eglinton, Chris Goldfinger, Takuya Itaki, Arata Kioka, Achim Kopf, Jasper Moernaut, Jim Mori, Yoshitaka Nagahashi, Volkhard Spieß, Witold Szczuciński, Mike Underwood, Kazuko Usami, Stefan Wiemer
Keywords	Paleoseismology, Earthquake, Sedimentology, Event Stratigraphy
Area	Japan Trench

Proponent Information

Proponent	Michael Strasser
Affiliation	University of Innsbruck
Country	Austria

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Abstract

Short historical and even shorter instrumental records limit our perspective of earthquake maximum magnitude and recurrence, and thus are inadequate to fully characterize Earth´s complex and multi-scale seismic behaviour and its consequences. Examining prehistoric events preserved in the geological record is essential to reconstruct the long-term history of earthquakes and to deliver observational data that help to reduce epistemic uncertainties in seismic hazard assessment for long return periods. “Submarine paleoseismology” is a promising approach to investigate deposits from the deep sea, where earthquakes leave traces preserved in the stratigraphic succession. However, at present we lack comprehensive data sets and long-term records that allow for conclusive distinctions between quality and completeness of the paleoseismic archives.

Motivated by the mission to fill the gap in long-term records of giant (Mw9-class) earthquakes, J-TRACK Paleoseismology aims at testing and developing submarine paleoseismology in the Japan Trench (JT). We propose a multi-coring approach by Mission Specific Platform shallow-subsurface (40m) piston coring to recover the continuous Upper Pleistocene-to-Holocene stratigraphic successions of trench-fill basins along an axis-parallel transect of the 7-8km deep trench. The cores from 18 proposed primary (and/or 13 alternate) sites will be used for multi-method applications to characterize event-deposits, for which the detailed stratigraphic expressions and spatio-temporal distribution will be analyzed for proxy-evidence of earthquakes.

Sediment remobilization related to the 2011-Mw-9.0-Tohoku-oki earthquake and the respective deposits are preserved in trench basins, formed by flexural bending of the subducting Pacific plate. These basins are ideal study areas for testing event-deposits for earthquake triggering, because they are poorly connected for sediment-transport from the shelf, experience high sedimentation rates and low benthos activity (and thus high preservation potential) in the hadal environment. Results from conventional coring covering the last ~1.500 years reveal good agreement between the sedimentary record and historical documents. Subbottom profiles images are consistent with basin-fill successions of episodic muddy turbidite deposition, thus defining clear targets for paleoseismologic investigations on longer time scales accessible only by IODP coring.

We will apply, further refine and implement new methods for establishing event-stratigraphy in the deep sea and for recognizing giant vs. smaller earthquakes vs. other driving mechanism. The results of this proposal can potentially produce a fascinating record unravelling an earthquake history that is 10 to a 100 times longer than currently available information. This would contribute to a tremendous advance in the understanding of the recurrence pattern of giant earthquakes and earthquake-induced geohazards globally.

Scientific Objectives

There is a high potential of using event-stratigraphy of trench-fill sedimentary successions in the Japan Trench to reconstruct a long history of giant earthquakes off NE Japan: The primary research objectives of JTRACK-Paleoseismology are to:

O-1: Identify the sedimentological, physical, chemical, and biogeochemical proxies of event-deposits in the sedimentary archive that allow for confident recognition and dating of past Mw9-class earthquakes vs. smaller earthquakes vs. other driving mechanism.
O-2: Explore the spatial and temporal distribution of such event-deposits to investigate along-strike and time-dependant variability of sediment sources, transport and deposition processes, and stratigraphic preservation.
O-3: Develop a long-term earthquake record for giant earthquakes.

O-1 and O-2 are related to the mission of testing and developing submarine paleoseismology to produce robust long-term records as input for addressing O-3 in the Japan Trench, for comparison with global examples. To address these objectives we propose IODP Mission Specific Platform shallow-subsurface (40m) piston coring to recover the continuous Upper Pleistocene-to-Holocene stratigraphic successions of isolated trench-fill basins along an axis-parallel transect of the 7-8km deep Japan Trench. The cores from proposed 18 primary (and/or 13 alternate) sites will be used for multi-method applications to characterize event-deposits, for which the detailed stratigraphic expressions and spatio-temporal distribution will be analyzed for proxy-evidence of earthquakes.

Non-standard measurements technology needed to achieve the proposed scientific objectives

Mission Specific Platform shallow-subsurface (40m) piston coring in deep waters of 7-8 km depth

Proposed Sites (Total proposed sites: 31; pri: 18; alt: 13; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
JTPS-01A (Primary)	36.07202 142.73503	8030	40	0	40	(i) Recover an expanded (relative to coupled site JTPS-02A) continuous Holocene stratigraphic succession (potentially reaching the upper Pleistocene) comprising event-deposits from the deepest depocentre in the southernmost-part of the JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPS-02A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the northward-extent of sediment-transport routed through the Nakaminato canyon (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPS-02A (Primary)	36.10118 142.75813	8000	40	0	40	(i) Recover a condensed (relative to coupled site JTPS-01A), continuous upper Pleistocene-to-Holocene stratigraphic succession, comprising thin sedimentary event-deposits on a trench-floor high near the deepest depocentre in the southernmost-part of the JT study area. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with results from the expanded couple site JTPS-01A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the northward-extent of sediment-transport routed through the Nakaminato canyon (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPS-03A (Alternate)	36.22997 142.88166	7990	35	0	35	(i) Recover a condensed (relative to coupled site JTPS-04A) continuous upper Pleistocene-to-Holocene stratigraphic succession, comprising event-deposits on an elevated trench-floor morphology in the southernmost trench-basin (Alternate site to JTPS-02A in <8km water depth). (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPS-04A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the northward-extent of sediment-transport routed through the Nakaminato canyon (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPS-04A (Alternate)	36.24424 142.89031	7990	40	0	40	(i) Recover an expanded (relative to coupled site JTPS-03A), continuous Holocene stratigraphic succession (potentially reaching the upper Pleistocene), comprising event-deposits from a local depocentre on an elevated trench-floor morphology in the southernmost trench-basin (Alternate site to JTPS-01A in <8km water depth). (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPS-03A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the northward-extent of sediment-transport routed through the Nakaminato canyon (O-2), to develop a long-term record for giant earthquakes (O-3).
JTPS-05B (Primary)	36.89173 143.40772	7700	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession (condensed in the upper part and more expanded in the lower part; relative to coupled site JTPS-06B), comprising event-deposits from a small isolated trench-basin in the central part of the southern JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPS-06B to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the northward-extent of sediment-transport routed through the Nakaminato canyon (O-2), to develop a long-term record for giant earthquakes (O-3).
JTPS-06B (Primary)	36.91171 143.42432	7710	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession (expanded in the upper part and more condensed in the lower part; relative to coupled site JTPS-05B), comprising event-deposits from a small isolated trench-basin in the central part of the southern JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPS-05B to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the northward-extent of sediment-transport routed through the Nakaminato canyon (O-2), to develop a long-term record for giant earthquakes (O-3).

Proposed Sites (Continued; total proposed sites: 31; pri: 18; alt: 13; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
JTPS-07A (Primary)	37.41496 143.73196	7820	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from an isolated trench-basin in the north-central part of the southern JT (would be expanded section relative to coupled contingency-option site JTPS-08A). (ii) Analyze the stratigraphic pattern and event-deposit characteristics (at best integrated with contingency-coring site JTPS-08A) and compare with integrated results from JTPS-09A,-10A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPS-08A (Alternate)	37.42749 143.73726	7820	30	0	30	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from the isolated trench-basin in the north-central part of the southern JT. Contingency-option site as condensed section relative to coupled site JTPS-07A. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPS-07A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPS-09A (Primary)	37.68110 143.86610	7550	40	0	40	(i) Recover an expanded (relative to coupled site JTPS-10A) continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from an isolated trench-basin in the northernmost part of the southern JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPS-10A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPS-10A (Primary)	37.70031 143.87689	7540	40	0	40	(i) Recover a condensed (relative to coupled site JTPS-09A) continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from the isolated trench-basin in the northernmost part of the southern JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPS-09A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPC-01A (Primary)	38.00853 144.00566	7570	30	0	30	(i) Recover a condensed (relative to coupled site JTPC-02A) continuous Holocene stratigraphic succession (potentially reaching the upper Pleistocene) comprising event-deposits from the isolated trench-basin in the structurally-complex area affected by 2011-coseismic-rupture-propagation-to-the-trench. (ii) Recover and analyze the top of an older trench-fill deformation event. (iii) Analyze the stratigraphic-pattern and event-deposit characteristics and integrate with JTPC-02A to assess local variability and establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iv) Compare results with all other sites to explore spatio-temporal distribution of earthquake-event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPC-02A (Primary)	38.02804 144.00227	7570	35	0	35	(i) Recover an expanded (relative to coupled site JTPC-01A) continuous Holocene stratigraphic succession (potentially reaching the upper Pleistocene) comprising event-deposits from the isolated trench-basin in the structurally-complex area affected by 2011-coseismic-rupture-propagation to the trench. (ii) Recover and analyze the top of an older trench-fill deformation event. (iii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPC-01A to assess local variability and establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iv) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).

Proposed Sites (Continued; total proposed sites: 31; pri: 18; alt: 13; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
JTPC-03B (Primary)	38.29761 144.05920	7460	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from the isolated trench-basin within the relatively-elevated trench-floor segment in the central JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and compare with integrated results from the couple sites JTPC-01A & -02A (in the south) and JTPC-05B (in the north) to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPC-04A (Alternate)	38.57586 144.12499	7560	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from an isolated graben-fill basin in the structurally-complex central part of the central JT, where the neighboring trench-basin only comprises disturbed sections. Contingency-option site as condensed section relative to coupled site (s. l.) JTPC-05A. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPC-05A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPC-05A (Primary)	38.75801 144.12942	7620	40	0	40	(i) Recover continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from a trench-basin in the central JT (expanded section of coupled contingency-option graben-basin sites (s.l.) JTPC-04A,-07A). (ii) Analyze stratigraphic-pattern and event-deposit characteristics (at best integrated with contingency sites JTPC-04A&-07A) and compare with results from the couple sites JTPC-8A,-09A in the north and JPTC-03A in the south, to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1) (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits(O-2) to develop a long-term record for giant earthquakes(O-3).
JTPC-06B (Alternate)	38.86920 144.15224	7630	35	0	35	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from the isolated trench-basin in the northern-to-central part of the central JT. Alternate sites to JTPC-05B&-09A, and contingency-option coring site (coupled (s.l.) with the relatively-condensed site JTPC-07A). (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPC-07A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPC-07A (Alternate)	38.91249 144.21916	7400	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from an isolated graben-fill basin in the northern-to-central part of the central JT. Alternate sites to JTPC-04A&-08A, and contingency-option coring site (coupled (s.l.) with the relatively-expanded sections at sites JTPC-06B/-10A). (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPC-06B/-10A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPC-08A (Primary)	39.03126 144.24752	7340	40	0	40	(i) Recover a condensed (relative to coupled site s.l. JTPC-09A) continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from an isolated graben-fill basin in the structurally-complex northern part of the central JT, where the neighboring trench-basin is at the same water-depth but only comprises disturbed sections. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPC-09A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).

Proposed Sites (Continued; total proposed sites: 31; pri: 18; alt: 13; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
JTPC-09A (Primary)	39.08195 144.21682	7440	35	0	35	(i) Recover an expanded (relative to coupled site s.l. JTPC-08A) continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from an isolated narrow trench-basin in the structurally-complex northern part of the central JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPC-08A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPC-10A (Alternate)	38.90768 144.15905	7640	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession comprising event-deposits from the isolated trench-basin in the northern-to-central part of the central JT. Alternate sites to JTPC-05A & -09A, and contingency-option coring site (coupled (s.l.) with the relatively-condensed site JTPC-07A). (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPC-07A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-01A (Alternate)	39.24858 144.20297	7460	30	0	30	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits from the trench-basin south of the large >1km-high escarpment at 39.4°N (Alternate site to JTPN-02A). (ii) Recover and analyze the top of mass-transport deposits potentially linked to the mega-landslide. (iii) Analyze the stratigraphic pattern and event-deposit characteristics and compare with JTPC-8A & -9A to assess local variability and establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iv) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-02A (Primary)	39.44436 144.21630	7520	30	0	30	(i) Recover continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits from the trench-basin north of the large >1km-high escarpment@39.4°N. (ii) Recover and analyze the top of mass-transport deposits potentially linked to mega-landslide. (iii) Analyze the stratigraphic pattern and event-deposit characteristics (at best integrated with contingency-coring site JTPN-03A) and compare with JTPN-04A,-05A/JTPC-08A,-09A to assess local variability and establish robust stratigraphic-pattern-recognition of proxy-evidence of earthquakes (O-1). (iv) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-03A (Alternate)	39.51979 144.32902	7250	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits from an isolated graben-fill basin near the large >1km-high escarpment and petit-spot volcano field. Contingency-option site as condensed section relative to coupled site (s.l.) JTPN-02A. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPN-02A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-04A (Alternate)	39.76647 144.26910	7470	40	0	40	(i) Recover continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits from the isolated trench-basin in the central part of the northern JT. Alternate site to JTPN-07A and contingency-option site as condensed section relative to coupled site JTPN-05A. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPN-05A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the southward-extent of sediment-transport routed through the Ogawara canyon (O-2) to develop a long-term record for giant earthquakes (O-3).

Proposed Sites (Continued; total proposed sites: 31; pri: 18; alt: 13; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
JTPN-05A (Primary)	39.78013 144.27636	7480	40	0	40	(i) Recover continuous upper Pleistocene-to-Holocene (potentially reaching the middle Pleistocene) stratigraphic succession comprising event-deposits from a trench-basin in the central area of northern JT (would be expanded section relative to coupled contingency-option site JTPN-04A). (ii) Analyze the stratigraphic pattern and event-deposit characteristics (at best integrated with JTPN-04A) and compare with JTPN-02A,-07A, to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the southward-extent of sediment-transport routed through the Ogawara canyon (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-06A (Alternate)	40.05940 144.31855	7570	40	0	40	(i) Recover a continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits from a trench-basin in the central area of the northern JT. Alternate site to JTPN-05A and contingency-option site as condensed section relative to coupled site JTPN-07A. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPN-07A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the southward-extent of sediment-transport routed through the Ogawara canyon (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-07A (Primary)	40.09392 144.32612	7560	40	0	40	(i) Recover continuous upper Pleistocene-to-Holocene (potentially reaching the middle Pleistocene) stratigraphic succession comprising event-deposits from the isolated trench-basin in the central part of the northern JT (would be expanded section relative to coupled contingency-option site JTPN-04A). (ii) Analyze the stratigraphic pattern and event-deposit characteristics (at best integrated with JTPN-06A) and compare with JTPN-05A, to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the southward-extent of sediment-transport routed through the Ogawara canyon (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-08A (Alternate)	40.32440 144.40110	7600	40	0	40	(i) Recover an expanded (relative to coupled site JTPN-11A) continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits from the isolated trench-basin in the northernmost JT. Alternate site to JTPN-09. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with results from couple site JTPN-11A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the southward-extent of sediment-transport routed through the Ogawara canyon (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-09A (Primary)	40.39568 144.42047	7620	40	0	40	(i) Recover an expanded (relative to coupled site JTPN-10A), continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits from the deepest depocentre in the northernmost part of the JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with results from couple site JTPN-10A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the southward-extent of sediment-transport routed through the Ogawara canyon (O-2) to develop a long-term record for giant earthquakes (O-3).
JTPN-10A (Primary)	40.43742 144.43687	7600	30	0	30	(i) Recover a condensed (relative to coupled site JTPN-09A), continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits on a trench-floor high near the deepest depocentre in the northernmost part of the JT. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with results from coupled site JTPN-10A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the southward-extent of sediment-transport routed through the Ogawara canyon (O-2) to develop a long-term record for giant earthquakes (O-3).

Proposed Sites (Continued; total proposed sites: 31; pri: 18; alt: 13; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
JTPN-11A (Alternate)	40.25341 144.39081	7550	30	0	30	(i) Recover a condensed (relative to coupled site JTPN-08A) continuous upper Pleistocene-to-Holocene stratigraphic succession (potentially reaching the middle Pleistocene) comprising event-deposits from an isolated trench-basin in the northernmost JT. Alternate site to JTPN-10A. (ii) Analyze the stratigraphic pattern and event-deposit characteristics and integrate with JTPN-08A to establish robust stratigraphic pattern recognition of proxy-evidence of earthquakes (O-1). (iii) Compare results with all other sites to explore spatio-temporal distribution of event-deposits and the southward-extent of sediment-transport routed through the Ogawara canyon (O-2) to develop a long-term record for giant earthquakes (O-3).

IODP Proposal Cover Sheet

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Lord Howe Rise Continental Ribbon

Received for: 2016-04-01

Title	First deep stratigraphic record for the Cretaceous eastern Gondwana margin: Tectonics, paleoclimate and deep life on the Lord Howe Rise high-latitude continental ribbon		
Proponents	Ron Hackney, Yasuhiro Yamada, Kliti Grice, Junichiro Kuroda, Jessica Whiteside, Marco Coolen, Fumio Inagaki, Richard Arculus, Dietmar Mueller, Saneatsu Saito, Scott Bryan, Julien Collot, Jun-Ichi Kimura, Nick Mortimer, Yoshihiko Tamura, Takehiko Hashimoto, Clinton Foster, Sean Johnson, William Orsi, Talitha Santini		
Keywords	Cretaceous, rifting, paleoclimate, microbiology, Gondwana	Area	Lord Howe Rise

Proponent Information

Proponent	Ron Hackney
Affiliation	Geoscience Australia
Country	Australia

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Abstract

Active plate tectonics and resulting changes in crustal architecture profoundly influence global climate, oceanic circulation, and the origin, distribution and sustainability of life. A key element of the 50-year-old theory of plate tectonics is the distinction between passive and active continental margins in both convergent and extensional tectonic settings. Yet we have been unable to fully resolve the tectonic setting and evolution of Gondwanaʼs eastern margin because much of it is now dispersed as huge, thinned, submerged, and relatively inaccessible "ribbons" of continental crust that include the Lord Howe Rise (LHR). Continental ribbons are not easily explained by plate tectonics, but they have been a crucial characteristic of post-Archean continental dispersal, modification, and re-assembly. The tectonic and paleogeographic evolution of these ribbons is poorly understood, as the deep stratigraphy of a large, un-accreted and intact continental ribbon, like the LHR, has not previously been explored.

The Cretaceous world - of which the LHR is a part - witnessed major changes in biogeochemical cycling, climate and evolution. These changes are thought to have been initiated by increased oceanic-crust production, possibly in combination with periodic and sudden releases of methane that resulted in elevated atmospheric CO2 concentrations and a rise in global sea level. However, modelling results indicate that the very warm ocean temperatures resulted in heat-stressed organisms that mean proxy estimates of Cretaceous climate should be re-evaluated.

Drilling exploration of the deep sub-seafloor biosphere has demonstrated that a remarkable diversity of microbial life is present in deeply-buried sediments. However, the biotic-abiotic transition zone has not yet been reached despite penetrating 2.5 km (~20 Ma) below the seafloor. Depth-dependent increases in temperature are considered to pose a major constraint on life at depth. However, the thermally-assisted decomposition of organic matter present in deep, warm sediments may provide a source of energy that is sufficient to support microbial communities in repairing thermally-induced cellular damage, thereby allowing life to persist beyond the depth range previously explored.

We propose a single deep-riser drill hole through a sedimentary basin and into basement on the 1600 km long by 600 km wide LHR. The processes of LHR crustal ribbon development will be investigated using rock cores recovered from up to 3,500 m below the seafloor. These samples will also provide major breakthroughs in understanding ocean biogeochemical cycles at high southern latitudes from the Cretaceous onwards, and in extending the known limits of life beneath the ocean floor.

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Scientific Objectives

Our globally-significant objectives, grouped into three broad themes, are:
• EARTH: To define the role and importance of elongate strips of continental crustal ribbons in plate tectonic cycles and continental evolution.
• OCEANS/CLIMATE: To recover new high-latitude data to better constrain the timing and nature of Cretaceous paleoclimate and linked changes in ocean biogeochemistry.
• LIFE: To test fundamental evolutionary concepts of sub-seafloor microbial life over a 100 million year timeframe.

These objectives help to address Challenges defined within each Research Theme of the IODP Science Plan for 2013-2023, and will be met by addressing the following questions:
• Are continental ribbons the key for determining the driving mechanism for plate tectonics?
• Is the LHR continental ribbon the result of upper-plate extension and rifting accompanying slab roll-back, or mantle upwelling accompanied by propagating seafloor spreading?
• The history of the eastern Gondwana margin was characterised by long-lived subduction throughout the Paleozoic, but was this subduction continuous through the Cretaceous?
• Do the LHR basins also contain a record of the paleogeographic and paleoenvironmental conditions prevailing during the transition from a relatively cool Early Cretaceous climate to a Late Cretaceous hothouse world?
• Do Ocean Anoxic Events (OAE) extend to high southern latitudes in the southwest Pacific?
• What are the limiting conditions under which life can be sustained?
• Have energy-starved conditions deep below the seafloor suppressed rates of genetic evolution, and therefore preserved correlations between deep subsurface microbial communities and their depositional environment?

Non-standard measurements technology needed to achieve the proposed scientific objectives

871 - CPP 2

Proposed Sites (Total proposed sites: 7; pri: 3; alt: 4; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
DLHR-1B (Alternate)	-26.394283 160.989760	1643	1344	300	1644	Recover a complete Early–Late Cretaceous record to: constrain the location and timing of Cretaceous subduction and magmatism along the eastern Gondwana margin, and the timing and drivers of subduction–rifting transition; obtain a Cretaceous high-latitude southern hemisphere climate record; identify effects of Cretaceous atmospheric and carbon cycle perturbations on Cretaceous terrestrial environments; identify effects of continental fragmentation and large-scale continental magmatism on terrestrial and marine environments of eastern Gondwana (including the development of Late Cretaceous marine anoxia and oceanographic circulation in southwest Pacific); constrain the limits of deep microbial life. Determine nature and age of underlying pre-rift basement.
DLHR-2A (Alternate)	-26.759528 161.197392	1670	2757	300	3057	Recover a complete Early–Late Cretaceous record to: constrain the location and timing of Cretaceous subduction and magmatism along the eastern Gondwana margin, and the timing and drivers of subduction–rifting transition; obtain a Cretaceous high-latitude southern hemisphere climate record; identify effects of Cretaceous atmospheric and carbon cycle perturbations on Cretaceous terrestrial environments; identify effects of continental fragmentation and large-scale continental magmatism on terrestrial and marine environments of eastern Gondwana (including the development of Late Cretaceous marine anoxia and oceanographic circulation in southwest Pacific); constrain the limits of deep microbial life. Determine nature and age of underlying pre-rift basement.
DLHR-3A (Primary)	-27.384797 161.663069	1530	1915	300	2215	Recover a complete Early–Late Cretaceous record to: constrain the location and timing of Cretaceous subduction and magmatism along the eastern Gondwana margin, and the timing and drivers of subduction–rifting transition; obtain a Cretaceous high-latitude southern hemisphere climate record; identify effects of Cretaceous atmospheric and carbon cycle perturbations on Cretaceous terrestrial environments; identify effects of continental fragmentation and large-scale continental magmatism on terrestrial and marine environments of eastern Gondwana (including the development of Late Cretaceous marine anoxia and oceanographic circulation in southwest Pacific); constrain the limits of deep microbial life. Determine nature and age of underlying pre-rift basement.
BLHRV-1B (Primary)	-27.564559 163.139748	1215	293	300	593	Determine nature and age of the ‘volcanic’ pre-rift basement to provide additional constraints on the location and timing of Cretaceous subduction and magmatism along the eastern Gondwana margin, and the timing and drivers of subduction–rifting transition. Complements the results of proposed deep drilling at site DLHR-1B, DLHR-2A or DLHR-3A.
BLHRV-2A (Alternate)	-27.895908 160.870635	2018	200	300	500	Determine nature and age of the ‘volcanic’ pre-rift basement to provide additional constraints on the location and timing of Cretaceous subduction and magmatism along the eastern Gondwana margin, and the timing and drivers of subduction–rifting transition. Complements the results of proposed deep drilling at site DLHR-1B, DLHR-2A or DLHR-3A.

Proposed Sites (Continued; total proposed sites: 7; pri: 3; alt: 4; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
BLHRB-1B (Primary)	-27.552905 162.918633	1208	258	300	558	Determine nature and age of the 'bland' pre-rift basement to provide additional constraints on the location and timing of Cretaceous subduction and magmatism along the eastern Gondwana margin, and the timing and drivers of subduction–rifting transition. Complements the results of deep proposed drilling at site DLHR-1B, DLHR-2A or DLHR-3A.
BLHRB-2B (Alternate)	-27.251973 162.820968	1193	263	300	563	Determine nature and age of the 'bland' pre-rift basement to provide additional constraints on the location and timing of Cretaceous subduction and magmatism along the eastern Gondwana margin, and the timing and drivers of subduction–rifting transition. Complements the results of proposed deep drilling at site DLHR-1B, DLHR-2A or DLHR-3A.

IODP Proposal Cover Sheet

Bend-Fault Serpentinization

876 - Pre

Title	Bend-Fault Serpentinization: Oceanic Crust and Mantle Evolution from Ridge through Trench
Proponents	J. Morgan, T. Henstock, D. Teagle, P. Vannucchi, G. Fujie, S. Kodaira, I. Grevemeyer, L. Ruepke, H. Villinger, C. Ranero, B. Ildefonse, K. Johnson, P. Kelemen, M. Schrenk,
Keywords	bend-fault serpentinization, mantle evolution, MoHole
Area	Cocos Plate near Nicaragua

Contact Information

Contact Person:	jason morgan		
Department:	earth sciences		
Organization:	royal holloway, university of london		
Address:	egham hill	egham	tw20 0ex
Tel.:		Fax:	
E-mail:	jason.morgan@rhul.ac.uk		

Abstract

During the past decade, it has become recognized that plate bending near a trench before subduction can be associated with significant chemical hydration-linked reactions in cold lithospheric mantle and overlying ocean crust. Bend-faults appear to play a key role by providing high-permeability pathways for seawater to flow into the oceanic crust and uppermost mantle. Bend-Fault serpentinization (BFS) has now been imaged by seismic reflection and refraction methods at Central American, Alaskan, Japanese, and South American subduction zones. The implications of this process for the exchange of water and carbon between Earth's exosphere and mantle are profound. Offshore Nicaragua where bend-fault serpentinization is best imaged, seismic observations suggest that a ~10-15km-thick layer beneath the Moho has been partially serpentinized by ~10-20%. Serpentinized peridotites exposed on slow-spread ridges and ophiolites commonly contain more than 1% carbonate. If created globally during bend-faulting and then subducted this volume of serpentinized, carbonated mantle would recycle water and CO2 into the mantle comparable to that emitted by plate spreading or consumed by crustal alteration, weathering and mountain building; this would require a total rethink of our basic understanding of Earth's global carbon and water cycles. This will also require us to obtain samples of crust and mantle after bend-faulting to know the ultimate composition of the oceanic crust and mantle recycled during subduction. Furthermore, mantle serpentinization has been linked to hydrogen and methane-generating reactions that are favorably used for chemosynthetic activity by microorganisms. If bend-fault serpentinization is indeed associated with hydrogen and methane production, then this region may be a major unrecognized component of the deep biosphere, and may have been in fact the first and safest place for deep-life to flourish on early Earth. Subducting bend-fault regions could have been a cradle for early life because these would have been the first places where water-ultramafic rock reactions would occur under liquid water-cover that was able to persist through impact events that induced incomplete vaporization of the proto-oceans.

In principle, the Ideal'BFS program would be co-located with MoHole drilling of oceanic crust and mantle on the same lithospheric flowline before the onset of plate-bending and BFS processes. In this way, we would obtain samples that will enable us to unravel how ridge, off-axis, and subduction plate-bending-related processes shape the long-term evolution of Earth's crust and mantle.

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876 - Pre

Scientific Objectives

Our objective is to drill through the ocean crust in an area of active bend-fault serpentinization that is occurring as the Cocos Plate bends and subducts at the Middle American Trench (MAT). We propose a dual-mode drilling strategy. First, D/V JOIDES Resolution or D/V Chikyu drilling through the upper parts of the Bend-fault system to better understand the chemistry and shallow fluids and fluid flow, and also assess drilling through bend-faults. Second, a MoHole-type drilling strategy to sample an intact crustal and mantle section through 1km below the ~5.5km-deep crust-mantle boundary.
The MAT is a unique site where known Bend-Fault Serpentinization lies beneath seafloor at ~3000-3800m water depths. It is also unique in that we can: (1) study the oceanic crust and mantle created at a modern fast-spreading ridge, the EPR; (2) sample it off-axis by MoHole drilling to obtain a complete crustal and mantle section that constrains the extent of ridge and off-axis processes in shaping the crust and uppermost mantle; (3) resample it at a site on bend-faulted crust that constrains the effects of bend-fault processes and obtains the actual crust and mantle material being recycled into the mantle at this trench.

Non-standard measurements technology needed to achieve the proposed scientific objectives.

MoHole-type drilling in ~3200m water depth

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
COCOS-01A	10.703, -87.571	3200	450	6550	7000	Drill through active bend-fault in the sub-Moho mantle, with spot-coring and side-wall core-sampling through oceanic crust/mantle. This would be one of ~3-4 planned drillholes within a ~4km region with almost identical drilling conditions. The shallower holes would be used to gain experience in drilling through an active bend-fault, and also used to study fluid flow, and the character of the bend-fault and its associated fluids and alteration in its sediment portion and mid-crustal regions. Only one hole is mentioned here as its drilling conditions will apply to the others, except their depths would be ~500m, ~2400m, and again ~7000m, respectively

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IODP Proposal Cover Sheet

NW Pacific Bend-Fault Hydrology

886 - Pre

Title	Bend-Fault Hydrology in the Old Incoming Plate
Proponents	T. MORISHITA, G. FUJIE, S. ONO, J. MORGAN, D. TEAGLE, M. YAMANO, S. SAITO, S. KODAIRA, J. KIMURA, N. ABE, P. KELEMEN, B. ILDEFONSE,
Keywords	Incoming Plate, Hydration, Outer rise
Area	Northwest Pacific

Contact Information

Contact Person:	Tomoaki MORISHITA		
Department:			
Organization:	Kanazawa University		
Address:			
Tel.:		Fax:	
E-mail:	moripta@staff.kanazawa-u.ac.jp		

Abstract

The oceanic plate has played a main role in global deep water circulation within the Earth. The physical, chemical and structural properties of the incoming plate are also crucial for understanding co-seismic megathrust slip at subduction zones. It has been generally accepted that hydration due to plate bending-induced normal faults (bend-faults) occurs in the region between trench and outer rise (outer rise). It is, however, emphasized that little is yet known about the degree and style of hydration in the oceanic plate at outer rises. Bend-fault hydration processes depend on thermal conditions and stress state. Investigating several subduction zones wtih various conditions is crucial to expand our knowledge of bend-fault hydration processes. The northwest Pacific (NW Pacific) region is one of the world oldest, thus coldest, and most studied oceanic plates, and is therefore a high priority region to study bend-fault hydration. Water circulation (deep penetration and deep upwelling) and hydration through the bend-faults in the NW Pacific region is supported by results from extensive recent geophysical surveys. Here:
(1) Horst and graben structures formed by bend-faulting are the best developed in the world, (2) Large bend-fault earthquakes (M>7) have repeatedly occurred and been well recorded, (3) Detailed Vp/Vs variations within the incoming plate have been determined (only known here), (4) The local stress state is likely to have changed significantly after the 2011 Tohoku Earthquake, and (5) Anomalously high heat flow suggests heat transport by water circulation. In addition, the NW Pacific Plate is the best place to comprehensively study relationships between subduction inputs, subduction tectonics, and subduction zone processes because one successful drilling project (JFAST) and a newly planned drilling project (JTRACK) will further augment the research goals of this proposal and because geochemical compositions of volcanic rocks and their quantitative modeling has also been extensively studied in the northeastern Japan Arc. In order to address (a) hydration processes and their extents along bend-faults and (b) geochemical and geophysical properties of the old incoming plate prior to subduction, we will analyze in-situ physical properties and lithofacies that will be best obtained by ocean drilling in the NW Pacific region.

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886 - Pre

Scientific Objectives

In order to address the following scientific objectives we propose to conduct in-situ sampling and observations of a damage zone associated with bend-fault hydration in the incoming plate at the northwest Pacific outer rise region:
(1) The Nature of horst-and-graben bend-fault hydration, which includes:
+ What are the mechanisms that enable seawater to penetrate to large depths in the incoming plate at outer rise region in spite of the high pressure and high temperatures at large depth?
+ How much water lies within the incoming plate?
+ What are the factors changing Vp/Vs in the incoming plate?
(2) The physical properties of the plate interface in the incoming plate, namely:
+ What are sediment compositions, permeabilities, and stress fields linked to plate-boundary fault/megathrust behavior?

Non-standard measurements technology needed to achieve the proposed scientific objectives.

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
HKD-2A	41.15, 147.17	5180	500	1000	1500	
HKD-1A	41.77, 146.715	6210	500	1000	1500	
THK-2A	38.99, 145.25	5400	500	1000	1500	To sample basaltic rocks from an area where the bend-faults are not observed but seismic structures are altered by the bend-faults induced small cracks and to obtain in-situ geophysical properties for comparing core-samples with the primary site and establishing the relationship between the degree of the development of bend-faults and the structural evolution.
THK-1A	39.04, 144.77	5890	500	1000	1500	To recover complete coring around a bend-fault, to sample sediments focusing on the chert and clay-rich layer, and to obtain in-situ geophysical properties.

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IODP Proposal Cover Sheet

898 - Pre

Fore Arc Mohole-to-Mantle

Received for: 2016-04-01

Title	Oceanic to Proto-Arc Mantle Transformation: Fore Arc M2M (Moho-to-Mantle) in the Bonin Trench, Northwestern Pacific		
Proponents	Katsuyoshi Michibayashi, Mark Reagan, Susumu Umino, Atsushi Okamoto, Ken Takai, Tomoaki Morishita, Osamu Ishizuka, Yumiko Harigane, Jun-Ichi Kimura, Takeshi Hanyu, Yasuhiko Ohara, Natsue Abe, Yoshihiko Tamura, Shigeaki Ono, Saneatsu Saito, Toshiya Fujiwara, Mikiya Yamashita, Gou Fujie, Koichiro Obana, Shuichi Kodaira		
Keywords	Mantle, Lower Crust, Moho, Fore-arc	Area	Bonin Trench

Proponent Information

Proponent	Katsuyoshi Michibayashi
Affiliation	Shizuoka University, ODS/JAMSTEC
Country	Japan

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Abstract

We aim to drill through deep oceanic crust and the Moho into the uppermost mantle beneath the Bonin fore-arc in the NW Pacific. The goals are to understand the origin and evolution of supra-subduction zone crust, the nature of the Moho, and the geochemical and geodynamic evolution of recently accreted lithospheric mantle.

Although peridotite samples are not geologically rare on the Earth's surface, fresh and in situ peridotite from recently convected mantle has yet to be obtained. We propose to drill into relatively young oceanic mantle; our target site is the fore-arc mantle/crust section exposed on the landward slope of the Bonin Trench. We sample the fresh lower igneous crust and the uppermost mantle peridotite, including the intervening boundary layer, that were accreted during the tectonism and magmatism associated with initiation of subduction at ~5248 Ma.

We explore:
1. Petrology: Peridotite and gabbro preserve records of melt-mantle reaction during subduction initiation and information of the pre-existed oceanic lithosphere
2. Tectonophysics: Peridotite records the structural history of subduction initiation, ocean lithosphere formation, and subsequent deformation
3. Fluid and Hydrology: Serpentinite in the fore-arc mantle to mantle-crust boundary records hydrology and chemistry of the subduction fluids during subduction initiation
4. Biosphere: Circulation of subducted fluids in the mantle and crust and their boundary (Moho) generates an unusual deep biosphere

Our objectives differ from those of the M2M projects aimed at mid ocean ridges, which focus on the formation of the oceanic crust during sea-floor spreading. Our focuses are on: (1) subduction initiation and (2) physical, chemical, and biological interactions between the mantle, crust and surface environment in a supra-subduction zone setting. These are entirely relevant to the driving force of the plate tectonics and interactions between Earth's deep mantle and the surface. They also address the IODP Science Plan Challenges 8, 9, 10 and 11 in the EARTH CONNECTIONS theme and Challenges 5 and 6 in the BIOSPHERE FRONTIERS theme.

898 - Pre

Scientific Objectives

1. Petrology: Peridotite and gabbro preserve records of melt-mantle reaction during subduction initiation and information of the pre-existed oceanic lithosphere
2. Tectonophysics: Peridotite records the structural history of subduction initiation, ocean lithosphere formation, and subsequent deformation
3. Fluid and Hydrology: Serpentinite in the fore-arc mantle to mantle-crust boundary records hydrology and chemistry of the subduction fluids during subduction initiation
4. Biosphere: Circulation of subducted fluids in the mantle and crust and their boundary (Moho) generates an unusual deep biosphere

Non-standard measurements technology needed to achieve the proposed scientific objectives

898 - Pre

Proposed Sites (Total proposed sites: 4; pri: 4; alt: 0; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
FM-01A (Primary)	28.472002 142.894852	7000	50	450	500	Ultramafic rocks such as peridotite, pyroxenites and serpentinites
FM-02A (Primary)	28.464926 142.851044	6500	50	450	500	lower crustal rocks such as gabbro and troctolite
FM-03A (Primary)	28.476512 142.922145	7500	50	50	100	Serpentinite muddy sediments and/or ultramafic rocks such as peridotite, serpentinite and pyroxenite
FM-04A (Primary)	28.483096 142.960488	8000	50	50	100	serpentinite muddy sediment and/or ultramafic rocks such as peridotite, serpentinite and pyroxenite

IODP Proposal Cover Sheet

925 - Pre

Blanco FZ Earthquake Triggering

Received for: 2017-10-02

Title	Earthquake Triggering Experiment on the Blanco Fracture Zone
Proponents	Jim Mori, James Kirkpatrick, Heather Savage, Emily Brodsky, Margaret Boettcher, Rachel Abercrombie, Frederic Cappa, Brett Carpenter, Xiaowei Chen, William Ellsworth, Nicholas Hayman, Jeff McGuire, Monica Schwehr, Jessica Warren
Keywords	Earthquakes, triggering, transforms, faults, Blanco
Area	Blanco fracture zone

Proponent Information

Proponent	Jim Mori
Affiliation	Disaster Prevention Research Institute, Kyoto University
Country	Japan

☑ Permission is granted to post the coversheet/site table on www.iodp.org

Abstract

To better understand earthquake triggering and address societal concerns about seismic events caused by human activities that have recently been occurring at alarming rates, we propose an active experiment to induce earthquakes on the Blanco Fracture Zone. Using water injections into the fault zone, changes in the local pore pressure can affect the stress state and bring the fault closer to failure in an earthquake. Past experiments have shown that such changes in effective stress can trigger small earthquakes relatively easily. A unique aspect of this proposal is to attempt triggering of a larger event. The Blanco Fracture Zone provides favorable sites where moderate-sized (M5 to 6) natural earthquakes occur at regular intervals of 5 to 20 years. We propose an experiment that will trigger both small earthquakes and a possibly larger event near or prior to the time of the next anticipated recurrence.

Careful monitoring of seismicity, water pressure and fluid movement associated with triggering of both small and larger earthquakes will provide unique new information about the stress conditions and initiation of the induced earthquakes. We will address scientific issues related to the spatial and temporal triggering of earthquakes from the stress forcing due to water injection. One important aspect is investigation of the dependence of the maximum size of a triggered event on the local stress conditions, which is an important unsolved problem for trying to evaluate the seismic hazard from induced earthquakes.

Sampling the transform fault to obtain physical rock properties, such as frictional strength and permeability is an important component of the project. Relating the observed fault properties to the spatial and temporal aspects of the earthquake triggering, has high potential for obtaining a better understanding of physical mechanisms of earthquakes initiation and occurrence.

All of these seismological topics are also relevant to naturally occurring earthquakes, so the experiment will address fundamental issues in understanding the physical mechanisms of all earthquakes.

925 - Pre

Scientific Objectives

Controlled triggering of earthquakes of various sizes with associated observations of local fluid and elastic properties will contribute to a better understanding of the stress conditions and initiation processes of induced and natural earthquakes. Scientific topics to be addressed include,

What are the amplitudes and timing of stress changes that trigger earthquakes?
Where will earthquakes occur?
What will be the size of the triggered earthquakes?
Is the nucleation process different for small and and large earthquakes?

Another important aspect of the project is to obtain fault-zone samples of an oceanic transform and measure physical properties, such as frictional strength and permeability. Relating these fault zone properties to the spatial and temporal occurrence of the earthquakes, can provide new information about the physical mechanisms of earthquake initiation and rupture for both induced and natural earthquakes.

Non-standard measurements technology needed to achieve the proposed scientific objectives

Use the riser system for controlled water injections into the fault zone

925 - Pre

Proposed Sites (Total proposed sites: 2; pri: 1; alt: 1; N/S: 0)

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)			Brief Site-specific Objectives
			Sed	Bsm	Total	
BLA-01A (Primary)	43.6210 -127.6520	2000	50	1500	1550	Sample transform fault zone Site for water injection
BLA-02A (Alternate)	43.4030 -127.9540	2000	50	1500	1550	Sample transform fault zone Site for water injection

Agenda Item 12

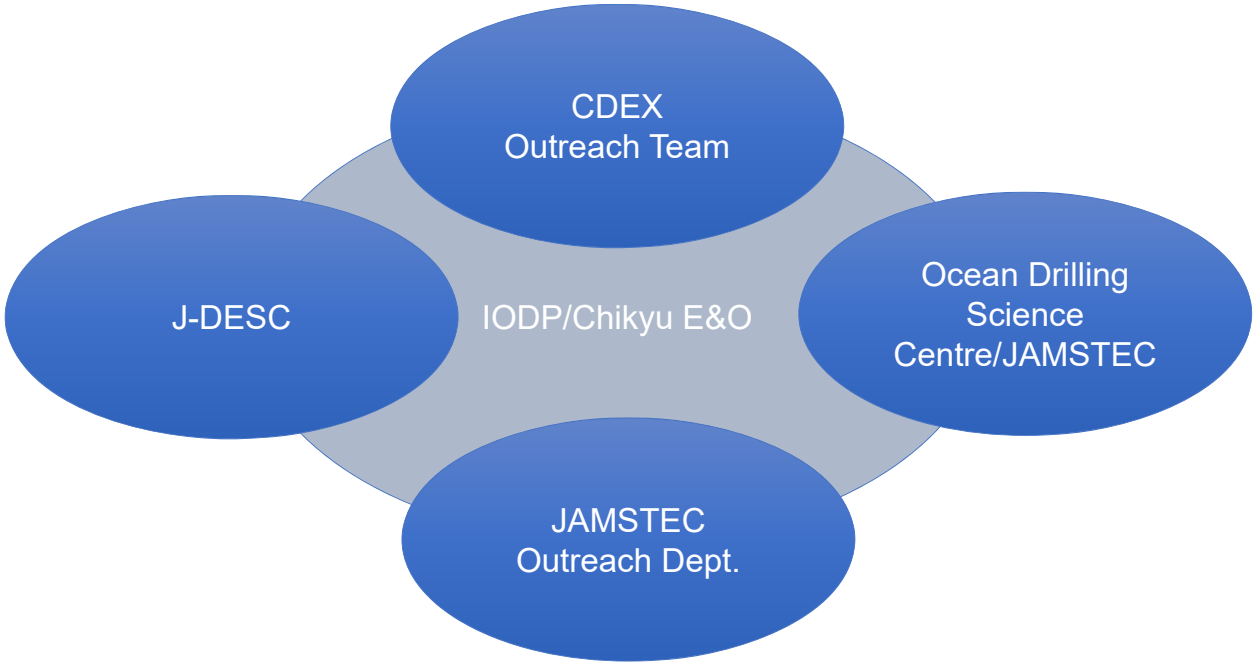
Long Term Strategy for Future Chikyu Implementation

a. Chikyu Riser proposals
b. Collaboration with JRSO (TDCS)
c. Collaboration with ESO? (Proposal 866)
d. CDEX M2M Task Force Team
e. Education/Research Program onboard Chikyu

Agenda Item 13

Chikyu Outreach Activities

IODP/Chikyu E&O Activities



Education and Research project

Core-Log-Seismic Integration Investigation at Sea

- Onboard workshop for students and young scientists
- 12 Jan - 24 Feb 2018 (w/IODP Exp. 380)
- Short (2 weeks) and full sessions (40 days)
- Role of Nankai Frontal Prism in past tsunamigenic earthquakes and slow slip, using Exp. 314 LWD data (Site C0006) and Exp. 316 cores (Sites C0006 and C0007)
- Lectures, thematic break-out sessions, laboratory work, data analysis, presentations, discussions, and writing
- 6 lecturers onboard, 4 mentors supporting activities from shore
- 18 applicants (Japan 7, US 6, ECORD 5)
- 14 selected (Japan 5, US 4, ECORD 5)

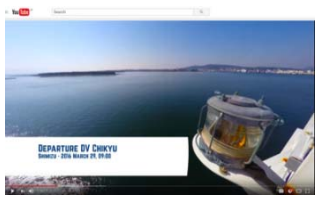
Lecture/seminar, symposium/workshop

- Upon request, CDEX/JAMSTEC conducted lectures/seminars about DV Chikyu and scientific ocean drilling for elementary, (junior) high schools, private companies, and general public.
  - 3 schools at Hachinohe (total 143 students)
  - 9 schools at Shimizu (total 1,203 students)
- CDEX/JAMSTEC held symposia at Hachinohe (150 attendees)
- With USSSP, ECORD, and ICDP, CDEX/JAMSTEC held a town hall meeting at AGU.



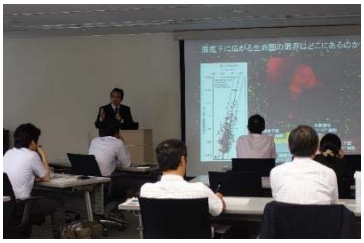
Expedition outreach (1)

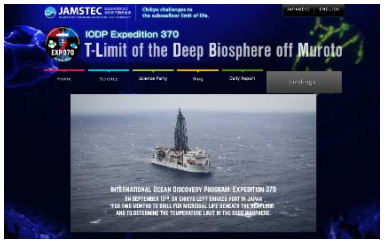
- Exp.365: NanTroSEIZE Shallow Megasplay
  - Issued a press release at the beginning and end of the expedition
  - Transmitted information via official webpage and Twitter account
  - Created 4 episodes plus 1 LTBMS explanation video and posted on YouTube (total 12,400 viewers as of 2 March 2018), exhibited a digest version of the video at the G7 Summit Japan 2016 International Media Center
  - Selected as AGU Cinema 2016 Top 10.



Expedition outreach (2)

- Exp.370: Temperature Limit of the Deep Biosphere off Muroto
  - Issued a press release and held a news briefing at the beginning and end of the expedition (total 26 media companies attended)
  - Transmitted information via official webpage and Twitter account
  - Created 1 video and posted on YouTube (total 3,001 viewers as of 2 March 2018)
  - Selected as AGU Cinema 2017 Top 10.
  - Provided an opportunity for filming onboard to NHK





Open ship events

- 15-18 September 2017, Hachinohe port
  - Originally 2 days special open ship event for VIPs, and 2 days open ship event for general public.
  - Open ship for general public became 1 day due to typhoon approach.
  - Total visitors, 5,012.
- 23-24 December 2017, Shimizu port
  - 2 days open ship event for VIPs and general public.
  - Total visitors, 7,814

Hachinohe port

Shimizu port

Shimizu port

Special exhibition “Deep Ocean 2017”

- at the National Museum of Nature and Science
- from 11 July – 1 October, 2017
- Total 617,062 visitors in 79 days (#2 in record), 7,811 visitor/day (#1 record)
- held a mini symposia about JFAST at the Museum (100 seats) and webcasted the event (16,047 viewers)

Outreach Future Plan

- Join EGU session, ECORD IODP Outreach: Past, Present and Future

- Exp. 358 video project
  - Similar to Exp. 365 and 370 video.
  - Also considering overall NanTroSEIZE summary video.

- Special volume of several Japanese magazines are under consideration.

Agenda Item 14

KCC Report

Agenda Item 15

Safety Review Committee Update

15. Chikyu Safety Review Committee Report

Safety Review Committee Update

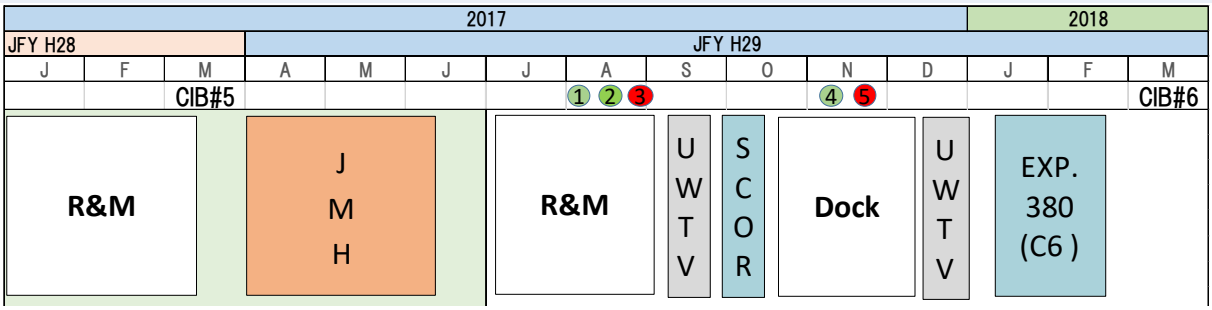
1. Newly established Geohazard sub-committee
2. IODP Expedition 380 NanTroSEIZE (C6)
3. Casing Design of IODP NanTroSEIZE (C2) Exp.358

6th Chikyu IODP Board (CIB) Meeting
19–20 March 2018@Kobe University

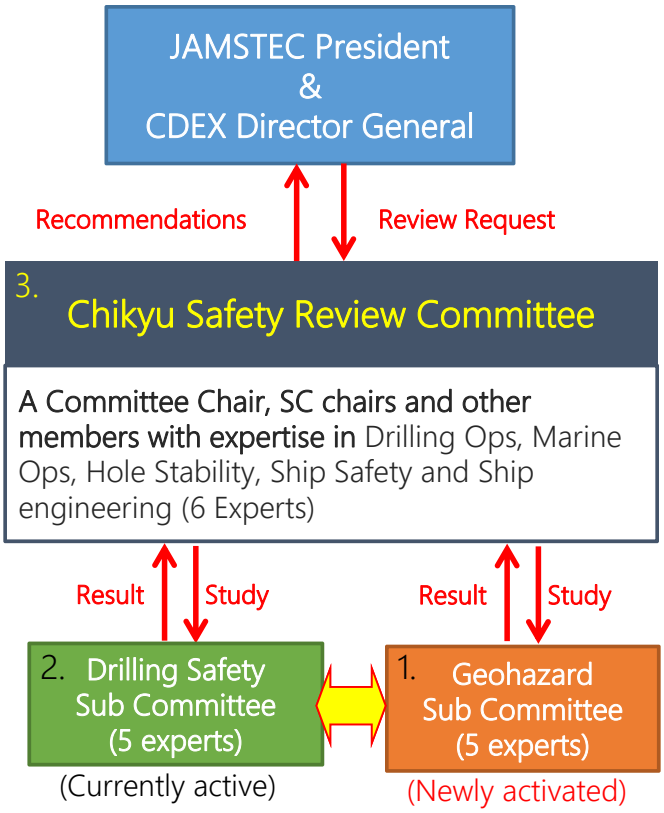
Shigemi Naganawa
Chair of Chikyu Safety Review Committee

Activities :
Chikyu Safety Review Committee and Sub-committee

#	Description
1	**Drilling Sub-Committee (DSC)** reviewed the safety of **the newly fabricated drilling tools mechanically activated by the UWTV and acusutic system** for drilling efficiency to be utilized during **IODP Exp. 380 NanTroSEIZE** and provided the recommendations to the chair of **Chikyu Safety Review Committee (CSR)** (Aug. 9)
2	**Geohazard Sub-Committee (GSC)** reviewed the mandate of the newly established Geohazard Sub-Committee and provided the recommendations to the chair of **Chikyu Safety Review Committee (CSR)** (Aug. 16)
3	**Chikyu Safety Review Committee (CSR)** did final safety evaluation of **the newly fabricated drilling tools to be mechanically activated by the UWTV and acusutic system** for drilling efficiency for the usage during IODP Exp. 380 NanTroSEIZE considering the recommendations of **DSC** and approved the drilling plan (Aug. 23)
4	**Drilling Sub-Committee (DSC)** and **Geohazard Sub-Committee (GSC) jointly** evaluated the drillig and geohazard of **IODP Exp. 380 NanTroSEIZE** and **IODP NanTroSEIZE C2 casing design**, and also provided the recommendations to the chair of **Chikyu Safety Review Committee (CSR)** (Nov. 7)
5	**Chikyu Safety Review Committee (CSR)** did final safety evaluation of **IODP Exp. 380 NanTroSEIZE** and **IODP NanTroSEIZE C2 casing design.** (Nov. 28)



1. Newly established Geohazard sub-committee
Chikyu Safety Review Committee Structure 2017



So far, geohazrd for;

1) riser hole
2) deep section of riser-less;

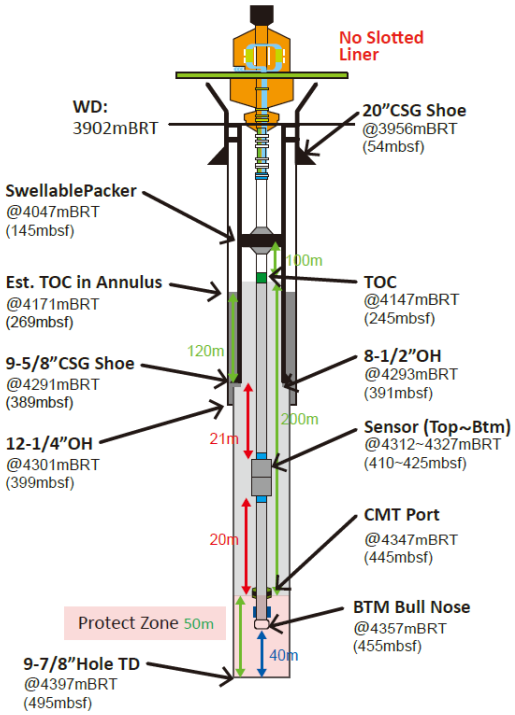
were based on proponent study only

Mandate : After the project is shifted to the implementation stage,

- **Geo-hazard Sub Co** shall study the site survey data submitted by the proponent to review potential shallow geo-hazard and deep geological safety
- Share the info. among Chikyu Safety Review Committee as well as Drilling Safety Sub Committee

2. IODP Expedition 380 NanTroSEIZE(C6)

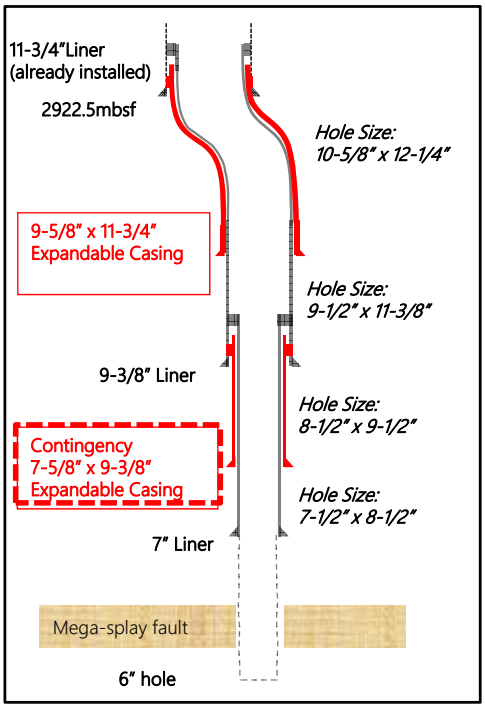
- Evaluated that the well is planned based on the experience and procedure followed so far gained during the offset wells drilled in the past, and no major risk would be encountered for implementation
- The key for this project is whether the cement is placed around the sensors of the observatory string as per the plan
- Since this operation is riser-less operation, no information of fluid return available
  Successful cementing operation can, however, be accomplished by monitoring the amount of cement pumped in conjunction with the cement plug as well as by monitoring pressure indication carefully



3. Safety Review on Casing Design
IODP NanTroSEIZE (C2) Exp.358

- Agreed to the casing program CDEX designed (3 sets of liners, including 2 sets of Expandable-No back up)
- Focused on improvement of collapse pressure: Current Plan
  1. Swellable packer to be utilized instead of cement setting
  2. 2. 9-5/8" CSG tie-back needs to be conducted
  3. 3. 9-3/8" Liner Hanger to be changed to in the 13-3/8" CSG
- Suggested the utilization of VSP in conjunction with geomechanics-study is worth considered for the last open hole section

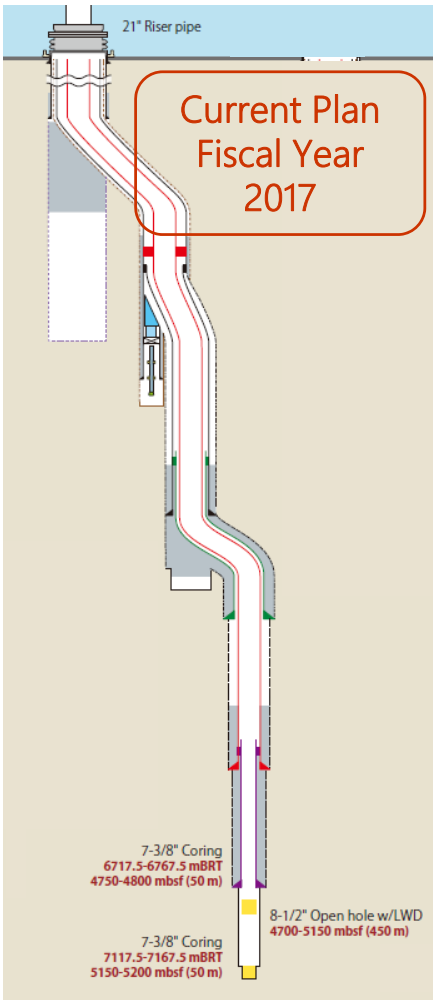
Previous Casing Program
(CIB #4 Meeting 23-24 March 2016)



6" hole will be drilled through target formation of mega-splay fault

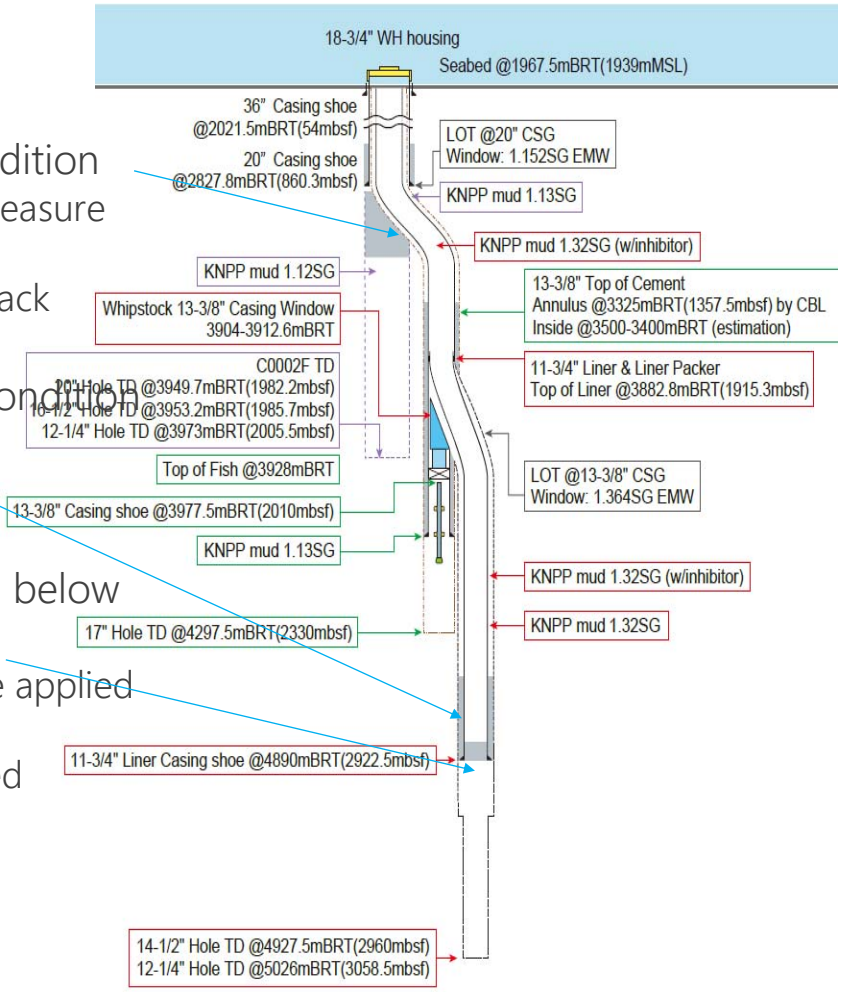
Changed to
8-1/2"
Last Open Hole

Core size
7-3/8"

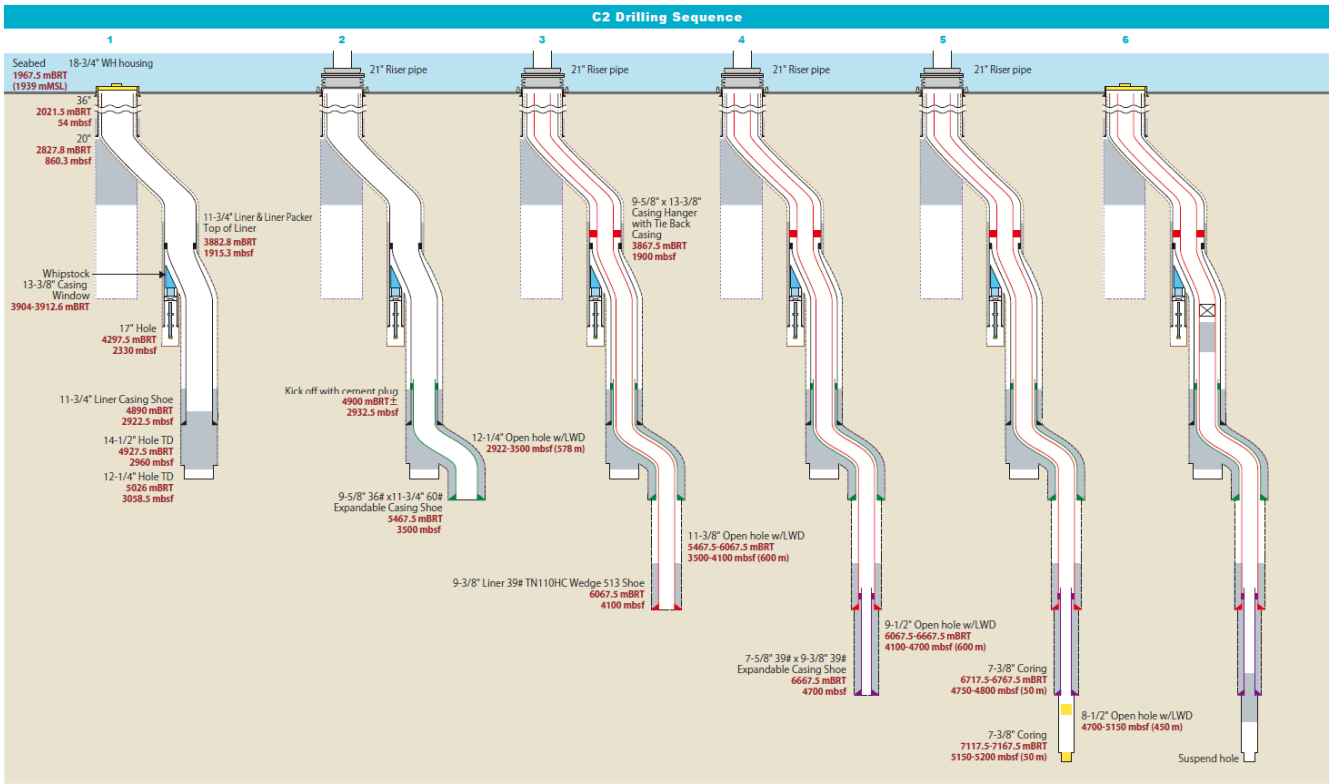


Existing Uncertainty

- 13-3/8" CSG wear condition
  - USIT will be run to measure the wear
  - Prepare 11-3/4" Tie back
- 11-3/4" CSG cement condition
  - USIT
  - Squeeze cementing
- 14-1/2" OH Condition below 11-3/4" shoe
  - Slick assembly will be applied for drill out
  - Whipstock is prepared



Revised Operation Sequence



Agenda Item 16

Chikyu/IODP Performance Review

a. JFY2017 Review

b. Current Mid-term (JFY2014 – 2018) Review Introduction

Chikyu/IODP Performance Review

JFY2017 Review

Main Points of Review :

- Efficiently operate and share both facilities and equipment
- Improve and maintain research environment to attract outstanding researchers from domestically and internationally of Japan
- Contribute as a hub for international human resource exchanges
- Contribute to the promotion of advanced science and technology
- To widely disseminate news to the public about the marine scientific technology developments and contributions to society carried out by CDEX
- Contribute to improving the international recognition of “Chikyu”

Agenda Item 17

Review of Consensus Statements and Action Items

Agenda Item 18

Next CIB Meeting

Agenda Item 19

Any Other Business