IOD	P Proposal Cover Sheet	603-CDP3
New	🗹 Revised 📃 Addendum	
Please fill out infor	mation in all gray boxes	—— Above For Official Use Only —
Title:	NanTroSEIZE: The Nankai Trough Se	ismogenic Zone Experiment
	Complex Drilling Project	8
Proponent(s):	Gaku Kimura, Harold Tobin, and the NanTro (24 Co-Proponents)	SEIZE Working Group
Keywords:	Seismogenic zone, earthquakes, tsunami	genesis, Area: Southwest
(5 or less)	fault mechanics	Japan margin
	Contact Information:	
Contact Person:	Harold Tobin	
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	Permission to post abstract on iSAS Web si	te: Yes I No

Received 1-October-2003

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 packerisolated 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  $\sim 80 - 150 + C$ .

**Proposed Sites:** 

#### SEE INDIVIDUAL PROPOSALS FOR EACH PHASE FOR SITE DESCRIPTIONS

Received 11 May 2007

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IOD	603-Add2		
New	Revised		JJ-Auuz
Please fill out info	rmation in all gray boxes	Above I	For Official Use Only
Title:	603-Add2, NanTroSEIZE Proposal 603 Addendum. Mechan of Mega-Splay Faults: Implications for Seismogenic Faulting		• 0
Proponent(s):	Lisa McNeill (Southampton), Greg Moore (IFREE-JAMSTEC) Wisconsin), Masataka Kinoshita (IFREE-JAMSTEC), Casey M Underwood U. (Missouri), Gaku Kimura (Tokyo Univ.)		
Keywords:	Seismogenic zone, earthquakes, tsunamigenesis, megasplay foult activity, foult mechanics	Area:	Nankai Trough,
(5 or less) Contact Inform	fault activity, fault mechanics ation:		Japan
Contact Person:	Lisa McNeill		
Department:	National Oceanography Centre, Southampton		
Organization:	University of Southampton		
Address	European Way Southampton UK		

Permission to post abstract on IODP-MI Web site:

44-23-8059 3640

lcmn@noc.soton.ac.uk

Abstract: (400 words or less)

Tel.:

E-mail:

We are requesting to add two additional sites to our list of contingency sites for NanTroSEIZE drilling during Stage 1. These two sites could be cored with APC/XCB (or HPCS/ESCS) during any of the 3 scheduled expeditions on either *Chikyu* or *JR*. The cores are designed to provide detailed age control on slope sediment that overlies the tips of the mega-splay fault system offshore Kii Peninsula. The new 3D seismic data volume images these sediments in greater detail than was previously available and we are able to choose key sites to date the most recent movement along the splay faults. The near-surface displacement history of these faults is key to understanding the timing and development of the splay system.

Fax:

44-23-8059 3059

# 603-Add2

#### Scientific Objectives: (250 words or less)

The objective of these two additional holes is to date the movement along the mega-splay system in the NanTroSEIZE drilling area.

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

None

#### Proposed Sites:

	<b>D</b>	Water	Penetration (m)			
Site Name	Position	Depth (m)	Sed	Bsm	Total	Brief Site-specific Objectives
NT2-05 A	33°12.433'N 136°43.867'E	2827	255	0	255	Core and date younger slope basin sediments to constrain splay fault activity
NT2-10 A	33°12.830'N 136°43.600'E	2702	325	0	325	Core and date older slope basin sediments (underlying prominent unconformity) to constrain splay fault activity

			Received 1-April-2003
iSAS/IC	DP Proposal Co	603A-Full2	
New	<b>R</b> evised	Addendum	

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Please fill out information in all gray boxes

Title:	NanTroSEIZE Reference Sites:
	Sampling and Measuring Inputs to the Seismogenic Zone
Proponent(s):	Michael Underwood, Juichiro Ashi, Wonn Soh, Julia Morgan, Saneatsu Saito,
	Demian Saffer, Elizabeth Screaton, Masataka Kinoshita, Gregory Moore, Miriam Kastner, Susan Bilek, Kohtaro Ujiie
Keywords:	Subduction inputs; physical and chemical hydrology; Area: Nankai Trough,
(5 or less)	lithostratigraphy; structural geology; heat flow and diagenesis Alea. Shikoku Basin
	Contact Information:
Contact Person:	Michael Underwood
Department:	Department of Geological Sciences
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E-mail:	UnderwoodM@missouri.edu
	Permission to post abstract on iSAS Web site: X Yes No

Abstract: (400 words or less)

A foremost goal of IODP is to drill into the seismogenic zone of a plate-boundary fault. The CDP proposal for NanTroSEIZE (Nankai Trough Seismogenic Zone Experiment) identifies several phases or milestones in pursuit of that goal. Phase 1, the shallow reference sites, will test five fundamental hypotheses: (1) Systematic and progressive changes in material properties and state control the onset of seismogenic behavior and locking of subduction thrusts. (2) Subduction zone megathrusts are weak faults; that is, they slip under conditions of low resolved shear stress. (3) Within the seismogenic zone, relative plate motion is accommodated primarily by coseismic frictional slip in a concentrated zone. (4) Out-of-sequence (or splay) faults develop where the plate-boundary fault is strong relative to adjacent zones without splay faults. (5) The plate-boundary fault, near its up-dip limit of seismicity, follows the interface between underthrust metasedimentary rocks and igneous basement.

Reference sites serve three vital roles in testing these hypotheses. First, they establish, prior to subduction, how lithology, deformation features, hydrologic properties (porosity, permeability), variables of state (stress, pore pressure, temperature) and *in situ* properties (mineral and fluid composition, alteration, grain fabric, strain rate, microseismicity) change from a basement high (potential asperity) to a basement plain. Second, after showing how basement topography affects stratigraphy and hydrology (and, therefore, mechanical properties), we will separate those inherited variables from changes superimposed by diagenesis, deformation, and fluid flow along the P-T path of subduction. Third, to track fault-zone evolution toward stick-slip behavior, we need to begin characterizing the plate-boundary fault where it is shallow and aseismic, then move down dip (with deep drilling) into the seismogenic zone.

Data from previous DSDP-ODP legs cannot be imported to the Kii-Kumano region because stratigraphic, thermal, and hydrologic inputs to Nankai Trough change so much along strike. Drilling two reference sites within the Shikoku Basin will quantify initial conditions and show how basement relief influences the pre-subduction geometry of sedimentary facies, temperature, permeability, sediment and basement alteration, and fluid flow. A third reference site at the toe of the accretionary prism will show early-phase deformation and verify how strata get partitioned above and below the frontal decollement. The prism-toe site, moreover, will add a third dimension to constraints on facies architecture, hydrogeology, thermal structure, and reaction progress where rocks first enter the subduction zone.

# 603A-Full2

#### Scientific Objectives: (250 words or less)

The overarching goal of this proposed investigation is to show how the primary geologic differences between subducting basement plains and basement highs (potential asperities for earthquakes) modulate the plate boundary's mechanical properties, relative strength, and earthquake rupture properties in the down-dip direction. To begin this assessment, we propose two reference sites seaward of the trench. This pairing of sites in Shikoku Basin will capture the end-member cause-and-effect of sand-rich versus sandpoor strata in the lower part of the section and show whether or not basement hydrology and alteration history vary significantly in response to basement topography. Drilling a third site through the frontal decollement into basement will be a challenge because total sediment thickness at the prism toe is ~1750 m. Such a site is essential, however, to verify the location of structural partitioning by the fault, as well as to identify early products of fault-related deformation and fluid flow. The only way to document threedimensional heterogeneities in hydrologic, compositional, thermal, and mechanical inputs is to integrate the following methods and tools at each site: (1) continuous coring, with penetration into at least 100 m of igneous basement; (2) complete suites of LWD logs for core-log-seismic integration and mapping; (3) lab tests of sediment composition, diagenesis, geotechnical properties, and hydrologic properties; (4) wireline hydrologic tests of *in situ* permeability (packer, pump, etc.); (5) high-resolution borehole measurements of temperature, pore pressure, and seismic velocity; and (6) chemical analysis of pore fluids, including fluids extracted from igneous basement.

	D :/:	Water	Pe	Penetration (m)		
Site Name	Position	Depth (m)	Sed	Bsm	Total	Brief Site-specific Objectives
NT1-01A	Lat: 32° 44.8878' N Long: 136° 55.0236' E	3540	460 m	100 m	560 m	Comprehensive characterization of Shikoku Basin strata and upper igneous crust above basement high (coring, downhole measurements, logging)
NT1-02A	Lat: 32° 47.4996' N Long: 137° 55.0236' E	4210	730 m	100 m	830 m	Comprehensive characterization of Shikoku Basin strata and upper igneous crust above basement plain (coring, downhole measurements, logging)
NT1-03A	Lat: 33° 1.23258' N Long: 136° 47.9485' E	4125	1740 m	10 m	1750 m	Comprehensive characterization of deformation, structural partitioning by decollement, diagenesis, and fluid flow at toe of Nankai accretionary prism (coring, downhole measurements, logging)

Proposed Sites: (Only High Priority Sites are listed here.)

IOD	D Duomogol Cowar Shoot		<b>B-Full2</b>
New	Revised Addendum		
Please fill out infor	mation in all gray boxes Al	bove For O <u>f</u>	ficial Use Only
Title:	NanTroSEIZE Drilling and Observatory Mechanical and Hydrologic State of Mega Implications for Seismogenic Faulting and Tsu	-Splay Fa	ults:
Proponent(s):	Masataka Kinoshita, Kevin Brown, Demian Saffer, Pierre Henry, Fre Sean P. S. Gulick, Tetsuro Hirono, Hisao Ito, Aitaro Kato, Gaku Kin Moore, J. Casey Moore, Yasuyuki Nakamura, Jin-Oh Park, Saneatsu Masanao Shinohara, Ralph Stephen, Harold Tobin, Kohtaro Ujiie, U Yamano	ura, Achim Saito, Susa	Kopf, Gregory n Schwartz,
Keywords: (5 or less)	Seismogenic zone, splay fault, tsunamigenesis, fault mechanics, fluid flow	Area:	Southwestern Japan margin

 $D_{1} = \frac{1}{2} + \frac{1}{2$ 

**Contact Information:** 

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	Deep-sea Research Department
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E-mail:	masa@jamstec.go.jp
	Permission to post abstract on iSAS Web site: Yes No

Abstract: (400 words or less)

The principal goal of NanTroSEIZE is to understand the mechanics of seismogenesis and rupture propagation along subduction plate boundary faults as stated in the accompanying CDP. At Nankai, large out-of-sequence-thrust faults ("mega-splays") that branch from the décollement are common, first order structural elements of the margin and appear continuous for several 10's of km along strike. These faults offset recent slope basin sediments, are characterized by seafloor scarps, and are commonly associated with active fluid venting. Off the Kii peninsula, such a mega-splay lies within the 1944 Tonankai coseismic rupture area estimated from tsunami and seismic waveform inversions; inversions cannot distinguish splay fault slip from décollement slip. Accordingly, both the décollement zone and the splay fault system represent necessary primary fault targets to address seismogenic zone processes.

The goal of this proposal is to (1) characterize the magnitude and nature of strain accumulation and slip along mega-splays off the Kii peninsula, and (2) sample and instrument the mega-splay fault system at a range of P-T conditions from ~1-3.5 km bsf. Specifically, this proposal is aimed at testing 5 key hypotheses: (1) The megasplay is a significant locus of plate boundary slip, slips in seismogenic events, and is currently locked; (2) The mega-splay is part of a weak plate boundary fault system and slips at low resolved shear stress; (3) Changes in physical and chemical properties of the fault zone with increasing temperature and pressure cause slip along the mega-splay to undergo a transition from aseismic to seismic slip; (4) The mega-splay is hydrologically connected to the seismogenic décollement zone at great depths impacting its mechanical and chemical state, and (5) Physical properties, chemistry, and state of the fault zone change systematically during the interseismic period.

Proposed drilling includes (1) coring of 1 site in the Kumano Basin, focused on characterizing the tectonic history of the plate above the mega-splay faults, and (2) intersection of the active mega-splay fault system at three depths from ~1 to ~3.5 km bsf (down dip evolutionary studies). We propose installation of long-term borehole monitoring instruments at several of the sites. These borehole observatories, along with surface arrays of measurements, regional geodetic and seismic monitoring both on land and via offshore cabled observatories, will provide critical data toward understanding the slip distribution, temporal nature, and controlling mechanisms of seismogenic faulting along the plate boundary system.

# 603B-Full2

#### Scientific Objectives: (250 words or less)

To test the five principal hypotheses (above), 5 holes will be drilled utilizing a dense net work of 2D and 3D seismic reflection data. Comprehensive programs of coring, logging and downhole measurements will target the insitu mega-splay and wall-rock structural architecture, fault properties, stress state, fluid pressure, and temperature. Post-drilling laboratory studies will include the fluid chemistry, veining/diagenesis, mechanical properties, and fault micro-fabric relationships. NT2 sites 1 through 3 will target the mega-splay fault at depths between ~ 1 and 3.5 km. They will assess evolutionary changes in all the various parameters over a temperature range of 20°C through ~100+ °C (Hypotheses 2 and 3). In addition, at NT2-01A and B sites (1km sites), closely-spaced, paired holes will allow extensive cross hole hydrologic and geophysical studies of the shallow fault-zone. Ultimately the 3.5 km site. NT2-3, will also be used for similar cross hole studies during the Phase 3 program. These cross hole tests, together with the fluid chemistry and vein studies, will constrain the down dip hydrologic connectivity of the fault system (Hypothesis 4). The NT2-04 site in the Kumano Basin, together with additional geological investigations along the splays fault traces, will allow us to constrain the mega-splay faulting activity (Hypothesis 1). At a minimum, Sites NT2-01A and NT2-03A will be instrumented for studies of the fault locking patterns (geodetic measurements), and long-term interactions of pore pressure, temperature, tilt and strain, seism city, fluid chemistry, and electrical properties during this interseismic period.

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

LWD (RAB), DVTP-P, hydrofracturing test (wireline packer test), VSP. Geodetic (strain/tilt), seismic and hydrologic (P,T) sensors and osmotic sampler are installed for a long-term borehole observatory at NT2-03A. Cross-well hydrologic (pumping / fluid injection test) and electrical propertiers experimentsare planned at NT2-01A and B.

			posed SI			I
~		Water	Pe	Penetration (m)		
Site Name	Position	Depth (m)	Sed	Bsm	Total	Brief Site-specific Objectives
NT2-01A NT2-01B	33°13.0'N, 136°41.4'E	2470	1000	0	1000	Characterization of active splay fault and fluid flow regime by core sampling, logging, cross- hole experiments and long- term monitoring
NT2-02A	33°14.0'N, 136°40.8'E	2080	2000	0	2000	Study the progressive change in the fault properties by intersecting the splay fault at intermediate depth of 2km
NT2-03A	33°15.9'N, 136°39.5'E	2240	3500	0	3500	Study the progressive change in the fault properties by intersecting the splay fault at intermediate depth of 3.5km
NT2-04A	33°23.4'N, 136°34.6'E	1990	1400	300	1700	Total history of the splay fault through continuous coring the Kumano basin sediments and pilot drilling for riser platform
NT2-06A,B	33°06.6'N, 136°31.3'E	2990	1000	0	1000	Alternate site for NT2-01A,B
NT2-07A	33°08.6'N, 136°30.0'E	2260	2000	0	2000	Alternate site for NT2-02A
NT2-08A	33°10.8'N, 136°28.6'E	2170	3500	0	3500	Alternate site for NT2-03A

Proposed Sites:

IOD			<b>B-Full2</b>
New New	Revised Addendum		
Please fill out infor	mation in all gray boxes Al	bove For O <u>f</u>	ficial Use Only
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Keywords: (5 or less)	Seismogenic zone, splay fault, tsunamigenesis, fault mechanics, fluid flow	Area:	Southwestern Japan margin

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Contact Information:

Contact Person:	Masataka Kinoshita
	Deep-sea Research Department
Organization:	Japan Marine Science and Technology Center
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Abstract: (400 words or less)

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# 603B-Full2

#### Scientific Objectives: (250 words or less)

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			posed SI			I
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NT2-08A	33°10.8'N, 136°28.6'E	2170	3500	0	3500	Alternate site for NT2-03A

Proposed Sites:

#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002

#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation						
Date Form Submitted:	Oct. 1, 2003						
	Characterization of active splay fault and fluid flow regime by core sampling, logging, cross-						
	hole experiments and long-term monitoring.						
Site Specific	Focuses are placed on mechanical and hydrological properties (e.g. strength, pore pressure,						
Objectives with Priority	permeability, porosity), fluid budget, origin of the fluid, detection of episodic flow.						
(Must include general objectives in proposal)	Borehole long-term observatory for hydrogeological properties is planned as well as cross-						
	hole experiment.						
	Priority:2						
List Previous Drilling in Area:	None						

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #		Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	/in: 13.0 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136 N	1in: 41.4 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary: A	lt:	Water Depth:	2.470 m



New

Revised

# Section C: Operational Information

			~									
			Sedim					Basement				
Proposed			1000	)								
Penetration:										0		
(m)	What is the total	sed. th	nickness?	>3,000	n	1						
	ſ							То	tal Penetr	ation:	700	m
General Lithologies:	Upper secti	on c	of spla	y faults	, con	sisti	ing of					
	deformed, o	com	pacted	l turbidi	te							
			-									
Coring Plan:												
(Specify or Circle)	1-2-3-APC	MDG	. 🗖 एव		an d	DCI				hrgb		
	1-2-3-APC	VPC*	· L XC	RE MD	CB₄⊟	PC:	S 🗖 KCB	Re-e		HKGB stems Currently	v Under Dev	elopment
Wireline Logging	Standard 7	Fools	2			Sneo	cial Tool	ç			LWD	1
Plan:	Neutron-Porosity			orehole Tel		-	Formation		mpling <b>F</b>	Density-l	Neutron	
	Litho-Density			iclear Magr			Borehole		· -	Resistivit	y-Gamma	Rav 🖌
		Z		sonance			& Pressure		ture 🗸		,	
	Gamma Ray		Geo	ochemical			Borehole	Seismic	C	Acoustic		
	Resistivity		Sid	e-Wall Cor	e							
			Sar	npling								
	Acoustic Formation Image											
	e						Others (		)	Others (F	MI	)
Max.Borehole	Expected value		Riser Dr °C	illing)								
Temp. :	20		C									
Mud Logging:	Cuttings San	nplin	g Inter	vals								
(Riser Holes Only)	fro		200	m	to	-	300	m	5	m	intervals	
				_				m,				
	fro	m _	700	m	to		900	m,	5	m	intervals	
									i	Basic Sampl	ing Interv	als: 5m
Estimated days:	Drilling/Coring:	15		Logging	: 5				Total On	-Site: 40		
Future Plan:	Longterm Boreh	ole O	bservati	ion Plan/R	Re-entr	v Pla	n					
i uturo i fuit.	Geodetic							c (P.T	) senso	rs with ca	sing	
	(20 da		,	, ~		J		(-,-	,			
	Cross-hole	<b>.</b> /	norima	onte (5 d	dave)							
Hazards/												a .1
Weather:	Please check for				Haza					wna window? (I	t is your V Preferable	
weather.	Shallow Gas		Complicate Condition	ed Seabed		Нус	irothermal A	ctivity			with the re	· .
	YY 1 1	_				¥ 1	1.1 175			May – A		,
	Hydrocarbon		Soft Seabe	d			slide and Tur	-	rrent		n risk i	n late
	Shallow Water Flow		Currents		$\mathbf{V}$	Met	hane Hydrate	;	☑	August t		ember,
										then low		
	Abnormal Pressure		Fractured	Zone		Diapi	r and Mud Vo	olcano		November	tł	rough
	Man-made Objects	-	Fault		-A				_	March)		
					Z	High	Temperature					
	H.C.	_	IL.I.D.	A	_	т. <i>с</i>			_			
	H <sub>2</sub> S		High Dip /	Angle		Ice C	onditions					
		_										
	CO <sub>2</sub>											

Site #: NT2-01A/B

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised 🗸

Date Form Submitted: Oct. 1, 2003

SSP Requir-Exists Data Type In DB Details of available data and data that are still to be collected ements Primary Line(s) :Location of Site on line (SP or Time only) 1 JAMSTEC Line-I (Feb. 2003) High resolution YES seismic reflection Crossing Lines(s): JAMSTEC Line-9 (Feb. 2003) Primary Line(s): 2 Location of Site on line (SP or Time only) KR0108-4 **Deep Penetration** YES seismic reflection Crossing Lines(s): YES 3 Seismic Velocity<sup>†</sup> Stacking velocity and migration velocity from MCS lines. OBS data also available. Seismic Grid YES Acquired by JAMSTEC in Feb. 2003 4 Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. Refraction YES 5a (surface) 2002 Refraction YES OBS data by Nakanishi et al. (1997) 5b (near bottom) Location of Site on line (Time) 3.5 kHz NO 6 7 Multi-narrow beam data by JAMSTEC R/V Yokosuka Swath YES bathymetry Side-looking 8a YES Some data collected using IZANAGI side scan sonar sonar (surface) NO 8b Side-looking sonar (bottom) 9 Photography YES Taken by submersibles of JASMTEC or Video 10 Heat Flow YES Obtained from surface ship, submersibles, long-erm monitoring and BSR Magnetics YES Compiled map published from AIST, Japan 11a YES Compiled map published from AIST, Japan 11b Gravity 12 Sediment cores YES Gravity and piston cores 13 Rock sampling YES Taken by submersible and ROV Water current data YES Available on JODC web page (http://www.jodc.go.jp/) 14a Ice Conditions 14b 15 OBS Being processed now microseismicity Navigation YES 16 17 Other

SSP Classification of Site:SSP Watchdog:Date of Last Review:SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

roposal #:

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

Proposal #:	Site #: NT2-01A/B		Date Form	n Submitted: Oct. 1, 2003	
Water Depth (m): 2470	Sed. Penetration (m): 100	00	Basement Penetration (m): 0		
				•	
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$	
Are high temperatures expected at this si	te?	Yes	No	✓	
o I					
Are there any other special requirements	for logging at this site?	Yes 🗆	No	$\checkmark$	

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	Cross-hole hydrologic and electrical experiment.RABHydrofracturing, Packer injection testCORK and Geodetic borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

Т

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

P	roposal #:	Site #: NT2-01A/B	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusal.	RCB to 1000 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in eas program.	stern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault zo	ne, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (J	une – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #	:	Site #: NT	2-01A/B	Date Form S	Submitted: Oct. 1, 2	003	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
300	Unconformity fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

#### Form 1 - General Site Information

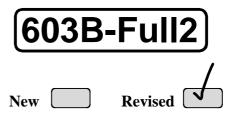
Please fill out information in all gray boxes Revised 7 M arch 2002

#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation
Date Form Submitted:	Oct. 1, 2003
	Study the progressive change in the fault properties by intersecting the splay fault at
Site Specific Objectives with Priority	intermediate depth of 2km. Integration with NT2-01A and NT2-03A are essential.
(Must include general objectives in proposal)	Priority:2
List Previous Drilling in Area:	None

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-02A If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #		Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 14.0 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 40.8 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2,080 m



# Section C: Operational Information

	Sediments					Basement				
Proposed		2	000							
Penetration: (m)	What is the total s	ed thickr	2 > 3 000	n	า			0		
(111)	what is the total a	seu. uneki	1033. 23,000		1	T	otal Penetra	ation: 1	,700	m
General Lithologies:	Slope basin	sedi	ment on	top,	frac	ctured				
	section acros	s the s	play fault,	and	under	rlying				
	deformed, co	mpact	ed turbidit	e						
Coring Plan: (Specify or Circle)	1-2-3-APC	VPC*	XCB MD	св∗□	PCS [	🗆 RCB 🗹 Re		HRGB	Under Devel	opment
Wireline Logging	Standard T	òols			Specia	al Tools			LWD	
Plan:	Neutron-Porosity		Borehole Tel			ormation Fluid S		Density-N	eutron	
	Litho-Density	✓	Nuclear Mag Resonance	netic		Borehole Temper	ature 🗸	Resistivity	-Gamma R	ay 🖌
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seismi	c 🗌	Acoustic		
	Resistivity		Side-Wall Cor Sampling	e						
	Acoustic									
	Formation Image				0	thers (	)	Others (FM	4I	)
Max.Borehole Temp. :	Expected value ( 40-		°C							
-			- 1							
Mud Logging: (Riser Holes Only)	Cuttings Sam									
(	fror			to		(			ntervals	
	fror	n <u>17</u>	<u>00</u> m	to	19	<u>00</u> m,	5	m ir	ntervals	
							<i>I</i>	Basic Samplin	g Interval	ls: 5m
Estimated days:	Drilling/Coring:		Logging				Total On-	-Site: 35		
Future Plan:	Longterm Boreh	ole Obse	rvation Plan/H	Re-entr	y Plan					
Hazards/	Please check foli	owing L	ist of Potentia	Haza	rda			What	is your We	pather
Weather:	Shallow Gas	-	olicated Seabed	i IIuzui		thermal Activity		window? (Pr	eferable p	period
		Cond			,				ith the red	isons)
	Hydrocarbon	_	Seabed			le and Turbidity Cu	irrent	May – Au (typhoon		late
	Shallow Water Flow		rents	Z	Methan	e Hydrate		August to then low		mber,
	Abnormal Pressure	Fract	ured Zone		Diapir a	nd Mud Volcano		November	-	ough
	Man-made Objects	Fau Fau	lt	Z	High Ter	mperature		March)		
	$H_2S$	High	Dip Angle		Ice Conc	litions				
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised 🗸

roposal #: Site #: NT2-02A Date Form Submitted: Oct. 1, 2003 SSP Requir-Exists Data Type In DB Details of available data and data that are still to be collected ements Primary Line(s) :Location of Site on line (SP or Time only) 1 JAMSTEC Line-I (Feb. 2003) High resolution YES seismic reflection Crossing Lines(s): JAMSTEC Line-9 (Feb. 2003) Primary Line(s): 2 Location of Site on line (SP or Time only) KR0108-4 **Deep Penetration** YES seismic reflection Crossing Lines(s): YES 3 Seismic Velocity<sup>†</sup> Stacking velocity and migration velocity from MCS lines. OBS data also available. Seismic Grid YES Acquired by JAMSTEC in Feb. 2003 4 Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. Refraction YES 5a (surface) 2002 Refraction YES OBS data by Nakanishi et al. (1997) 5b (near bottom) Location of Site on line (Time) 3.5 kHz NO 6 7 Multi-narrow beam data by JAMSTEC R/V Yokosuka Swath YES bathymetry Side-looking 8a YES Some data collected using IZANAGI side scan sonar sonar (surface) NO 8b Side-looking sonar (bottom) 9 Photography YES Taken by submersibles of JASMTEC or Video 10 Heat Flow YES Obtained from surface ship, submersibles, long-erm monitoring and BSR Magnetics YES Compiled map published from AIST, Japan 11a YES Compiled map published from AIST, Japan 11b Gravity 12 Sediment cores YES Gravity and piston cores 13 YES Taken by submersible and ROV Rock sampling Water current data YES Available on JODC web page (http://www.jodc.go.jp/) 14a Ice Conditions 14b 15 OBS Being processed now microseismicity Navigation YES 16 17 Other

SSI Comments.

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

 $\checkmark$ 

Proposal #:	Site #: NT2-02A		Date Form Submitted: Oct. 1, 2003				
Water Depth (m): 2080	Sed. Penetration (m): 200	00	Basement Penetration (m): 0				
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$			
Are high temperatures expected at this si	te?	Yes 🗆	No	✓			
The high temperatures expected at this si			110				
Are there any other special requirements	for logging at this site?	Yes 🗆	No	$\checkmark$			

\_\_\_\_

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB preferred	2

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

P	roposal #:	Site #: NT2-02A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusa	1.RCB to 2000 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in en program.	astern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault z	zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon	(June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #:		Site #: NT	2-02A	Date Form S	Date Form Submitted: Oct. 1, 2003			
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments	
400 1800	Unconformity	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism			



#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002 New



#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation		
Date Form Submitted:	Oct. 1, 2003		
	Study the progressive change in the fault properties by intersecting the splay fault at		
Site Specific intermediate depth of 3.5km. Integration with NT2-01A and NT2-02A are essen			
Objectives with Priority (Must include general objectives in proposal)	Priority:1		
List Previous Drilling in Area:	None		

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-03A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 15.9 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 39.5 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2,240 m

# Section C: Operational Information

	Sediments				Basement			
Proposed			3500					0
Penetration: (m)	What is the total	sed. thic	kness? >3,000	n	n			0
( )						1	Total Penetra	ation: 2,200 m
General Lithologies:	Slope basir		liment on	top,		ctured		
	section acros		- ·		unde	rlying		
Coring Plan:	deformed, co Continuous	-			d wi	th ordinary		aging
(Specify or Circle)			g пау ве те ⊐ хсв 🗹 мо	-		•		00 0
	1-2-3-APC	VPC*	⊥ XCBMZI MD	CB*	PCS	L RCB Z Re		HRGB sstems Currently Under Development
Wireline Logging Plan:	Standard 7	Fools			Speci	al Tools		LWD
Flaii.	Neutron-Porosity		Borehole Tel			Formation Fluid		Density-Neutron
	Litho-Density	Z	Nuclear Mag Resonance	netic		Borehole Temper	rature	Resistivity-Gamma Ray
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seism	ic 🗌	Acoustic
	Resistivity	Z	Side-Wall Con Sampling	re				
	Acoustic		Bamping					
	Formation Image				C	Others (	)	Others (FMI )
Max.Borehole	Expected value		ser Drilling) °C					
Temp. :		-100						
Mud Logging:	Cuttings Sampling Intervals							
(Riser Holes Only)	fro	m	<u>1700</u> m	to	19	<u>900</u> m,	5	m intervals
	fro	m <u> </u>	<u>3300</u> m	to	35	<u>500</u> m,	5	m intervals
							1	Basic Sampling Intervals: 5m
Estimated days:	Drilling/Coring:	130	Logging	g: 20			Total On-	-Site: 250
Future Plan:	Longterm Boreh							
	Geodetic	strai	n/tilt), seism	ic an	d hyc	lrologic (P,	T) sensor	rs (100 days?)
Hazards/	Please check for	lowing	List of Potentia	l Haza	rds			What is your Weather
Weather:	Shallow Gas		mplicated Seabed	i 11uzu		othermal Activity		window? (Preferable period
			ndition					with the reasons)
	Hydrocarbon	_	ft Seabed			de and Turbidity C	urrent	May – August (typhoon risk in late
	Shallow Water Flow		furrents	Ø	Metha	ne Hydrate		August to September, then low pressure in
	Abnormal Pressure	Fr	actured Zone		Diapir a	and Mud Volcano		November through
	Man-made Objects		ault	☑	High Te	emperature		March)
	$H_2S$	Hi	gh Dip Angle		Ice Con	nditions		
	CO <sub>2</sub>							

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised

posal #	<i>t</i> :		Site #:	NT2-03A	Date Form Submitted: Oct. 1, 2003
	Data Type	SSP Requir- ements	Exists In DB	Details of avail	lable data and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s) JAMSTEC Line-I (Feb. 2003) Crossing Lines(s): JAMSTEC	
2	Deep Penetration seismic reflection		YES	Primary Line(s): KR0108-4 Crossing Lines(s):	Location of Site on line (SP or Time
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and mig OBS data also available.	ration velocity from MCS lines.
4	Seismic Grid		YES	Acquired by JAMSTEC ir	n Feb. 2003
5a	Refraction (surface)		YES	Two-ship COP (max. off 2002	fset 20km) was obtained by JAMSTEC in S
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et	al. (1997)
6	3.5 kHz		NO		Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data b	y JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using	IZANAGI side scan sonar
8b	Side-looking sonar (bottom)		NO		
9	Photography or Video		YES	Taken by submersibles of	
10	Heat Flow		YES	Obtained from surface shi	p, submersibles, long-erm monitoring and BSR
11a	Magnetics		YES	Compiled map published f	from AIST, Japan
11b	Gravity		YES	Compiled map published t	from AIST, Japan
12	Sediment cores	1	YES	Gravity and piston cores	
13	Rock sampling		YES	Taken by submersible and	
14a	Water current data		YES	Available on JODC web p	bage (http://www.jodc.go.jp/)
14b	Ice Conditions				
15	OBS microseismicity			Being processed now	
16	Navigation		YES		
17	Other	1	1		

SSP Classification of Site:SSP Watchdog:Date of Last Review:SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

Proposal #:	Site #: NT2-03A		Date For	m Submitted: Oct. 1, 2003
Water Depth (m): 2240	Sed. Penetration (m): 350	00	Basemen	t Penetration (m): 0
Do you need to use the conical side-entry	Yes	No	$\checkmark$	
Are high temperatures expected at this si	Yes	No	✓	
The high temperatures expected at this si			110	
Are there any other special requirements	for logging at this site?	Yes	No	$\checkmark$

\_\_\_\_

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB, VSP Hydrofracturing, Packer injection test CORK and Geodetic/Seismic borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

Т

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

 $\checkmark$ 

Р	roposal #:	Site #: NT2-03A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusa	1.RCB to 3500 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in e program.	astern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault a	zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon	(June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #:		Site #: NT2-03A		Date Form S	Submitted: Oct. 1, 2		
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
300 1800 3400	Unconformity Fault fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002 New Revise

603B-Full2



#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation
Date Form Submitted:	Oct. 1, 2003
Site Specific Objectives with Priority (Must include general objectives in proposal)	Total history of the splay fault system through continuous coring the Kumano foreac basin sediments: Objective 1 is the primary target of this site. Total history of the splay fault system is depicted by integrating the results from NT1b-05A as a reference for this site. Drilling the underlying acoustic basement is planned to clarify the structure of pst accretionary complex, but is also used as a pilot drilling for the future riser-based proposal. Priority:4
List Previous Drilling in Area:	None

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-04A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 23.4 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 34.6 E	Distance to Land:	37 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	1,990 m

# Section C: Operational Information

	Sediments						Basement		
Proposed		1	,400					200	
Penetration: (m)	What is the total s	ness? 1,400	n	1			300		
			,			To	otal Penetra	ation: 1	,700 m
General Lithologies:	Forearc basin					•			
	laying on a			nt o	f Te	ertially			
Coring Dian	accretionary of	compl	ex						
Coring Plan: (Specify or Circle)	1-2-3-APC	/PC* 🗆	XCB MD	Св∗□	PCS	🗆 RCB 🗹 Re-		HRGB	Under Developmen
Wireline Logging	Standard Te	ools			Spec	ial Tools		]	LWD
Plan:	Neutron-Porosity	✓	Borehole Tel		r 🔲	Formation Fluid S		Density-N	eutron
	Litho-Density	Z	Nuclear Magi Resonance	netic		Borehole Tempera & Pressure	ature 🗸	Resistivity-	Gamma Ray 🗖
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seismic	° [	Acoustic	
	Resistivity	Z	Side-Wall Cor Sampling	e					
	Acoustic		Sumpling						
	Formation Image					Others (	)	Others (FM	ſI)
Max.Borehole Temp. :	Expected value (1	For Rise	r Drilling) °C						
-	70								
Mud Logging: (Riser Holes Only)	Cuttings Sam								
(10000 110000 0100))	_		m	to		m,			ntervals
	from	1 <u> </u>	m	to		m,		m ir	ntervals
Estimated days									g Intervals: 51
Estimated days:	Drilling/Coring:		Logging				Total On	n-Site: 18	
Future Plan:	Longterm Boreho	ole Obse	rvation Plan/H	Re-entr	y Plan	ı			
Hazards/	Please check follo	owing L	ist of Potentia	l Hazai	rds			What	s your Weathe
Weather:	Shallow Gas	Com	plicated Seabed			rothermal Activity	_	window? (Pr	eferable perio
	l	Cond						May – Au	ith the reasons
	Hydrocarbon [	_	Seabed			lide and Turbidity Cu	rrent		risk in lat
	Shallow Water Flow		Tents	Z	Wieur	ane Hydrate	Z	August to then low	
	Abnormal Pressure [	Frac	tured Zone		Diapir	and Mud Volcano		November	throug
	Man-made Objects	Fau Fau	lt	Z	High 7	Temperature		March)	
	H <sub>2</sub> S [	High	Dip Angle		Ice Co	nditions			
	CO <sub>2</sub> [								

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised

osal #	•		Site #:	NT2-04ADate Form Submitted: Oct. 1, 2003
	Data Type	SSP Requir- ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s)       :Location of Site on line (SP or Time JAMSTEC Line-I (Feb. 2003)         Crossing Lines(s):       JAMSTEC Line (Feb. 2003)
2	Deep Penetration seismic reflection		YES	Primary Line(s):     Location of Site on line (SP or Time KR0108-4       Crossing Lines(s):     Image: Crossing Lines(s)
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and migration velocity from MCS lines. OBS data also available.
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb. 2003
5a	Refraction (surface)		YES	Two-ship COP (max. offset 20km) was obtained by JAMSTEC in \$2002
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (1997)
6	3.5 kHz		NO	Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data by JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using IZANAGI side scan sonar
8b	Side-looking sonar (bottom)		NO	
9	Photography or Video		YES	Taken by submersibles of JASMTEC
10	Heat Flow		YES	Obtained from surface ship, submersibles, long-erm monitoring and BSR
11a	Magnetics		YES	Compiled map published from AIST, Japan
11b	Gravity		YES	Compiled map published from AIST, Japan
12	Sediment cores		YES	Gravity and piston cores
13	Rock sampling		YES	Taken by submersible and ROV
14a	Water current data		YES	Available on JODC web page (http://www.jodc.go.jp/)
14b 15	Ice Conditions OBS microseismicity			Being processed now
16	Navigation		YES	
	Other	+		

SSP Classification of Site: SSP Watchdog: Date of Last Review: SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised 1

Proposal #:	Site #: NT2-04A		Date For	m Submitted: Oct. 1, 2003
Water Depth (m): 1990	Sed. Penetration (m): 140	00	Basemen	t Penetration (m): 300
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$
Are high termoretures expected at this si	ta)	Vac.	No	_1
Are high temperatures expected at this si	te?	Yes	No	$\checkmark$
Are there any other special requirements	for logging at this site?	Yes	No	$\checkmark$
If "Yes" Please describe requireme	nts:			

\_\_\_\_\_

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP		

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

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### Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

Р	roposal #:	Site #: NT2-04A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusa	l.RCB to 1700 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in e program.	astern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault z	zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon	(June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #:		Site #: NT2-04A		Date Form Submitted: Oct. 1, 2003			
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
1400	Unconformity	Holoc ene to late Tertial y	1.5- 2.0km/s	Turbidite & hemipelagic sediments	Forearc basin		Fan deposits?

#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002 New

603B-Full2



#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation						
Date Form Submitted:	Oct. 1, 2003						
	Characterization of active splay fault and fluid flow regime by core sampling, logging, cross-						
	hole experiments and long-term monitoring.						
Site Specific Objectives with Priority (Must include general objectives in proposal)	Focuses are placed on mechanical and hydrological properties (e.g. strength, pore pressure, permeability, porosity), fluid budget, origin of the fluid, detection of episodic flow. Borehole long-term observatory for hydrogeological properties is planned as well as cross-hole experiment.						
	Priority:3 (Alternate site for NT2-01A/B)						
List Previous Drilling in Area:	None						

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-06A/B	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 06.6 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 31.3 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2.990 m

# Section C: Operational Information

	Sediments						Basement				
Proposed	1000						0				
Penetration: (m)	What is the total sed. thickness? $>3,000$ m						0				
	Total Penetra								tion: 70	0 m	
General Lithologies:	Upper section of splay faults, consisting deformed, compacted turbidite										
Coring Plan: (Specify or Circle)	1-2-3-APC VPC* XCB MDCB* PCS RCB Re-entry HRGB * Systems Currently Under Development										
Wireline Logging Plan:	Standard 7		Special Tools				LWD				
	Neutron-Porosity Litho-Density	<b>√</b>	Borehole Te Nuclear Mag Resonance			Formation Borehole ' & Pressure	Temperat		Density-Neu Resistivity-O	itron 🗹 Gamma Ray	
	Gamma Ray	V	Geochemical			Borehole	Seismic		Acoustic		
	Resistivity		Side-Wall Co Sampling	re							
	Acoustic Formation Image					Others (		)	Others ( FMI	)	
Max.Borehole Temp. :	Expected value20		iser Drilling) °C								
Mud Logging: (Riser Holes Only)	Cuttings Sampling Intervals										
	from <u>200</u> m to <u>300</u> m, <u>5</u>						m intervals				
	from <u>700</u> m to <u>900</u> m, <u>5</u> m intervals									ervals	
	Basic Sampling Intervals: 5m										
Estimated days:	Drilling/Coring: 15 Logging: 5						Total On-Site: 40				
Future Plan:	Longterm Borehole Observation Plan/Re-entry Plan Geodetic (strain/tilt), seismic and hydrologic (P,T) sensors with casing (20 days) Cross-hole experiments (5 days)										
Hazards/ Weather:	Please check following List of Potential Hazards     What is your Weather										
	Shallow Gas	Shallow Gas Complia			icated Seabed Hydrothern			mal Activity		window? (Preferable period	
	Hydrocarbon	=	ondition oft Seabed		Londo	lide and Turl	aidity Cur	rent		with the reasons) May – August	
	Shallow Water Flow	_	Currents	☑		ane Hydrate	-	<b>Z</b>	(typhoon risk in late August to September,		
	Abnormal Pressure	□ F	ractured Zone		Diapir	and Mud Vo			hen low pressure in November through		
	Man-made Objects	<b>V</b>	Fault	_ ∕	High	Femperature			March)		
	H <sub>2</sub> S		ligh Dip Angle		Ice Co	onditions					
	CO <sub>2</sub>										

Site #: NT2-06A/B

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

roposal #:

New

Revised

Date Form Submitted: Oct. 1, 2003

1				
	Data Type	SSP Requir- ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s)       :Location of Site on line (SP or Time only)         JAMSTEC Line-I (Feb. 2003)       Crossing Lines(s):         JAMSTEC Line-9 (Feb. 2003)
2	Deep Penetration seismic reflection		YES	Primary Line(s): KR0108-4 Crossing Lines(s):
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and migration velocity from MCS lines. OBS data also available.
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb. 2003
5a	Refraction (surface)		YES	Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. 2002
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (1997)
6	3.5 kHz		NO	Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data by JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using IZANAGI side scan sonar
8b	Side-looking sonar (bottom)		NO	
9	Photography or Video		YES	Taken by submersibles of JASMTEC
10	Heat Flow		YES	Obtained from surface ship, submersibles, long-erm monitoring and BSR
11a	Magnetics		YES	Compiled map published from AIST, Japan
11b	Gravity		YES	Compiled map published from AIST, Japan
12	Sediment cores		YES	Gravity and piston cores
13	Rock sampling		YES	Taken by submersible and ROV
14a	Water current data		YES	Available on JODC web page (http://www.jodc.go.jp/)
14b	Ice Conditions			
15	OBS microseismicity			Being processed now
16	Navigation		YES	
17	Other			

 SSP Classification of Site:
 SSP Watchdog:
 Date of Last Review:

 SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

Proposal #:		Date Form Submitted: Oct. 1, 2003			
Water Depth (m): 2990	Sed. Penetration (m): 100	00	Basement Penetration (m): 0		
Do you need to use the conical side-entry	Yes	No	$\checkmark$		
A . 1 . 1	V	N			
Are high temperatures expected at this si	te?	Yes	No		
Are there any other special requirements	for logging at this site?	Yes 🗆	No		
The more any other spectal requirements	for logging at this site.	105 =	110	₩-	

\_\_\_\_

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	Cross-hole hydrologic and electrical experiment.RABHydrofracturing, Packer injection testCORK and Geodetic borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

Т

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

Р	roposal #:	Site #: NT2-06A/B	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusa	1.RCB to 1000 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in ea program.	astern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault z	zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (	(June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #	:	Site #: NT	2-06A/B	Date Form S	Submitted: Oct. 1, 2	003	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
300	Unconformity fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002

Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation						
Date Form Submitted:	Oct. 1, 2003						
	Study the progressive change in the fault properties by intersecting the splay fault at						
Site Specific Objectives with Priority	intermediate depth of 2km. Integration with NT2-01A and NT2-03A are essential.						
(Must include general objectives in proposal)	Priority:2 (Alternate site for NT2-02A)						
List Previous Drilling in Area:	None						

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-07A	If site is a reoccupation of an old DSDP/ODP         Γ2-07Α       Site, Please include former Site #		Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 08.6 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 30.0 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2,260 m



New

Revised

# Section C: Operational Information

	Sediments					Basement				
Proposed		2	000				0			
Penetration: (m)	What is the total sed. thickness? >3,000 m			1		0				
()						7	Total Penetra	ation:	1,700	m
General Lithologies:	Slope basin		ment on	top,		tured				
	section acros		<b>-</b> • ·		under	lying				
	deformed, co	mpact	ed turbidit	e						
Coring Plan: (Specify or Circle)	1-2-3-APC	VPC*	XCB MD	Св∗□	PCS	RCB 🗹 R		HRGB	ntly Under De	velopment
Wireline Logging	Standard T	ools			Special	l Tools			LWD	
Plan:	Neutron-Porosity	✓	Borehole Tel			rmation Fluid		Densit	y-Neutron	
	Litho-Density	$\checkmark$	Nuclear Mag Resonance	netic		orehole Temper Pressure	rature	Resisti	vity-Gamma	<sup>I Ray</sup>
	Gamma Ray	<b>V</b>	Geochemical			orehole Seism	ic 🗌	Acousti	.c	
	Resistivity	Z	Side-Wall Cor Sampling	e						
	Acoustic		F8							
	Formation Image				Ot	hers (	)	Others	(FMI	)
Max.Borehole Temp. :	Expected value (		r Drilling) °C							
-	40-		-							
Mud Logging: (Riser Holes Only)	Cuttings Sam									
(Riser Holes Only)	fror			to			5		n intervals	
	fror	n <u>17</u>	<u>00</u> m	to		<u>0</u> m,	5	r	n intervals	5
							1	Basic Sam	pling Inter	vals: 5m
Estimated days:	Drilling/Coring:		Logging				Total On	-Site: 35		
Future Plan:	Longterm Boreh	ole Obse	rvation Plan/F	Re-entr	y Plan					
Hazards/	Please check foll	owing L	ist of Potential	Haza	rds			Wł	hat is your	Weather
Weather:	Shallow Gas		plicated Seabed			ermal Activity			(Preferabl	e period
		Cond	ition					Mari	with the	reasons)
	Hydrocarbon	—	Seabed			and Turbidity C	urrent		- August oon risk	in late
	Shallow Water Flow		rents	Ø	Methane	Hydrate	Z	August then lo	to Sep	tember, ure in
	Abnormal Pressure	Fract	ured Zone		Diapir and	d Mud Volcano		Novemb		hrough
	Man-made Objects	Fau	lt	<b>V</b>	High Tem	perature		March)		
	H <sub>2</sub> S	High	Dip Angle		Ice Condi	tions				
	CO <sub>2</sub>									

Site #: NT2-07A

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

roposal #:

New

Revised 🗸

Date Form Submitted: Oct. 1, 2003

SSP Requir-Exists Data Type In DB Details of available data and data that are still to be collected ements Primary Line(s) :Location of Site on line (SP or Time only) 1 JAMSTEC Line-I (Feb. 2003) High resolution YES seismic reflection Crossing Lines(s): JAMSTEC Line-9 (Feb. 2003) Primary Line(s): 2 Location of Site on line (SP or Time only) KR0108-4 **Deep Penetration** YES seismic reflection Crossing Lines(s): YES 3 Seismic Velocity<sup>†</sup> Stacking velocity and migration velocity from MCS lines. OBS data also available. Seismic Grid YES Acquired by JAMSTEC in Feb. 2003 4 Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. Refraction YES 5a (surface) 2002 Refraction YES OBS data by Nakanishi et al. (1997) 5b (near bottom) Location of Site on line (Time) 3.5 kHz NO 6 7 Multi-narrow beam data by JAMSTEC R/V Yokosuka Swath YES bathymetry Side-looking 8a YES Some data collected using IZANAGI side scan sonar sonar (surface) NO 8b Side-looking sonar (bottom) 9 Photography YES Taken by submersibles of JASMTEC or Video 10 Heat Flow YES Obtained from surface ship, submersibles, long-erm monitoring and BSR Magnetics YES Compiled map published from AIST, Japan 11a YES Compiled map published from AIST, Japan 11b Gravity 12 Sediment cores YES Gravity and piston cores 13 Rock sampling YES Taken by submersible and ROV Water current data YES Available on JODC web page (http://www.jodc.go.jp/) 14a Ice Conditions 14b 15 OBS Being processed now microseismicity Navigation YES 16 17 Other

 SSP Classification of Site:
 SSP Watchdog:
 Date of Last Review:

 SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

 $\checkmark$ 

Proposal #:	Site #: NT2-07A		Date For	m Submitted: Oct. 1, 2003	
Water Depth (m): 2260	Sed. Penetration (m): 200	00	Basement Penetration (m): 0		
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$	
Are high temperatures expected at this si	Yes 🗆	No	✓		
The high temperatures expected at this si			110		
Are there any other special requirements	for logging at this site?	Yes 🗆	No	$\checkmark$	

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB preferred	2

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

P	roposal #:	Site #: NT2-07A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refu	usal.RCB to 2000 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in program.	eastern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fau	lt zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoc	on (June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #		Site #: NT	2-07A	Date Form S	Submitted: Oct. 1, 2	003	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
400 1800	faults, etc	Holoc ene to Mioce ne	( <i>km/sec</i> ) 1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism	accum. (m/My)	



#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002 New

Revised	

#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation				
Date Form Submitted:	Oct. 1, 2003				
	Study the progressive change in the fault properties by intersecting the splay fault at				
Site Specific Objectives with	intermediate depth of 3.5km. Integration with NT2-01A and NT2-02A are essential.				
Priority (Must include general objectives in proposal) Priority:1 (Alternate site for NT2-03A)					
List Previous Drilling in Area:	None				

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-08A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 10.8 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 28.6 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2,170 m

# Section C: Operational Information

	Sediments						Basement			
Proposed Penetration:			3500				0			
(m)	What is the total	sed. thick	ness? >3,000	n	1			0		
			,				Total Penet	ration:	2,200	m
General Lithologies:	Slope basir		ment on	top,		tured				
	section acros		<b>T A</b>		under	lying				
Coring Plan:		deformed, compacted turbidite Continuous coring may be replaced with ordinary/LWD lo 1-2-3-APC VPC* C XCB MDCB* PCS RCB Re-entry								
(Specify or Circle)										
	1-2-3-APC	VPC* ∟	I XCB⊠ MD	CB∗∟	PCS L			HRGB Systems Currer	ntly Under Dev	velopment
Wireline Logging Plan:	Standard Tools Special Tools							LWD		
Flaii.	Neutron-Porosity	$\checkmark$	Borehole Te			ormation Fluid		Density	y-Neutron	
	Litho-Density	Z	Nuclear Mag Resonance	netic		orehole Temp Pressure	berature		vity-Gamma	Ray
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seisi	mic	Acousti	c	
	Resistivity	Z	Side-Wall Co Sampling	re						
	Acoustic		Bamping							
	Formation Image				0	thers (	)	Others	FMI	)
Max.Borehole	Expected value		er Drilling) °C							
Temp. :		-100	_							
Mud Logging: (Riser Holes Only)	Cuttings San									
(Riser Holes Only)	fro		7 <u>00</u> m	to			5		n intervals	
	fro	m <u>33</u>	<u>300</u> m	to	350	<u>00</u> m,	5_	n	n intervals	
								Basic Sam	oling Interv	als: 5m
Estimated days:	Drilling/Coring:		Logging	-			Total O	on-Site: 250		
Future Plan:	Longterm Boreh				•	1 • /1		(100	1 0)	
	Geodetic	(strain/	tilt), seism	nc an	d hyd	rologic (ł	(T) sense	ors (100	days?)	
Hazards/	Please check for	lowing L	ist of Potentia	l Haza	rds			Wł	at is your V	Veather
Weather:	Shallow Gas	Com	plicated Seabed	_		hermal Activity	_		(Preferable	e period
			lition			1.00		May _	with the r August	easons)
	Hydrocarbon		Seabed			e and Turbidity e Hydrate			on risk i	in late
	Shallow Water Flow		irents	Z	Wieulali	e riyurate	Z	August then lo	-	ember, ire in
	Abnormal Pressure	Frac	tured Zone		Diapir ar	nd Mud Volcano		Novemb	-	hrough
	Man-made Objects	Fau	ılt		High Ter	nperature		March)		
	$H_2S$	High	n Dip Angle		Ice Cond	litions				
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised 

oposal #:			Site #: NT2-08ADate Form Submitted: Oct. 1, 2003			
	Data Type	SSP Requir- ements	Exists In DB	Details of available	data and data that are still to be collected	
1	High resolution seismic reflection		YES	Primary Line(s) JAMSTEC Line-I (Feb. 2003) Crossing Lines(s): JAMSTEC Line	:Location of Site on line (SP or Time of 2-9 (Feb. 2003)	
2	Deep Penetration seismic reflection		YES	Primary Line(s): KR0108-4 Crossing Lines(s):	Location of Site on line (SP or Time or	
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and migratic OBS data also available.	on velocity from MCS lines.	
4	Seismic Grid		YES	Acquired by JAMSTEC in Fel	b. 2003	
5a	Refraction (surface)		YES	Two-ship COP (max. offset 2002	20km) was obtained by JAMSTEC in Se	
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (	(1997)	
6	3.5 kHz		NO		Location of Site on line (Time)	
7	Swath bathymetry		YES	Multi-narrow beam data by JA	MSTEC R/V Yokosuka	
8a	Side-looking sonar (surface)		YES	Some data collected using IZA	ANAGI side scan sonar	
8b	Side-looking sonar (bottom)		NO			
9	Photography or Video		YES	Taken by submersibles of JAS	MTEC	
10	Heat Flow		YES	Obtained from surface ship, su	ubmersibles, long-erm monitoring and BSR	
11a	Magnetics		YES	Compiled map published from	n AIST, Japan	
11b	Gravity		YES	Compiled map published from	n AIST, Japan	
12	Sediment cores		YES	Gravity and piston cores		
13	Rock sampling		YES	Taken by submersible and RO		
14a	Water current data		YES	Available on JODC web page	(http://www.jodc.go.jp/)	
14b	Ice Conditions					
15	OBS microseismicity			Being processed now		
16	Navigation		YES			
17	Other					

SSP Classification of Site: SSP Watchdog: Date of Last Review: SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

 $\checkmark$ 

Proposal #:	Site #: NT2-08A		Date Form	n Submitted: Oct. 1, 2003
Water Depth (m): 2170	Sed. Penetration (m): 350	00	Basement	Penetration (m): 0
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes 🗆	No	
Are high temperatures expected at this signature	te?	Yes	No	
Are there any other special requirements	for logging at this site?	Yes 🗆	No	$\checkmark$

\_\_\_\_\_

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB, VSP Hydrofracturing, Packer injection test CORK and Geodetic/Seismic borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of penetration or significant basement
borehole@ldeo.columbia.edu	penetration of significant basement
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

Т

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

 $\checkmark$ 

P	roposal #:	Site #: NT2-08A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusal	.RCB to 3500 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in ea program.	stern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault ze	one, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (	June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #	:	Site #: NT	2-08A	Date Form S	Submitted: Oct. 1, 2	.003	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
300 1800 3400	Unconformity Fault fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		
300 1800	Unconformity Fault	ene to Mioce	1.6-	sediments to old accretionary			

			Received 1 April 2004
IODP P	roposal Cover S	heet	603C-Full
New	Revised	Addendum	
			— Above For Official Use Only —

Please fill out information in all gray boxes

Title:

Proponent(s):

NanTroSEIZE Drilling and Observatory Phase 3: A Window into the Seismogenic Zone 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,

	Kohtaro Ujiie, Kelin Wang		
Keywords:	Seismogenic zone, fault mechanics, borehole observatory,	Area:	Southwestern
(5 or less)	tsunamigenesis	Alca.	Japan margin

Demian Saffer, Arito Sakaguchi, Masanao Shinohara, Ralph Stephen, Akito Tsutsumi,

**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. Downhole 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.

Proposedctivities 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.

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

Proposed Sites:

	te Summary Forn I Site Information	ns:	603C	-Full
Please fill out informati Revised 7 March 2002	on in all gray boxes		New	Revised
Section A: Proposa	al Information			
Title of Proposal:	NanTroSEIZE I	Drilling and Observate Seismogenie	•	Window into the
Date Form Submitted:	Apr. 1, 2003 Sample and instrument	decollement, mega-splay,	and wall rock of	lower prism to address
Site Specific Objectives with Priority (Must include general objectives in proposal)	-	ry, and temporal change ob		

List Previous Drilling in Area:

### Section B: General Site Information

None

Site Name: (e.g. SWPAC-01A)	NT3-01A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	SouthwesternNankai Trough off Kumano
Latitude:	Deg: 33	Min: 17.6 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 38.6 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary: X	Alt:	Water Depth:	1,950 m

# Section C: Operational Information

		Se	diments				Ba	asement	
Proposed		580	0 - 6000					200	
Penetration: (m)	What is the total	sed thick	ness? >5.500	n	1				
()	What is the total	sea. men	1055		-	Ĩ	Total Penetra	ntion: 6,200 m	
General Lithologies:	Slope basin	Slope basin clastic sediments, accreted and							
	deformed tre	ench t	urbidites, l	nemip	ela	gic and			
	pelagic mud		±						
Coring Plan: (Specify or Circle)	Continuous		•	-			gging in i	intervals	
(specify of circle)	1-2-3-APC PC* X MD * PCS CB Re try HGB								
Wireline Logging	Standard 7	「ools			Spec	cial Tools		LWD	
Plan:	Neutron-Porosity	✓	Borehole Te			Formation Fluid S		Density-Neutron	
	Litho-Density	✓	Nuclear Mag Resonance	netic		Borehole Temper & Pressure	rature	Resistivity-Gamma Ray	
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seism	ic 🔽	Acoustic	
	Resistivity	Z	Side-Wall Co	re					
	Acoustic		Sampling		_				
	Formation Image					Others (	)	Others (FMI )	
Max.Borehole Temp. :	Expected value 150-170								
Mud Logging:	Cuttings San	pling l	ntervals						
(Riser Holes Only)	fro	m <u>150</u>	)0 m	to	_36	<u>600</u> m,	_5	m intervals	
		m 430		to	62		5	m intervals	
			_					Basic Sampling Intervals: 5m	
Estimated days:	Drilling/Coring:	???	Logging	g: ??			Total On-		
Future Plan:	Longterm Boreh	ole Obse	ervation Plan/	Re-entr	y Pla	n			
	Long-term	observ	atory insta	llatio	n ar	nd data telem	netry/reco	ording	
Hazards/ Weather:	Please check fol	lowing L	ist of Potentia	l Hazar	ds.			What is your Weather	
weather.	Shallow Gas		plicated Seabed dition		Нус	Irothermal Activity		window? (Preferable period with the reasons)	
	Hydrocarbon	Soft	Seabed		Lands	slide and Turbidity C	urrent	May – August optimal	
	Shallow Water Flow	Cu Cu	rrents	V	Metl	hane Hydrate	Z	(typhoon risk in late August to September)	
	Abnormal Pressure	Frac	tured Zone		Diapi	r and Mud Volcano		August to September)	
	Man-made Objects	Fat	ılt	⊿	High	Temperature			
	H <sub>2</sub> S	Higl	n Dip Angle		Ice C	onditions			
	CO <sub>2</sub>								

#### Form 2 - Site Survey Detail

### iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New Revised
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osal #	<i>t</i> :		Site #:	NT3-01A	Date Form Submitted: Apr. 1, 2003
	Data Type	SSP Requir- ements	Exists In DB		ta and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s) : JAMSTEC Line-L (Feb. 2003) Crossing Lines(s): JAMSTEC Line-9 (	Location of Site on line (SP or Time only) Feb. 2003)
2	Deep Penetration seismic reflection		YES	Primary Line(s): KR0108-5 Crossing Lines(s):	Location of Site on line (SP or Time only)
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and PODM m OBS wide-angle data also availa	igration velocity from MCS lines. able.
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb.	2003, also IFREE lines from 1998 - 2003
5a	Refraction (surface)		YES	Two-ship COP (max. offset 2 2002	0km) was obtained by JAMSTEC in Se
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (19	997)
6	3.5 kHz		NO		Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data by JAM	ASTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using IZAN	IAGI side scan sonar
8b	Side-looking sonar (bottom)		NO		
9	Photography or Video		YES	Taken by submersibles of JASM	ITEC
10	Heat Flow		YES	Obtained from surface ship, sub	mersibles, long-term monitoring and BSR
11a	Magnetics		YES	Compiled map published from A	AIST, Japan
11b	Gravity		YES	Compiled map published from A	AIST, Japan
12	Sediment cores		YES	Gravity and piston cores	
13	Rock sampling		YES	Taken by submersible and ROV	
14a	Water current data		YES	Available on JODC web page (h	http://www.jodc.go.jp/)
14b	Ice Conditions	_			
15	OBS microseismicity		YES	Obana et al., in press	
16	Navigation		YES		
17	Other	1	1		

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

### Form 3 - Detailed Logging Plan

### iSAS/IODP Site Summary Forms:

·		New Revised
Proposal #:	Site #: NT3-01A	Date Form Submitted: Apr. 1, 2003
Water Depth (m): 1950	Sed. Penetration (m): 6000	Basement Penetration (m): 200
Do you need to use the conical side-entry Are high temperatures expected at this si Are there any other special requirements If "Yes" Please describe requireme	te?Yes $\checkmark$ Nofor logging at this site?Yes $\square$ No	$\checkmark$

\_\_\_\_\_

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic	Yes, dipole sonic, LWD sonic for physical properties	
FMS	Preferably FMI & RAB. Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV	Perhaps?	
Resistivity-Laterolog	LWD resistivity	
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB, VSP Hydrofracturing, Packer injection test Geodetic/Seismic and multi-level packer borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

### Form 4 – Pollution & Safety Hazard Summary

Please fill out information in all gray boxes

New Revised

Proposal #:		Site #: NT3-01A	Date Form Submitted: Apr. 1, 2003
1 Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.) APC to refusal, then XCB to refusal.RCB to e		APC to refusal, then XCB to refusal. RCB to 620	00 m or 200 m into basement.
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct BSR drilling in eastern N our program.	Jankai in 2004. This data will be used for
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	Except for normal gas hydrate occurrence, none	е.
6	What "special" precautions will be taken during drilling?	Fault zones are likely unstable and overpress kicks.	sured, prone to collapse, possible pressure
7	What abandonment procedures do you plan to follow:	Unknown at this time for riser operations	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (June – Octo	ber)
9	Summary: What do you consider the major risks in drilling at this site?	Current, shallow overpressure (but latter is prol	bably not major

### Form 5 – Lithologic Summary

	ODI Site Sui	J					
Proposal #:	Proposal #: Site #: NT3-01A			Date Form Submitted: Apr. 1, 2003			
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
200 1000 4500 6000	Unconformity Unconformity Fault fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

	te Summary Forr	ns:	603C-	-Full	
Form 1 - Genera Please fill out informati Revised 7 March 2002	I Site Information	r	New 🗸	Revised	
Section A: Propos	al Information				
Title of Proposal:	NanTroSEIZE	Drilling and Observator Seismogenic	-	Window into the	
Date Form Submitted:	_	decollement, mega-splay, a		lower prism to ac	ldress
Site Specific Objectives with Priority (Must include general objectives in proposal)	Priority:2	ry, and temporal enange obje			
	None				

List Previous Drilling in Area:

### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT3-02A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	SouthwesternNankai Trough off Kumano
Latitude:	Deg: 33	Min: 12.9 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 27.4 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary: X	Alt: X	Water Depth:	1,950 m

# Section C: Operational Information

		Se	diments				Basement		
Proposed	5800 - 6000				200				
Penetration: (m)	What is the total	sed thick	ness? >5.500	n	1				
()	What is the total	sea. men	1055		-	Ĩ	Total Penetra	ntion: 6,200 m	
General Lithologies:	Slope basin	clasti	c sedimen	ts, ac	cret	ted and			
	deformed tre	ench t	urbidites, l	nemip	ela	gic and			
	pelagic mud		±						
Coring Plan: (Specify or Circle)		Continuous coring may be replaced with LWD logging in intervals							
(specify of circle)	1-2-3-APC	C* XC	MD * P			ellatry HIGB	□ * Sy.	stems Currently Under Development	
Wireline Logging	Standard 7	「ools			Spec	cial Tools		LWD	
Plan:	Neutron-Porosity	✓	Borehole Te			Formation Fluid S		Density-Neutron	
	Litho-Density	✓	Nuclear Mag Resonance	netic		Borehole Temper & Pressure	rature	Resistivity-Gamma Ray	
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seism	ic 🔽	Acoustic	
	Resistivity	Z	Side-Wall Co	re					
	Acoustic		Sampling		_				
	Formation Image					Others (	)	Others (FMI )	
Max.Borehole Temp. :	Expected value 150-170								
Mud Logging:	Cuttings San	pling l	ntervals						
(Riser Holes Only)	fro	m <u>150</u>	)0 m	to	_36	<u>600</u> m,	_5	m intervals	
		m 430		to	62		5	m intervals	
			_					Basic Sampling Intervals: 5m	
Estimated days:	Drilling/Coring:	???	Logging	g: ??			Total On-		
Future Plan:	Longterm Boreh	ole Obse	ervation Plan/	Re-entr	y Pla	n			
	Long-term	observ	atory insta	llatio	n ar	nd data telem	netry/reco	ording	
Hazards/ Weather:	Please check fol	lowing L	ist of Potentia	l Hazar	ds.			What is your Weather	
weather.	Shallow Gas		plicated Seabed dition		Нус	Irothermal Activity		window? (Preferable period with the reasons)	
	Hydrocarbon	Soft	Seabed		Lands	slide and Turbidity C	urrent	May – August optimal	
	Shallow Water Flow	Cu Cu	rrents	V	Metl	hane Hydrate	Z	(typhoon risk in late August to September)	
	Abnormal Pressure	Frac	tured Zone		Diapi	r and Mud Volcano		August to September)	
	Man-made Objects	Fat	ılt	⊿	High	Temperature			
	H <sub>2</sub> S	Higl	n Dip Angle		Ice C	onditions			
	CO <sub>2</sub>								

#### Form 2 - Site Survey Detail

### iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New		Revised	
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Proposal #	ŧ:		Site #:	NT3-02A Date Form Submitted: Apr. 1, 2003
	Data Type	SSP Requir- ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s)       :Location of Site on line (SP or Time only)         JAMSTEC Line-B (Feb. 2003)         Crossing Lines(s):       JAMSTEC Line-9 (Feb. 2003)
2	Deep Penetration seismic reflection		YES	Primary Line(s):       Location of Site on line (SP or Time only)         KR0108-5, 3       Crossing Lines(s):
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and PODM migration velocity from MCS lines. OBS wide-angle data also available.
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb. 2003, also IFREE lines from 1998 - 2003
5a	Refraction (surface)		YES	Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. 2002
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (1997)
6	3.5 kHz		NO	Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data by JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using IZANAGI side scan sonar
8b	Side-looking sonar (bottom)		NO	
9	Photography or Video		YES	Taken by submersibles of JASMTEC
10	Heat Flow		YES	Obtained from surface ship, submersibles, long-term monitoring and BSR
11a	Magnetics		YES	Compiled map published from AIST, Japan
11b	Gravity		YES	Compiled map published from AIST, Japan
12	Sediment cores		YES	Gravity and piston cores
13	Rock sampling		YES	Taken by submersible and ROV
14a	Water current data		YES	Available on JODC web page (http://www.jodc.go.jp/)
14b	Ice Conditions			
15	OBS microseismicity		YES	Obana et al., in press
16	Navigation		YES	
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

### Form 3 - Detailed Logging Plan

### iSAS/IODP Site Summary Forms:

·		New Revised
Proposal #:	Site #: NT3-01A	Date Form Submitted: Apr. 1, 2003
Water Depth (m): 1950	Sed. Penetration (m): 6000	Basement Penetration (m): 200
Do you need to use the conical side-entry Are high temperatures expected at this si Are there any other special requirements If "Yes" Please describe requireme	te?Yes $\checkmark$ Nofor logging at this site?Yes $\square$ No	$\checkmark$

\_\_\_\_\_

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic	Yes, dipole sonic, LWD sonic for physical properties	
FMS	Preferably FMI & RAB. Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV	Perhaps?	
Resistivity-Laterolog	LWD resistivity	
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB, VSP Hydrofracturing, Packer injection test Geodetic/Seismic and multi-level packer borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

### Form 4 – Pollution & Safety Hazard Summary

Please fill out information in all gray boxes

New Revised

P	roposal #:	Site #: NT3-01A	Date Form Submitted: Apr. 1, 2003			
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusal. RCB to 6200 m or 200 m into basement.				
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct BSR drilling in eastern N our program.	Jankai in 2004. This data will be used for			
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None				
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs				
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	Except for normal gas hydrate occurrence, none	е.			
6	What "special" precautions will be taken during drilling?	Fault zones are likely unstable and overpress kicks.	sured, prone to collapse, possible pressure			
7	What abandonment procedures do you plan to follow:	Unknown at this time for riser operations				
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (June – Octo	ber)			
9	Summary: What do you consider the major risks in drilling at this site?	Current, shallow overpressure (but latter is prob	bably not major			

### Form 5 – Lithologic Summary

Proposal #:	:	Site #: NT	'3-01A	Date Form S	Submitted: Apr. 1, 2	2003		
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments	
200 1000 4500 6000	Unconformity Unconformity Fault fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism			

			Received 1 April 2004
IODP P	603C-Full		
New	Revised	Addendum	
			— Above For Official Use Only —

Please fill out information in all gray boxes

Title:

Proponent(s):

NanTroSEIZE Drilling and Observatory Phase 3: A Window into the Seismogenic Zone 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,

	Kohtaro Ujiie, Kelin Wang		
Keywords:	Seismogenic zone, fault mechanics, borehole observatory,	Area:	Southwestern
(5 or less)	tsunamigenesis	Alca.	Japan margin

Demian Saffer, Arito Sakaguchi, Masanao Shinohara, Ralph Stephen, Akito Tsutsumi,

**Contact Information:** 

Contact Person:	Harold Tobin								
Department:	Earth and Environmental Science Department								
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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. Downhole 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.

Proposedctivities 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.

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

Proposed Sites:

				I ··· ···				
IOD	P Proposal Cover Sheet		603D-Full2					
	mation in all gray boxes		A	lbove For Oj	fficial Use Only			
Title: The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites								
Proponent(s):	Elizabeth Screaton, Michael Underwood, Den Obana, Greg Moore, Kevin Brown, Juichiro Asl		affer, Kelin	Wang, Geo	off Wheat, Koichiro			
Keywords: (5 or less)	Subduction inputs; hydrogeology; long-term obs	servato	ories	Area:	Nankai Trough Shikoku Basin			
	Contact Informati	on:						
Contact Person:	Elizabeth Screaton							
Department:	Department of Geology							
Organization:	nization: University of Florida							
Address								
Tel.:	(352) 392-4612							
E-mail:	screaton@ ufl.edu							

Received 1 April 2005

Permission to post abstract on IODP-MI Sapporo Web site: X 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.

		Water	Pe	enetration (	m)	
Site Name	Position	on Depth (m) Sed Bsm Total		Total	Brief Site-specific Objectives	
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.

#### Proposed Sites:

				I ··· ···				
IOD	P Proposal Cover Sheet		603D-Full2					
	mation in all gray boxes		A	lbove For Oj	fficial Use Only			
Title: The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites								
Proponent(s):	Elizabeth Screaton, Michael Underwood, Den Obana, Greg Moore, Kevin Brown, Juichiro Asl		affer, Kelin	Wang, Geo	off Wheat, Koichiro			
Keywords: (5 or less)	Subduction inputs; hydrogeology; long-term obs	servato	ories	Area:	Nankai Trough Shikoku Basin			
	Contact Informati	on:						
Contact Person:	Elizabeth Screaton							
Department:	Department of Geology							
Organization:	nization: University of Florida							
Address								
Tel.:	(352) 392-4612							
E-mail:	screaton@ ufl.edu							

Received 1 April 2005

Permission to post abstract on IODP-MI Sapporo Web site: X 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.

Cite Name	Desiden	Water	Pe	enetration (	m)	
Site Name	Position	Depth (m) Sed Bsm Total		Total	Brief Site-specific Objectives	
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.

#### Proposed Sites:



#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New

Revised [

#### Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites							
Date Form Submitted: Site Specific Objectives with Priority (Must include general objectives in proposal)	Sept. 30, 2004 One CORK hole with screened interval in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement. Reference site to characterize hydrology of Shikoku Basin strata and upper igneous crust where a bathymetric mound is underlain by a basement high. Objectives are to show how stratigraphy, basement topography, and thermal structure affect the physical and hydrologic properties of subduction inputs.							
List Previous Drilling in Area:	This site would be a return to NT1-01A, which is proposed to be drilled in 603A-Full2 (NantroSEIZE Reference Sites).							

## Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT1-01A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 32 N	Min: :44.8878	Jurisdiction:	Japan
Longitude:	Deg: 136 E	Min: 55.0236	Distance to Land:	130 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, O	ther ( )		
Priority of Site:	Primary:x	Alt:	Water Depth:	3540 m

	Codimonta							D	4	
<b>D</b> 1	Sediments						Basement			
Proposed	460				4	0				
Penetration: (m)	What is the total sed. thickness? 460 m									
	what is the total s	ed. unickn	less? 400	III			To	tal Panatr	ation: 500	m
General Lithologies:	Possible silt/	mud t	urbidites a	nd as	h la	were	Basa		ation. 500	
General Ennotogies.	Hemipelagic				11 10	iyers	Dase	an		
	Thempelagic	muu	and muusu	JIIC						
Coring Plan:	Limited cori	no as	necessary t	0 001	nfiri	m sere	en loca	ations fo	or CORKs	
(Specify or check)		· ·	•							
	1-2-3-APC 🛛 V	PC*	CB DIDCB	*	¢S	R	Re		s  Under	Development
Wireline Logging	Standard T	ools			Snec	cial Too	ale		LWI	
Plan:					-					
	Neutron-Porosity		Borehole Tele					Sampling	Density-Neutron	n 🗆
	Litho-Density		Nuclear Magne Resonance	etic		& Pressu	e Tempera		Resistivity-Gami	na Ray 🗆
	Gamma Ray		Geochemical				e Seismic	Γ	Acoustic	
	Guinniù Ruy		Geoenemieur					nts if needed		
	Resistivity		Side-Wall Core	•			om previou		. 10	
	i constituty		Sampling			drilling.	omproviou	5 (1 mase 1)		
	Acoustic									
	Formation Image					Others (		)	Others (	)
Max.Borehole	Expected value (I	For Rise	r Drilling)							
Temp. :			-°C							
Mud Logging:	Cuttings Sam	pling I	ntervals							
(Riser Holes Only)	from	1	m	to			m,		m interv	als
		1					m,		m interv	als
		·					,			
Estimated days:		_							Basic Sampling Int	ervals: 5m
•	Drilling/Coring: :					-	CORKs)	Total On	i-Site: 17	
Future Plan:	Longterm Boreho						. 1	1.	1. ,	
	Long term me	onitori	ing (CORK	.s) 01	bas	semen	t and o	verlying	g sediments.	
Hazards/ Weather:	Please check foll	owing Li	ist of Potential	Haza	rds				What is your V	
weather.	Shallow Gas	Comp	olicated Seabed Co	ndition	Hyd	rothermal	Activity		window? (Pre period with the	ferable reasons)
		_								( cusons)
	Hydrocarbon	Soft	Seabed		Lands	slide and T	urbidity Cu	rrent	April-July:	n
	Shallow Water Flow	Curre	ents		Meth	ane Hydrat	e		Avoid typhoc season	011
	Abnormal Pressure	Fract	ured Zone		Diapi	r and Mud	Volcano			
		<b>-</b>								
	Man-made Objects	- Fault			High	Temperatu	re			
	H <sub>2</sub> S	High	Dip Angle		Ice C	onditions				
		_								
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

## **IODP Site Summary Forms:**

Site #: NT1-01A

Please fill out information in all gray boxes

'roposal #: 603D-Full

Other

17

New

SSP Requir-Exists Data Type Details of available data and data that are still to be collected ements In DB Primary Line(s) :Location of Site on line (SP or Time only) 1 No High resolution seismic reflection Crossing Lines(s): Primary Line(s): KR9806-2 SP2710 2 Yes Location of Site on line (SP or Time only) **Deep Penetration** seismic reflection Crossing Lines(s): KR0211-S0 Stacking velocity and migration velocity from MCS lines. OBS data. 3 Seismic Velocity<sup>†</sup> Yes 4 Seismic Grid Yes 5a Refraction Yes Two ship COP (maximum offset 20 km) obtained by JAMSTEC. (surface) OBS data by Nakanishi et al. (1997) 5b Refraction Yes (near bottom) Location of Site on line (Time) 3.5 kHz 6 7 Swath Yes Multi-narrow-beam data by JAMSTEC R/V Yokusuka. bathymetry 8a Side-looking No sonar (surface) 8b Side-looking No sonar (bottom) 9 Photography No or Video 10 Heat Flow Yes. Compiled map published from AIST, Japan. 11a Magnetics Yes Compiled map published from AIST, Japan. 11b Gravity Yes 12 Sediment cores No 13 Rock sampling No Available on JODC web page (http://www.jodc.go.jp) Water current data 14a Ice Conditions 14b OBS Yes 15 microseismicity Yes Navigation 16

SSP Classification of Site: SSP Watchdog: Date of Last Review: SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

Revised

Date Form Submitted: Sept. 30, 2004

# Form 3 - Detailed Logging Plan

# **IODP Site Summary Forms:**

New	Re

Proposal #: 603D-Full	Site #: NT1-01A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 3540	Sed. Penetration (m): 460	Basement Penetration (m): 40

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗌	No	•
Are high temperatures expected at this site?	Yes 🗌	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	
If "Yes" Please describe requirements: No logging planned. S	ite will have bee	n logged in	previous phase.

CORK installation only

What do you estimate the total logging time for this site to be: 12 days install casing/CORKS

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

# Form 4 – Pollution & Safety Hazard Summary

# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

Р	roposal #: 603D-Full	Site #: NT1-01A	Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited coring to confir	m monitoring intervals for CORK. CORK installation
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	None	
7	What abandonment procedures do you plan to follow:	None. Holes will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current. Typhoon	a season (June to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

# Form 5 – Lithologic Summary

					New	Revise	d
Proposal #	: 603D-Full	Site #: NT	1-01A	Date Form	Submitted: Sept. 30,	2004	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environme nt	Avg. rate of sed. accum. (m/My)	Comments
seafloor			1.6-1.9	Hemipelagite	Backarc basin Floor	23 m/my	
460	Unconformity	20 Ma	2.0	Volcanic sediment and basement basalt	Backarc basin spreading ridge		
560	Total depth						

New

# 603D-Full2

## Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New Revised

Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites							
Submitted: Site Specific Objectives with Priority	Sept. 30, 2004 One CORK hole with screened interval in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement. Reference site to characterize hydrology of Shikoku Basin strata and upper igneous crust where basement topography is relatively flat. Objectives are to document how stratigraphy, basement topography, and thermal structure affect the physical and							
	hydrologic properties of subduction inputs. This site would be a return to NT1-02A, which is proposed to be drilled in 603A-Full2 (NantroSEIZE Reference Sites).							

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT1-02A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 32 N	Min: :47.4996	Jurisdiction:	Japan
Longitude:	Deg: 137 E	Min: 9.2784	Distance to Land:	145 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Ot	her ( )		
Priority of Site:	Primary:x	Alt:	Water Depth:	4210 m

	Sediments						Basement			
Proposed	730			/	40					
Penetration:	/30					4	ΗŪ			
(m)	What is the total s	ed. thickr	ness? 730	m	1					
							To	otal Penetr	ation: 770	m
General Lithologies:	Possible silt/	'mud t	urbidites an	nd as	sh la	ayers	Basa	alt	L.	
	Hemipelagic					5				
	1 0									
Coring Plan:	Limited cori	ng as i	necessary t	o coi	nfiri	m scre	een loca	ations fo	or CORKs	
(Specify or check)	1-2-3-APC 🔲 V	- РС* Г		*	rs	R	Re	н∏⊮в		
	1-2-5-74 C [] V				<b>F</b> 0		Ite_Itu y		stems Currently Under 1	Development
Wireline Logging	Standard To	ools		;	Spec	cial To	ols		LWD	)
Plan:	Neutron-Porosity		Borehole Tele	viewer		Format	tion Fluid S	Sampling	] Density-Neutron	
	Lidha Danaita		Nuclear Magne	etic			le Tempera		Resistivity-Gamm	
	Litho-Density		Resonance			& Press	ure		Resistivity-Gamin	а кау 🗆
	Gamma Ray		Geochemical			Borehol	le Seismic		Acoustic	
			Side-Wall Core			Limited	l measureme	ents if needed	to	
	Resistivity	_	Sampling	·			rom previou	is (Phase I)		
			F 0			drilling.				
	Acoustic					Otherne (		``	Others (	
Max.Borehole	Formation Image Expected value (I	For Rise	r Drilling)			Others (		)	Others (	)
Temp. :		or Rise	-°C							
Mud Logging:	Cuttings Sam	pling I	ntervals							
(Riser Holes Only)	from	1	m	to			m,		m interva	ls
	from	ı	m	to			m,		m interva	ls
								Ŀ	Basic Sampling Inte	rvals: 5m
Estimated days:	Drilling/Coring:	6 days	Logging:	12 (ii	nstall	casing/	CORKs)	Total On	-Site: 18 days	
Future Plan:	Longterm Boreho									
	Long term me	onitori	ing (CORK	s) of	fbas	semen	it and o	verlying	g sediments.	
									1	
Hazards/	Please check foll	owing Li	ist of Potential	Haza	rds				What is your W	
Weather:	Shallow Gas		olicated Seabed Co	ndition	Hyd	lrothermal	Activity		window? (Pref period with the r	erable easons)
	-	Soft	Seabed		Land	clide and T	Furbidity Cu		April-July:	cusonsy
	liyuloculoon		Seubeu		Dunu	shee and h	fullolatly eu		Avoid typhoo	n
	Shallow Water Flow	Curre	ents		Meth	ane Hydra	te		season	-
	Abnormal Pressure	Fract	ured Zone		Diapi	ir and Muc	l Volcano			
	Man-made Objects	- Fault			High	Temperati	ure			
	H <sub>2</sub> S	High	Dip Angle		Ice C	onditions				
		_								
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

## **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

'roposal #: 603D-Full Site #: NT1-02A Date Form Submitted: Sept. 30, 2004 SSP Requir-Exists Data Type Details of available data and data that are still to be collected ements In DB Primary Line(s) :Location of Site on line (SP or Time only) 1 No High resolution seismic reflection Crossing Lines(s): Primary Line(s): KR9806-1 SP1740 2 Yes Location of Site on line (SP or Time only) **Deep Penetration** seismic reflection Crossing Lines(s): KR0211-S0 nearby Stacking velocity and migration velocity from MCS lines. OBS data. 3 Seismic Velocity<sup>†</sup> Yes 4 Seismic Grid Yes 5a Refraction Yes Two ship COP (maximum offset 20 km) obtained by JAMSTEC. (surface) OBS data by Nakanishi et al. (1997) 5b Refraction Yes (near bottom) Location of Site on line (Time) 3.5 kHz 6 7 Swath Yes Multi-narrow-beam data by JAMSTEC R/V Yokusuka. bathymetry 8a Side-looking No sonar (surface) Side-looking 8b No sonar (bottom) 9 Photography No or Video 10 Heat Flow Yes. Compiled map published from AIST, Japan. 11a Magnetics Yes Compiled map published from AIST, Japan. 11b Gravity Yes 12 Sediment cores No 13 Rock sampling No Available on JODC web page (http://www.jodc.go.jp) Water current data 14a Ice Conditions 14b OBS Yes 15 microseismicity Yes Navigation 16 Other 17

 SSP Classification of Site:
 SSP Watchdog:
 Date of Last Review:

 SSP Comments:
 Date of Last Review:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

all gray boxes

# Form 3 - Detailed Logging Plan

# **IODP Site Summary Forms:**

Γ

New	Revised

Proposal #: 603D-Full	Site #: NT1-02A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 4210	Sed. Penetration (m): 730	Basement Penetration (m): 40

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗌	No	
Are high temperatures expected at this site?	Yes 🗆	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	
If "Yes" Please describe requirements: No logging planned. S	ite will have bee	n logged in	previous phase.

CORK installation only

What do you estimate the total logging time for this site to be: 12 days (CORK/casing install)

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

# Form 4 – Pollution & Safety Hazard Summary

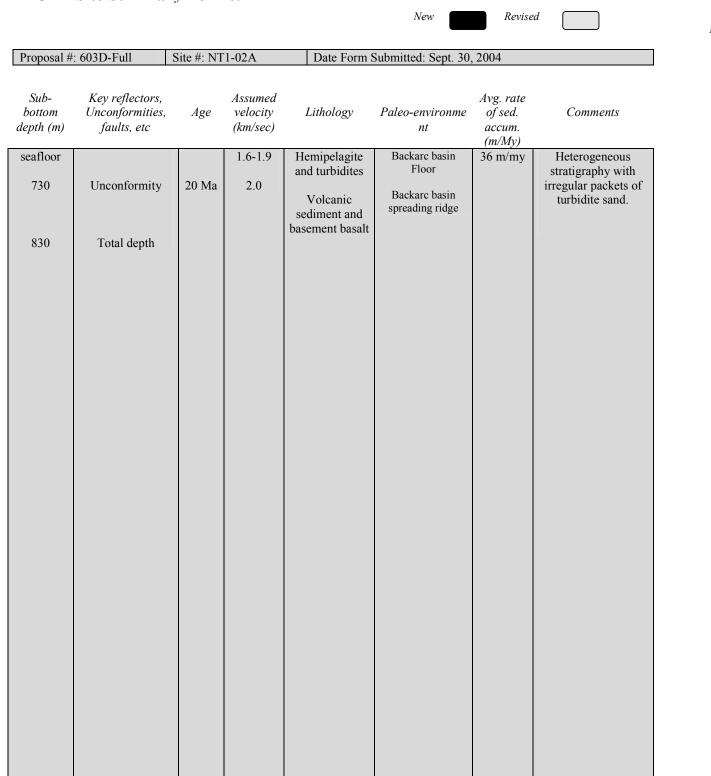
# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New	Revised

Proposal #: 603D-Full		Site #: NT1-02A	Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited coring to confirm monitor	ring intervals for CORK. CORK installation
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	May need casing of sandy turbidites prinstallation.	rior to basement drilling/basement CORK
7	What abandonment procedures do you plan to follow:	None. Holes will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current. Typhoon season (J	une to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

#### Form 5 – Lithologic Summary



New



## Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New Revised

Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites								
Date Form Submitted:	Sept. 30, 2004								
Site Specific Objectives with Priority	Reference site to characterize hydrology of decollement and underlying turbidites at the toe of the accretionary prism and to monitor micro-seismicity and strain. Objectives are to install CORK to monitor hydrologic properties and fluid-flow signals within and below the frontal décollement zone.								
(Must include general objectives in proposal)									
List Previous Drilling in Area:	This site would be a return to NT1-03A, which is proposed to be drilled in 603A-Full2 (NantroSEIZE Reference Sites).								

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT1-03A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 33 N	Min: 1.23258	Jurisdiction:	Japan
Longitude:	Deg: 136 E	Min: 47.94852	Distance to Land:	100 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Ot	her ( )		
Priority of Site:	Primary:x	Alt:	Water Depth:	4125 m

	Sediments					Basement				
Proposed Penetration:	1200									
(m)	What is the total s	ed. thickr	ness? 1740	m	l					
							Tot	tal Penetra	ation: 1200	m
General Lithologies:		sand	turbidites	·	sh	layers,				
	emipelagic m	nud an	d mudston	e						
Coring Plan:	Limited cori	ng as i	necessary (	to coi	nfirr	n screet	n loca	tions fo	r CORKs	
(Specify or check)	1-2-3-APC 🔲 V	PC*	CB DIDCB	*	CS	R <b>GB</b> R	ehtry	Н∏јВ		
Wireline Logging	Standard T	aala	 [					* Sy:	stems Currently Unde	
Plan:	Standard T				-	ial Tool		r <b>–</b>		
	Neutron-Porosity		Borehole Tele Nuclear Magn			Formation Borehole 7		ampling 🗌 ure		
	Litho-Density		Resonance			& Pressure	-		Resistivity-Gan	nma Ray 🗀
	Gamma Ray		Geochemical			Borehole S	Seismic		Acoustic	
	Resistivity		Side-Wall Cor	e		Limited me fill gaps fron		ts if needed t	to	
	Resistivity		Sampling			drilling.	ii pievious	(Thase I)		
	Acoustic									
Max.Borehole	Formation Image Expected value (I	For Rise	r Drilling)		-	Others (		)	Others (	)
Temp. :			-°C							
Mud Logging:	Cuttings Sam	pling I	ntervals							
(Riser Holes Only)	fron	n	m	to			m,		m inter	vals
	fron	n	m	to			m,		m inter	vals
								В	asic Sampling In	tervals: 5m
Estimated days:	Drilling/Coring:	-				casing/CO	RKs)	Total On-	Site: 18 days	
Future Plan:	Longterm Boreho Long term me						and de	collem	ent	
		0111011		(3) 01	un	oranes a	and ac	Concin	ciit.	
Hazards/	Please check foll	owing L	ist of Potentia	l Haza	rds				What is your	
Weather:	Shallow Gas	Comp	olicated Seabed Co	ondition	Hydi	rothermal Ac	tivity		window? (Pr period with the	
	Hydrocarbon	Soft	Seabed		Lands	lide and Turt	oidity Cur	rent	April-July:	
	Shallow Water Flow	Curre	ents		Metha	ine Hydrate			Avoid typho season	on
	Abnormal Pressure	Fract	ured Zone		Diapir	and Mud Vo	olcano		5645011	
	Man-made Objects	Fault			High 1	Femperature				
	H <sub>2</sub> S	High	Dip Angle		Ice Co	onditions				
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

## **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

'roposal #: 603D-Full Site #: NT1-03A Date Form Submitted: Sept. 30, 2004 SSP Requir-Exists Data Type Details of available data and data that are still to be collected ements In DB Primary Line(s) :Location of Site on line (SP or Time only) 1 No High resolution seismic reflection Crossing Lines(s): Primary Line(s): KR0108-4 SP16550 2 Yes Location of Site on line (SP or Time only) **Deep Penetration** seismic reflection Crossing Lines(s): Stacking velocity and migration velocity from MCS lines. OBS data. 3 Seismic Velocity<sup>†</sup> Yes 4 Seismic Grid Yes 5a Refraction Yes Two ship COP (maximum offset 20 km) obtained by JAMSTEC. (surface) OBS data by Nakanishi et al. (1997) 5b Refraction Yes (near bottom) Location of Site on line (Time) 3.5 kHz 6 7 Swath Yes Multi-narrow-beam data by JAMSTEC R/V Yokusuka. bathymetry 8a Side-looking No sonar (surface) 8b Side-looking No sonar (bottom) 9 Photography No or Video 10 Heat Flow Yes. Compiled map published from AIST, Japan. 11a Magnetics Yes Compiled map published from AIST, Japan. 11b Gravity Yes 12 Sediment cores No 13 Rock sampling No Available on JODC web page (http://www.jodc.go.jp) Water current data 14a Ice Conditions 14b OBS Yes 15 microseismicity Yes Navigation 16 Other 17

 SSP Classification of Site:
 SSP Watchdog:
 Date of Last Review:

 SSP Comments:
 Date of Last Review:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

# Form 3 - Detailed Logging Plan

# **IODP Site Summary Forms:**

New	Re

Proposal #: 603D-Full	Site #: NT1-03A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 4125	Sed. Penetration (m): 1200	Basement Penetration (m): 0
	· · · ·	

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗌	No	•
Are high temperatures expected at this site?	Yes 🗆	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	
If "Yes" Please describe requirements: No logging planned. S	ite will have been	n logged in	previous phase.

CORK installation only

What do you estimate the total logging time for this site to be: 12 days (CORK/casing install)

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

# Form 4 – Pollution & Safety Hazard Summary

# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

Р	roposal #: 603D-Full	Site #: NT1-03A	Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited coring to confirm	n monitoring intervals for CORK. CORK installation
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	May need shallow casing to to stab	ilize sandy turbidites.
7	What abandonment procedures do you plan to follow:	None. Holes will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current. Typhoon	season (June to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current, instability of accreted tren	ch turbidites.

# Form 5 – Lithologic Summary

IODP	Site Summa	r <u>y</u> Forn	18:		New	Revise	ed
Proposal #	: 603D-Full	Site #: NT	1-03A	Date Form S	Submitted: Sept. 30,	, 2004	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environme nt	Avg. rate of sed. accum. (m/My)	Comments
seafloor			1.5	Hemipelagite + volcanic ash	Upper Shikoku Basin		
230	Fault	Quater nary	1.6-1.8	turbidites	Trench wedge		Probably contains thick layers of unconsolidated sands.
790	Reflector	Pleisto cene	1.9	hemipelagite and volcanic ash	Upper Shikoku Basin		
1000	Reflector	Plio- Mioce ne	2.4	hemipelagite + turbidite	Lowe Shikoku Basin		Heterogeneous stratigraphy with irregular packets of sand or sandstone
1200	Total depth						

New



## Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New Revised

Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites
Date Form Submitted:	Sept. 30, 2004 One CORK hole with screened interval in turbidites and sealed basement.
Site Specific Objectives with Priority	Companion CORK hole with fully cased sediment and open basement. Objectives are to document variations in turbidite and basement fluid flow between NT1-02A and deformation front.
(Must include general objectives in proposal)	No seisstific deilling in immediate sinisite DSDD 97 ODD 121, 100 and 100
List Previous Drilling in Area:	No scientific drilling in immediate vicinity. DSDP 87, ODP 131, 190, and 196 were conducted about 200 km SW of this proposal's sites.

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	VT1-05A If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #		Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 33 N	Min: 01.3482	Jurisdiction:	Japan
Longitude:	Deg: 137 E	Min: 3.3432	Distance to Land:	120 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Ot	her ( )	·	
Priority of Site:	Primary:	Alt:x	Water Depth:	4310 m

# Section C: Operational Information

	Sec	liments			Ba	sement
Proposed Penetration:	1528			40		
(m)	What is the total sed. thickr	less? 1528	m			
	~ 44 44 4				Penetrat	tion: 1568 m
General Lithologies:	Possible silt/mud t Hemipelagic mud		-	s Basalt		
	memperagic muu	and muustone				
Coring Plan: (Specify or check)	APC/XCB to refus	al, RCB to TI	).			
(specify or eneck)	1-2-3-APC <b>■</b> VPC*	CB DCB*	CS R	Rehtry	H <b></b> B * Svst	tems Currently Under Development
Wireline Logging	Standard Tools		Special	Tools	595	LWD
Plan:	Neutron-Porosity	Borehole Teleview	rer 🗌 🛛 For	mation Fluid Sam	oling 🗌	Density-Neutron
	Litho-Density	Nuclear Magnetic Resonance		ehole Temperature ressure		Resistivity-Gamma Ray
	Gamma Ray	Geochemical	D Bore	ehole Seismic		Acoustic
	Resistivity	Side-Wall Core Sampling				
	Acoustic	Sumpling				
	Formation Image		Othe	rs (	)	Others ( )
Max.Borehole Temp. :	Expected value (For Rise	r Drilling) °C				
Mud Logging:	Cuttings Sampling I	ntervals				
(Riser Holes Only)	from	m t	.0	m,		m intervals
	from	m t		m,		m intervals
					Bc	asic Sampling Intervals: 5m
Estimated days:	Drilling/Coring: 18 days	Logging: 7 lo 12 CORK/ca		То	tal On-S	Site: 37 days
Future Plan:	Longterm Borehole Obse	rvation Plan/Re-en	ntry Plan	. 1	1 •	1.
	Long term monitori	ng (CORKs) (	of basem	ent and over	lying	sediments.
Hazards/	Please check following L	ist of Potential Ha	ards			What is your Weather
Weather:	Shallow Gas Comp	licated Seabed Condition		mal Activity	_	window? (Preferable
						period with the reasons)
	Hydrocarbon Soft	Seabed	Landslide a	nd Turbidity Current		April-July: Avoid typhoon
	Shallow Water Flow  Curre	ents	Methane H	ydrate		season
	Abnormal Pressure 🔲 Fract	ured Zone	Diapir and	Mud Volcano		
	Man-made Objects 🔲 Fault		High Temp	erature		
	H <sub>2</sub> S High	Dip Angle	Ice Conditi	ons		
	CO <sub>2</sub>					

# Form 2 - Site Survey Detail

## **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

'roposal #: 603D-Full		Site #:	NT1-05A	Date Form Submitted: Sept. 30, 2004	
	Data Type	SSP Requir- ements	Exists In DB		and data that are still to be collected
1	High resolution seismic reflection		No	Primary Line(s) Crossing Lines(s):	:Location of Site on line (SP or Time only)
2	Deep Penetration seismic reflection		Yes	Primary Line(s): KR9806-1 SP2922 Crossing Lines(s): KY0314-100 SP 3	Location of Site on line (SP or Time only)
3	Seismic Velocity <sup>†</sup>		Yes	Stacking velocity and migration v	velocity from MCS lines. OBS data.
4	Seismic Grid		Yes		
5a	Refraction (surface)		Yes	Two ship COP (maximum offset 2	20 km) obtained by JAMSTEC.
5b	Refraction (near bottom)		Yes	OBS data by Nakanishi et al. (199	97)
6	3.5 kHz				Location of Site on line (Time)
7	Swath bathymetry		Yes	Multi-narrow-beam data by JAM	STEC R/V Yokusuka.
8a	Side-looking sonar (surface)		No		
8b	Side-looking sonar (bottom)		No		
9	Photography or Video		No		
10	Heat Flow		Yes.		
11a	Magnetics		Yes	Compiled map published from Al	IST, Japan.
11b	Gravity		Yes	Compiled map published from Al	IST, Japan.
12	Sediment cores		No		
13	Rock sampling		No		
14a	Water current data			Available on JODC web page (htt	tp://www.jodc.go.jp)
14b	Ice Conditions				
15	OBS microseismicity		Yes		
16	Navigation		Yes		
17	Other				

SSP Classification of Site: SSP Watchdog: Date of Last Review: SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

# Form 3 - Detailed Logging Plan

# **IODP Site Summary Forms:**

Г

#### New

Revised

Proposal #: 603D-Full	Site #: NT1-05A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 4310	Sed. Penetration (m): 1528	Basement Penetration (m): 40

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗆	No	
Are high temperatures expected at this site?	Yes 🗌	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	
If "Yes" Please describe requirements:			

What do you estimate the total logging time for this site to be: 7 days logging, 12 days CORK/casing install

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation of clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electromagnetic properties in sedimentary sequence and basement.	1
Acoustic	Determination of in situ velocity and estimation of physical properties. Comparsion with seismic velocity and create synthetic seismograms.	1
FMS	Imaging of sedimentary structures and fractures. Core-log correlation of structural features.	2
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, electro-magnetic properties, and lithology in unstable borehole environment.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	Packer: hydrologic tests of sediment + basement VSP: core-log-seismic integration CORK: monitoring of sediment P, T, chem	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of penetration or significant basement
at: borehole@ldeo.columbia.edu	penetration of significant basement penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

Т

# Form 4 – Pollution & Safety Hazard Summary

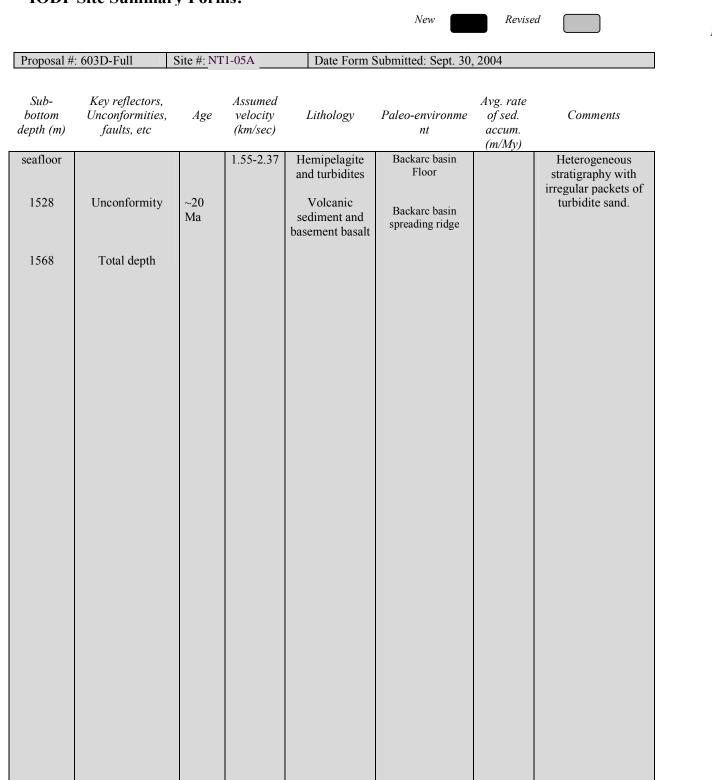
# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New Revised

Р	roposal #: 603D-Full	Site #: NT1-05A	Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, XCB to refusal.	RCB to TD, log. CORK installation.
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	May need casing of sandy t installation.	urbidites prior to basement drilling/basement CORK
7	What abandonment procedures do you plan to follow:	None. Holes will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current. Typho	on season (June to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

#### Form 5 – Lithologic Summary



New

# iSAS/IODP Site Summary Forms: Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002



Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Reference Sites: Sampling and Measuring Inputs to the Seismogenic Zone
Date Form Submitted:	3/31/05
Site Specific Objectives with Priority (Must include general objectives in proposal)	One CORK hole with screened interval in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement. Reference site to characterize hydrology of Shikoku Basin strata and upper igneous crust where basement topography is relatively flat. Objectives are to document how stratigraphy, basement topography, and thermal structure affect the physical and hydrologic properties of subduction inputs.
List Previous Drilling in Area:	This site would be a return to NT1-06A, proposed as an alternate to NT1-02A from proposal 603A-Full2 (NantroSEIZE Reference Sites).

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT01-06A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 32 N	Min: 51.35	Jurisdiction:	Japan
Longitude:	Deg: 137 E	Min: 17.58	Distance to Land:	145 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Other	r ( )		
Priority of Site:	Primary:	Alt: X	Water Depth:	4200 m

# Section C: Operational Information

	S	ediments		Basement			
Proposed	990 m			40 m			
Penetration: (m)	What is the total sed. thickness? 990 m						
				Te	otal Penetra	tion: 1030	m
General Lithologies:	Silt and sand tur	bidites, ash layers	,	Basalt		·	
	hemipelagic muc	d and mudstone					
Coring Plan:	Limited coring a	s necessary to con	firm of	roon loor	ations for	COPKa	
(Specify or check)	e	5					
	1-2-3-APC VPC	C* XCB MDCB*	PCS []	RCB 🕅 Re		HRGB	elopment
Wireline Logging Plan:	Standard Tools	S	Special 7	Tools		LWD	
I lall.	Neutron-Porosity	Borehole Televiewer	Form	nation Fluid	Sampling 🗌		
	Litho-Density	Nuclear Magnetic		ehole Temper	<sup>rature</sup> 🖂	Resistivity-Gamma	<sup>Ray</sup> □
	Gamma Ray	Resonance Geochemical	_	essure nole Seismic		Acoustic	
				d measuremen			
	Resistivity	Side-Wall Core Sampling		ps from previo			
		Sampling	drillin	ıg.			
	Acoustic Formation Image		Othe	re ( )		Others ()	
Max.Borehole	Tormation image —	alue (For Riser	Oute	.5 (	)	Others ( )	
Temp. :	_	ming)					
Mud Logging:	Cuttings Sampling	0/					
(Riser Holes Only)	from	-		m,		m intervals	
	from	m to		m,		m intervals	
	B	asic Sampling In	tervals	: 5m			
Estimated days:	Drilling/Coring: 7 days	s Logging: 12 da	ys (casing	/CORK)	Total On-	Site: 19 days	
Future Plan:	Lon	gterm Borehole (	Theory	ation Pla	n/Ro-on	try Plan	
	CORK observato	•	JUSCIV	ation 1 17	111/ IXC-CII	ti y 1 ian	
<b>II 1</b> - /		, y					
Hazards/ Weather:		following List o			ards	What is your Wea window? (Prefere	
	Shallow Gas	omplicated Seabed Condition	Hydrotheri	nal Activity		period with the rea	
	Hydrocarbon S	oft Seabed	Landslide at	nd Turbidity Cu	urrent	April-July :	
	Shallow Water Flow	Currents	Methane Hy	drate		avoid typhoon season	
	Abnormal Pressure 🔲 Fi	ractured Zone	Diapir and N	Iud Volcano			
	Man-made Objects 🔲 Fa	ault	High Tempe	rature			
	H <sub>2</sub> S H	ligh Dip Angle	Ice Conditio	ns			
	CO <sub>2</sub>						

# Form 2 - Site Survey Detail

osal	#: 603A-Full		Site #:	: NT01-06A New Revised
	Data Type	SSP Requir- ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection		Yes	Primary Line(s)       :Location of Site on line (SP or Time only)         odkm03-103-1 SP2860       Crossing Lines(s): odkm03-ACA SP2175
2	Deep Penetration seismic reflection		Yes	Primary Line(s):       Location of Site on line (SP or Time only)         KR9806-1 nearby         Crossing Lines(s):         KR0211-S0 nearby
3	Seismic Velocity <sup>†</sup>		Yes	Stacking velocity and migration velocity from MCS lines. OBS data
4	Seismic Grid		Yes	
5a	Refraction (surface)		Yes	Two ship COP (maximum offset 20 km) obtained by JAMSTEC at the e of September, 2002.
5b	Refraction (near bottom)		Yes	OBS data by Nakanishi et al. (1997)
6	3.5 kHz		No	Location of Site on line (Time)
7	Swath bathymetry		Yes	Multi-narrow-beam data by JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		No	
8b	Side-looking sonar (bottom)		No	
9	Photography or Video		No	
10	Heat Flow		Yes	
11a	Magnetics		Yes	Compiled map published from AIST, Japan
11b	Gravity		Yes	Compiled map published from AIST, Japan
12	Sediment cores		No	
13	Rock sampling		No	
14a	Water current data			Available on JODC web page (http://www.jodc.go.jp)
14b	Ice Conditions			
15	OBS microseismicity		Yes	
16	Navigation		Yes	

# Form 3 - Detailed Logging Plan

			New Revis	ed 🦳
Proposal #: 603D-Full2		Site #: NT01-06A	Date Form Submitted: 3	3/31/05
Water Depth (m): 4200		Sed. Penetration (m): 990	Basement Penetration (1	m): 40
Do you need to use the conical s Are high temperatures expected Are there any other special requ If "Yes" Please describe re	at this si irements	te? Yes $\square$ No	$\stackrel{\boxtimes}{\boxtimes}$ n logged in previous phase	Se
What do you estimate the total l	ogging ti	me for this site to be: <u>12 days casing</u>	CORK install	Relevance
Measurement Type		Scientific Objective		(1=high, 3=Low)
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK			

# iSAS/IODP Site Summary Forms:

# iSAS/IODP Site Summary Forms: Form 4 – Pollu

# Form 4 – Pollution & Safety Hazard Summary

Please fill out information in all gray boxes

New	Revised		
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Proposal #: 603D-Full2		Site #: NT01-06A	Date Form Submitted: 3/31/05
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited coring to confirm monitorin installation	g intervals for CORK. CORK
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	Standard monitoring of C $_1$ to C $_n$ ; shallow casi sandy turbidite layers.	ng may be needed to stabilize shallow
7	What abandonment procedures do you plan to follow:	None. Will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (June to Oct	t.)
9	Summary: What do you consider the major risks in drilling at this site?	Kuroshio Current	

	ODP Site Su				New	Rev	ised
Proposal #	: 603D-Full2	Site #: NT	01-06A	Date Form S	Submitted: 3/31/05		
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
990	unconformity	Holocene to lower Miocene	1.6-1.9	Hemipelagite + volcanic ash + turbidites	backarc basin floor	36 m/My	Heterogeneous stratigraphy with irregular packets of turbidite sand
		20 Ma	2.0	volcanic sediment and basement basalt	backarc basin		

# Form 5 – Lithologic Summary

# 603D-Full2

## Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New Revised

Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites
Date Form Submitted:	Sept. 30, 2004 CORK monitoring for material properties, strain, geochemistry seaward of deep
Site Specific Objectives with Priority	riser hole (NT3-01). Monitoring intervals in clay-rich horizon (for strain) and in sandy horizon (for diffusive signal). Target depths will be refined based on prior drilling.
(Must include general objectives in proposal)	
List Previous Drilling in Area:	This site would be a return to NT2-04A which is proposed to be drilled in 603B-Full2.

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-04A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Kumano Basin off Kii
Latitude:	Deg: 33 N	Min: 23.4	Jurisdiction:	Japan
Longitude:	Deg: 136 E	Min: 34.6'	Distance to Land:	60 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Ot	her ( )		
Priority of Site:	Primary:x	Alt:	Water Depth:	1990 m

	Sediments						Basement			
Proposed	1400				40			Dusement		
Penetration:			2 1400							
(m)	What is the total	sed. thickn	less? 1400	m	1		Tota	1 Penetra	ution: 1440 m	
General Lithologies:	Forearc b	asin s	sediment	unco	onfo	rmably	1014	in r eneure		
	laying on a					2				
	Complex.									
Coring Plan: (Specify or check)	Limited cor	ing as i	necessary t	o coi	nfir	m screen	locati	ions fo	r CORKs	
(specify or enecty	1-2-3-APC	VPC*	]CB _IDCB	*	¢S	R <b>GB</b> Re	htry	H⊟B * Sv	stems Currently Under Developm	nent
Wireline Logging	Standard 7	Tools			Spec	cial Tools			LWD	
Plan:	Neutron-Porosity		Borehole Tele	viewer		Formation I	Fluid Sa	mpling 🗌	] Density-Neutron	
	Litho-Density		Nuclear Magn Resonance	etic		Borehole Ter & Pressure	mperatui	re	Resistivity-Gamma Ray	
	Gamma Ray		Geochemical			Borehole Se	ismic		Acoustic	
			Side-Wall Core	2		Limited measu	irements i	f needed to		
	Resistivity		Sampling	5		ll gaps from pr	evious (Pl	hase I)		
	Acoustic					tilling.				
	Formation Image					Others (		)	Others ( )	
Max.Borehole Temp. :	Expected value	For Rise	r Drilling) ≏C							
Mud Logging:	Cuttings Sam	npling II	- • /							
(Riser Holes Only)	from	n	m to			1	m, _		m intervals	
	from	n	m to		1	m,		m intervals		
								В	asic Sampling Intervals:	5m
Estimated days:	Drilling/Coring:	4	Logging	6 cas	ing/C	CORK instal	1 1	Fotal On-	Site: 10 days	
Future Plan:	-		vation Plan/Re-entry Plan		ın					
	Long term m	onitori	ng (CORK	(s).						
Hazards/										
Weather:	Please check fol Shallow Gas	0	<i>ist of Potentia</i> licated Seabed Co			rothermal Activ	vity		What is your Weather window? (Preferable	
	Silanow Gas		meated Seabed Ce		IIyu	notiterinai Activ	vity		period with the reasons	
	Hydrocarbon	Soft S	Seabed		Land	slide and Turbic	dity Curre		April-July:	
	Shallow Water Flow		ents		Meth	ane Hydrate			Avoid typhoon season	
	Abnormal Pressure	Fract	ured Zone		Diapi	r and Mud Volc	cano			
	Man-made Objects	🔲 Fault			High	Temperature				
	$H_2S$	High	Dip Angle		Ice C	onditions				
	CO <sub>2</sub>									

# Form 2 - Site Survey Detail

# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

'roposal #: 603D-Full			Site #: NT2-04A		Date Form Submitted: Sept. 30, 2004		
	Data Type	SSP Requir- ements	Exists In DB	Details of available data	and data that are still to be collected		
1	High resolution seismic reflection		Yes	Primary Line(s)       :Location of Site on line (SP or Time only)         JAMSTEC Line 1       Feb. 2003)         Crossing Lines(s):       JAMSTEC Line (Feb. 2003)			
2	Deep Penetration seismic reflection		Yes	Primary Line(s): KR0108-4 Crossing Lines(s):	Location of Site on line (SP or Time only)		
3	Seismic Velocity <sup>†</sup>		Yes	Stacking velocity and migration v	velocity from MCS lines. OBS data.		
4	Seismic Grid		Yes				
5a	Refraction (surface)		Yes	Two ship COP (maximum offset	20 km) obtained by JAMSTEC.		
5b	Refraction (near bottom)		Yes	OBS data by Nakanishi et al. (199	97)		
6	3.5 kHz				Location of Site on line (Time)		
7	Swath bathymetry		Yes	Multi-narrow-beam data by JAM	STEC R/V Yokusuka.		
8a	Side-looking sonar (surface)		Yes	Some data collected using IZANA	AGI side scan sonar.		
8b	Side-looking sonar (bottom)		No				
9	Photography or Video		Yes	Taken by JAMSTEC submersible	?S.		
10	Heat Flow		Yes.				
11a	Magnetics		Yes	Compiled map published from Al	IST, Japan.		
11b	Gravity		Yes	Compiled map published from Al	IST, Japan.		
12	Sediment cores		Yes	Gravity and piston cores.			
13	Rock sampling		No				
14a	Water current data			Available on JODC web page (htt	tp://www.jodc.go.jp)		
14b	Ice Conditions						
15	OBS microseismicity		Yes				
16	Navigation		Yes				
17	Other						

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

# Form 3 - Detailed Logging Plan

# **IODP Site Summary Forms:**

New	Revised

Proposal #: 603D-Full	Site #: NT2-04A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 1990	Sed. Penetration (m): 1400	Basement Penetration (m): 40

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗆	No	•
Are high temperatures expected at this site?	Yes 🗆	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	•
If "Yes" Please describe requirements: No logging planned. S	ite will have bee	n logged in	previous phase.

CORK installation only

What do you estimate the total logging time for this site to be: 6 days (install casing/CORK)

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

# Form 4 – Pollution & Safety Hazard Summary

# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New	Revised
New	Revised

P	roposal #: 603D-Full	Site #: NT2-04A		Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited co installation	ring to confirm monitori	ng intervals for CORK to 1450 m. CORK
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None		
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None		
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile sho	ws BSR.	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No		
6	What "special" precautions will be taken during drilling?	May need casing to to	o stabilize shallow sedim	ents.
7	What abandonment procedures do you plan to follow:	None. Holes will be (	CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio curr	ent. Typhoon season (Jun	ne to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current, instability of	shallow sediments.	

# Form 5 – Lithologic Summary

		_,			New	Revise	d	
Proposal #	: 603D-Full	Site #: NT	2-04A	Date Form	Submitted: Sept. 30,	, 2004		
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environme nt	Avg. rate of sed. accum. (m/My)	Comments	
seafloor 1400	Unconformity	Holocen e to Late tertiary	1.5-2	Turbidites and hemipelagic sediments	Forearc basin sediments			
1450	Total depth							

New

IOD			<b>B-Full2</b>				
New New	Revised Addendum						
Please fill out infor	mation in all gray boxes Al	bove For O <u>f</u>	ficial Use Only				
Title:	: NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation						
Proponent(s):	Masataka Kinoshita, Kevin Brown, Demian Saffer, Pierre Henry, Fred Chester, Tadanori Goto, Sean P. S. Gulick, Tetsuro Hirono, Hisao Ito, Aitaro Kato, Gaku Kimura, Achim Kopf, Gregory Moore, J. Casey Moore, Yasuyuki Nakamura, Jin-Oh Park, Saneatsu Saito, Susan Schwartz, Masanao Shinohara, Ralph Stephen, Harold Tobin, Kohtaro Ujiie, Urumu Tsunogai, and Makoto Yamano						
Keywords: (5 or less)	Seismogenic zone, splay fault, tsunamigenesis, fault mechanics, fluid flow	Area:	Southwestern Japan margin				

 $D_{1} = \frac{1}{2} + \frac{1}{2$ 

Contact Information:

Contact Person:	Masataka Kinoshita					
	Deep-sea Research Department					
Organization:	Japan Marine Science and Technology Center					
Address	2-15 Natsushima, Yokosuka 237-0061 JAPAN					
Tel.:	+81-46-867-9323 Fax: +81-46-867-9315					
E-mail:	masa@jamstec.go.jp					
	Permission to post abstract on iSAS Web site: Yes No					

Abstract: (400 words or less)

The principal goal of NanTroSEIZE is to understand the mechanics of seismogenesis and rupture propagation along subduction plate boundary faults as stated in the accompanying CDP. At Nankai, large out-of-sequence-thrust faults ("mega-splays") that branch from the décollement are common, first order structural elements of the margin and appear continuous for several 10's of km along strike. These faults offset recent slope basin sediments, are characterized by seafloor scarps, and are commonly associated with active fluid venting. Off the Kii peninsula, such a mega-splay lies within the 1944 Tonankai coseismic rupture area estimated from tsunami and seismic waveform inversions; inversions cannot distinguish splay fault slip from décollement slip. Accordingly, both the décollement zone and the splay fault system represent necessary primary fault targets to address seismogenic zone processes.

The goal of this proposal is to (1) characterize the magnitude and nature of strain accumulation and slip along mega-splays off the Kii peninsula, and (2) sample and instrument the mega-splay fault system at a range of P-T conditions from ~1-3.5 km bsf. Specifically, this proposal is aimed at testing 5 key hypotheses: (1) The megasplay is a significant locus of plate boundary slip, slips in seismogenic events, and is currently locked; (2) The mega-splay is part of a weak plate boundary fault system and slips at low resolved shear stress; (3) Changes in physical and chemical properties of the fault zone with increasing temperature and pressure cause slip along the mega-splay to undergo a transition from aseismic to seismic slip; (4) The mega-splay is hydrologically connected to the seismogenic décollement zone at great depths impacting its mechanical and chemical state, and (5) Physical properties, chemistry, and state of the fault zone change systematically during the interseismic period.

Proposed drilling includes (1) coring of 1 site in the Kumano Basin, focused on characterizing the tectonic history of the plate above the mega-splay faults, and (2) intersection of the active mega-splay fault system at three depths from ~1 to ~3.5 km bsf (down dip evolutionary studies). We propose installation of long-term borehole monitoring instruments at several of the sites. These borehole observatories, along with surface arrays of measurements, regional geodetic and seismic monitoring both on land and via offshore cabled observatories, will provide critical data toward understanding the slip distribution, temporal nature, and controlling mechanisms of seismogenic faulting along the plate boundary system.

# 603B-Full2

#### Scientific Objectives: (250 words or less)

To test the five principal hypotheses (above), 5 holes will be drilled utilizing a dense net work of 2D and 3D seismic reflection data. Comprehensive programs of coring, logging and downhole measurements will target the insitu mega-splay and wall-rock structural architecture, fault properties, stress state, fluid pressure, and temperature. Post-drilling laboratory studies will include the fluid chemistry, veining/diagenesis, mechanical properties, and fault micro-fabric relationships. NT2 sites 1 through 3 will target the mega-splay fault at depths between ~ 1 and 3.5 km. They will assess evolutionary changes in all the various parameters over a temperature range of 20°C through ~100+ °C (Hypotheses 2 and 3). In addition, at NT2-01A and B sites (1km sites), closely-spaced, paired holes will allow extensive cross hole hydrologic and geophysical studies of the shallow fault-zone. Ultimately the 3.5 km site. NT2-3, will also be used for similar cross hole studies during the Phase 3 program. These cross hole tests, together with the fluid chemistry and vein studies, will constrain the down dip hydrologic connectivity of the fault system (Hypothesis 4). The NT2-04 site in the Kumano Basin, together with additional geological investigations along the splays fault traces, will allow us to constrain the mega-splay faulting activity (Hypothesis 1). At a minimum, Sites NT2-01A and NT2-03A will be instrumented for studies of the fault locking patterns (geodetic measurements), and long-term interactions of pore pressure, temperature, tilt and strain, seism city, fluid chemistry, and electrical properties during this interseismic period.

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

LWD (RAB), DVTP-P, hydrofracturing test (wireline packer test), VSP. Geodetic (strain/tilt), seismic and hydrologic (P,T) sensors and osmotic sampler are installed for a long-term borehole observatory at NT2-03A. Cross-well hydrologic (pumping / fluid injection test) and electrical propertiers experimentsare planned at NT2-01A and B.

			posed SI			I
~		Water	Pe	netration (	m)	
Site Name	Position	Depth (m)	Sed	Bsm	Total	Brief Site-specific Objectives
NT2-01A NT2-01B	33°13.0'N, 136°41.4'E	2470	1000	0	1000	Characterization of active splay fault and fluid flow regime by core sampling, logging, cross- hole experiments and long- term monitoring
NT2-02A	33°14.0'N, 136°40.8'E	2080	2000	0	2000	Study the progressive change in the fault properties by intersecting the splay fault at intermediate depth of 2km
NT2-03A	33°15.9'N, 136°39.5'E	2240	3500	0	3500	Study the progressive change in the fault properties by intersecting the splay fault at intermediate depth of 3.5km
NT2-04A	33°23.4'N, 136°34.6'E	1990	1400	300	1700	Total history of the splay fault through continuous coring the Kumano basin sediments and pilot drilling for riser platform
NT2-06A,B	33°06.6'N, 136°31.3'E	2990	1000	0	1000	Alternate site for NT2-01A,B
NT2-07A	33°08.6'N, 136°30.0'E	2260	2000	0	2000	Alternate site for NT2-02A
NT2-08A	33°10.8'N, 136°28.6'E	2170	3500	0	3500	Alternate site for NT2-03A

Proposed Sites:

#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002

#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation
Date Form Submitted:	Oct. 1, 2003
	Characterization of active splay fault and fluid flow regime by core sampling, logging, cross-
	hole experiments and long-term monitoring.
Site Specific	Focuses are placed on mechanical and hydrological properties (e.g. strength, pore pressure,
Objectives with Priority	permeability, porosity), fluid budget, origin of the fluid, detection of episodic flow.
(Must include general objectives in proposal)	Borehole long-term observatory for hydrogeological properties is planned as well as cross-
	hole experiment.
	Priority:2
List Previous Drilling in Area:	None

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-01A/B	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	/in: 13.0 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136 N	1in: 41.4 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary: A	lt:	Water Depth:	2.470 m



New

Revised

# Section C: Operational Information

			~									
	Sediments						Basement					
Proposed			1000	)								
Penetration:								0				
(m)	What is the total sed. thickness? >3,000 m											
	ſ							То	tal Penetr	ation:	700	m
General Lithologies:	Upper secti	on c	of spla	y faults	, con	sisti	ing of					
	deformed, o	com	pacted	l turbidi	te							
			-									
Coring Plan:												
(Specify or Circle)	1-2-3-APC	MDG	. 🗖 एव		an d	DCI				hrgb		
	1-2-3-APO	VPC*	· L XC	RE MD	CB₄⊟	PC:	S 🗖 KCB	Re-e		HKGB stems Currently	v Under Dev	elopment
Wireline Logging	Standard 7	Fools	2			Sneo	cial Tool	ç			LWD	1
Plan:	Neutron-Porosity			orehole Tel		-	Formation		mpling <b>F</b>	Density-l	Neutron	
	Litho-Density			iclear Magr			Borehole		· -	Resistivit	y-Gamma	Rav 🖌
		Z		sonance			& Pressure		ture 🗸		,	
	Gamma Ray		Geo	ochemical			Borehole	Seismic	C	Acoustic		
	Resistivity		Sid	e-Wall Cor	e							
			Sar	npling								
	Acoustic Formation Image											
	e						Others (		)	Others (F	MI	)
Max.Borehole	Expected value		Riser Dr °C	illing)								
Temp. :	20		C									
Mud Logging:	Cuttings San	nplin	g Inter	vals								
(Riser Holes Only)	fro		200	m	to	-	300	m	5	m	intervals	
				_				m,				
	fro	m _	700	m	to		900	m,	5	m	intervals	
									i	Basic Sampl	ing Interv	als: 5m
Estimated days:	Drilling/Coring:	15		Logging	: 5				Total On	-Site: 40		
Future Plan:	Longterm Boreh	ole O	bservati	ion Plan/R	Re-entr	v Pla	n					
i uturo i fuit.	Geodetic							c (P.T	) senso	rs with ca	sing	
	(20 da		,	, ~		J		(-,-	,			
	Cross-hole	<b>.</b> /	norima	onte (5 d	dave)							
Hazards/												a .1
Weather:	Please check for				Haza					wna window? (I	t is your V Preferable	
weather.	Shallow Gas		Complicate Condition	ed Seabed		Нус	irothermal A	ctivity			with the re	· .
	YY 1 1	_				¥ 1	1.1 175			May – A		,
	Hydrocarbon		Soft Seabe	d			slide and Tur	-	rrent		n risk i	n late
	Shallow Water Flow		Currents		$\mathbf{V}$	Met	hane Hydrate	;		August t		ember,
										then low		
	Abnormal Pressure		Fractured	Zone		Diapi	r and Mud Vo	olcano		November	tł	rough
	Man-made Objects	-	Fault		-A				_	March)		
					Z	High	Temperature					
	H.C.	_	IL.I.D.	A	_	т. <i>с</i>			_			
	H <sub>2</sub> S		High Dip /	Angle		Ice C	onditions					
		_										
	CO <sub>2</sub>											

Site #: NT2-01A/B

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised 🗸

Date Form Submitted: Oct. 1, 2003

SSP Requir-Exists Data Type In DB Details of available data and data that are still to be collected ements Primary Line(s) :Location of Site on line (SP or Time only) 1 JAMSTEC Line-I (Feb. 2003) High resolution YES seismic reflection Crossing Lines(s): JAMSTEC Line-9 (Feb. 2003) Primary Line(s): 2 Location of Site on line (SP or Time only) KR0108-4 **Deep Penetration** YES seismic reflection Crossing Lines(s): YES 3 Seismic Velocity<sup>†</sup> Stacking velocity and migration velocity from MCS lines. OBS data also available. Seismic Grid YES Acquired by JAMSTEC in Feb. 2003 4 Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. Refraction YES 5a (surface) 2002 Refraction YES OBS data by Nakanishi et al. (1997) 5b (near bottom) Location of Site on line (Time) 3.5 kHz NO 6 7 Multi-narrow beam data by JAMSTEC R/V Yokosuka Swath YES bathymetry Side-looking 8a YES Some data collected using IZANAGI side scan sonar sonar (surface) NO 8b Side-looking sonar (bottom) 9 Photography YES Taken by submersibles of JASMTEC or Video 10 Heat Flow YES Obtained from surface ship, submersibles, long-erm monitoring and BSR Magnetics YES Compiled map published from AIST, Japan 11a YES Compiled map published from AIST, Japan 11b Gravity 12 Sediment cores YES Gravity and piston cores 13 Rock sampling YES Taken by submersible and ROV Water current data YES Available on JODC web page (http://www.jodc.go.jp/) 14a Ice Conditions 14b 15 OBS Being processed now microseismicity Navigation YES 16 17 Other

SSP Classification of Site:SSP Watchdog:Date of Last Review:SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

roposal #:

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

Proposal #:	osal #: Site #: NT2-01A/B			Date Form Submitted: Oct. 1, 2003		
Water Depth (m): 2470	Sed. Penetration (m): 100	00	Basement Penetration (m): 0			
				•		
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$		
Are high temperatures expected at this si	te?	Yes	No	✓		
o I						
Are there any other special requirements	for logging at this site?	Yes 🗆	No	$\checkmark$		

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	Cross-hole hydrologic and electrical experiment.RABHydrofracturing, Packer injection testCORK and Geodetic borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

Т

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

P	roposal #:	Site #: NT2-01A/B	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusal.	RCB to 1000 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in eas program.	stern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault zo	ne, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (J	une – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #: Site #: NT2-01A/B			Date Form S	Submitted: Oct. 1, 2	003		
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
300	Unconformity fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

#### Form 1 - General Site Information

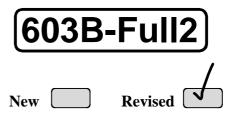
Please fill out information in all gray boxes Revised 7 M arch 2002

#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation
Date Form Submitted:	Oct. 1, 2003
	Study the progressive change in the fault properties by intersecting the splay fault at
Site Specific Objectives with Priority	intermediate depth of 2km. Integration with NT2-01A and NT2-03A are essential.
(Must include general objectives in proposal)	Priority:2
List Previous Drilling in Area:	None

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-02A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 14.0 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 40.8 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2,080 m



# Section C: Operational Information

	Sediments						Basement			
Proposed		2	000							
Penetration: (m)	What is the total sed. thickness? $>3,000$ m						0			
(111)	what is the total a	seu. uneki	1033. 23,000		1	T	otal Penetra	ation: 1	,700	m
General Lithologies:	Slope basin									
	section acros	s the s	play fault,	and	under	rlying				
	deformed, co	mpact	ed turbidit	e						
Coring Plan: (Specify or Circle)	1-2-3-APC	VPC*	XCB MD	св∗□	PCS [	🗆 RCB 🗹 Re		HRGB	Under Devel	opment
Wireline Logging	Standard T	òols			Specia	al Tools			LWD	
Plan:	Neutron-Porosity		Borehole Tel			ormation Fluid S		Density-N	eutron	
	Litho-Density	✓	Nuclear Mag Resonance	netic		Borehole Temper	ature 🗸	Resistivity	-Gamma R	ay 🖌
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seismi	c 🗌	Acoustic		
	Resistivity		Side-Wall Cor Sampling	e						
	Acoustic									
	Formation Image				0	thers (	)	Others (FM	4I	)
Max.Borehole Temp. :	Expected value ( 40-		°C							
-			- 1							
Mud Logging: (Riser Holes Only)	Cuttings Sam									
(	fror			to		(			ntervals	
	fror	n <u>17</u>	<u>00</u> m	to	19	<u>00</u> m,	5	m ir	ntervals	
							<i>I</i>	Basic Samplin	g Interval	ls: 5m
Estimated days:	Drilling/Coring:		Logging				Total On-	-Site: 35		
Future Plan:	Longterm Boreh	ole Obse	rvation Plan/H	Re-entr	y Plan					
Hazards/	Please check foli	owing L	ist of Potentia	Haza	rda			What	is your We	pather
Weather:	Shallow Gas	-	olicated Seabed	i IIuzui		thermal Activity		window? (Pr	eferable p	period
		Cond			,				ith the red	isons)
	Hydrocarbon	_	Seabed			le and Turbidity Cu	irrent	May – Au (typhoon		late
	Shallow Water Flow		rents	Z	Methan	e Hydrate		August to then low		mber,
	Abnormal Pressure	Fract	ured Zone		Diapir a	nd Mud Volcano		November	-	ough
	Man-made Objects	Fau Fau	lt	V	High Ter	mperature		March)		
	$H_2S$	High	Dip Angle		Ice Conc	litions				
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised 🗸

roposal #: Site #: NT2-02A Date Form Submitted: Oct. 1, 2003 SSP Requir-Exists Data Type In DB Details of available data and data that are still to be collected ements Primary Line(s) :Location of Site on line (SP or Time only) 1 JAMSTEC Line-I (Feb. 2003) High resolution YES seismic reflection Crossing Lines(s): JAMSTEC Line-9 (Feb. 2003) Primary Line(s): 2 Location of Site on line (SP or Time only) KR0108-4 **Deep Penetration** YES seismic reflection Crossing Lines(s): YES 3 Seismic Velocity<sup>†</sup> Stacking velocity and migration velocity from MCS lines. OBS data also available. Seismic Grid YES Acquired by JAMSTEC in Feb. 2003 4 Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. Refraction YES 5a (surface) 2002 Refraction YES OBS data by Nakanishi et al. (1997) 5b (near bottom) Location of Site on line (Time) 3.5 kHz NO 6 7 Multi-narrow beam data by JAMSTEC R/V Yokosuka Swath YES bathymetry Side-looking 8a YES Some data collected using IZANAGI side scan sonar sonar (surface) NO 8b Side-looking sonar (bottom) 9 Photography YES Taken by submersibles of JASMTEC or Video 10 Heat Flow YES Obtained from surface ship, submersibles, long-erm monitoring and BSR Magnetics YES Compiled map published from AIST, Japan 11a YES Compiled map published from AIST, Japan 11b Gravity 12 Sediment cores YES Gravity and piston cores 13 YES Taken by submersible and ROV Rock sampling Water current data YES Available on JODC web page (http://www.jodc.go.jp/) 14a Ice Conditions 14b 15 OBS Being processed now microseismicity Navigation YES 16 17 Other

SSI Comments.

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

 $\checkmark$ 

Proposal #:	Site #: NT2-02A		Date Form Submitted: Oct. 1, 2003		
Water Depth (m): 2080	Sed. Penetration (m): 200	00	Basement Penetration (m): 0		
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$	
Are high temperatures expected at this si	te?	Yes	No	✓	
The high temperatures expected at this si			110		
Are there any other special requirements	for logging at this site?	Yes 🗆	No	$\checkmark$	

\_\_\_\_

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB preferred	2

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

P	roposal #:	Site #: NT2-02A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusa	1.RCB to 2000 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in en program.	astern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault z	zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon	(June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #		Site #: NT	2-02A	Date Form S	Submitted: Oct. 1, 2	003	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
400 1800	Unconformity	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		



#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002 New



#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation							
Date Form Submitted:	Oct. 1, 2003							
	Study the progressive change in the fault properties by intersecting the splay fault at							
-	intermediate depth of 3.5km. Integration with NT2-01A and NT2-02A are essential.							
Objectives with Priority (Must include general objectives in proposal)	Priority:1							
List Previous Drilling in Area:	None							

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-03A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 15.9 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 39.5 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2,240 m

# Section C: Operational Information

	Sediments						Basement			
Proposed			3500				0			
Penetration: (m)	What is the total	sed. thic	kness? >3,000	n	n		0			
( )						1	Total Penetra	ation: 2,200 m		
General Lithologies:	Slope basin sediment on top, fractured									
	section acros		- ·		unde	rlying				
Coring Plan:	deformed, co Continuous	-			d wi	th ordinary		aging		
(Specify or Circle)			g пау ве те ⊐ хсв 🗹 мо	-		•		00 0		
	1-2-3-APC	VPC*	⊥ XCBMZI MD	CB*	PCS	L RCB L Re		HRGB sstems Currently Under Development		
Wireline Logging Plan:	Standard 7	Fools			Speci	al Tools		LWD		
Flaii.	Neutron-Porosity		Borehole Tel			Formation Fluid		Density-Neutron		
	Litho-Density	Z	Nuclear Mag Resonance	netic		Borehole Temper	rature	Resistivity-Gamma Ray		
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seism	ic 🗌	Acoustic		
	Resistivity	Z	Side-Wall Con Sampling	re						
	Acoustic		Bamping							
	Formation Image				C	Others (	)	Others (FMI )		
Max.Borehole	Expected value		ser Drilling) °C							
Temp. :		-100								
Mud Logging:	Cuttings Sampling Intervals									
(Riser Holes Only)	from <u>1700</u> m to <u>1900</u> m, <u>5</u> m intervals									
	fro	m <u> </u>	<u>3300</u> m	to	35	<u>500</u> m,	5	m intervals		
							1	Basic Sampling Intervals: 5m		
Estimated days:	Drilling/Coring:	130	Logging	g: 20			Total On-	-Site: 250		
Future Plan:	Longterm Boreh									
	Geodetic	strai	n/tilt), seism	ic an	d hyc	lrologic (P,	T) sensor	rs (100 days?)		
Hazards/	Please check for	lowing	List of Potentia	l Haza	rds			What is your Weather		
Weather:	Shallow Gas		mplicated Seabed	i 11uzu		othermal Activity		window? (Preferable period		
			ndition					with the reasons)		
	Hydrocarbon	_	ft Seabed			de and Turbidity C	urrent	May – August (typhoon risk in late		
	Shallow Water Flow		furrents	Ø	Metha	ne Hydrate		August to September, then low pressure in		
	Abnormal Pressure	Fr	actured Zone		Diapir a	and Mud Volcano		November through		
	Man-made Objects		ault	☑	High Te	emperature		March)		
	$H_2S$	Hi	gh Dip Angle		Ice Con	nditions				
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised

posal #	<i>t</i> :		Site #:	NT2-03A	Date Form Submitted: Oct. 1, 2003
	Data Type	SSP Requir- ements	Exists In DB	Details of avail	lable data and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s) JAMSTEC Line-I (Feb. 2003) Crossing Lines(s): JAMSTEC	
2	Deep Penetration seismic reflection		YES	Primary Line(s): KR0108-4 Crossing Lines(s):	Location of Site on line (SP or Time
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and mig OBS data also available.	ration velocity from MCS lines.
4	Seismic Grid		YES	Acquired by JAMSTEC ir	n Feb. 2003
5a	Refraction (surface)		YES	Two-ship COP (max. off 2002	fset 20km) was obtained by JAMSTEC in S
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et	al. (1997)
6	3.5 kHz		NO		Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data b	y JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using	IZANAGI side scan sonar
8b	Side-looking sonar (bottom)		NO		
9	Photography or Video		YES	Taken by submersibles of	
10	Heat Flow		YES	Obtained from surface shi	p, submersibles, long-erm monitoring and BSR
11a	Magnetics		YES	Compiled map published f	from AIST, Japan
11b	Gravity		YES	Compiled map published t	from AIST, Japan
12	Sediment cores	1	YES	Gravity and piston cores	
13	Rock sampling		YES	Taken by submersible and	
14a	Water current data		YES	Available on JODC web p	bage (http://www.jodc.go.jp/)
14b	Ice Conditions				
15	OBS microseismicity			Being processed now	
16	Navigation		YES		
17	Other	1	1		

SSP Classification of Site:SSP Watchdog:Date of Last Review:SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

Proposal #:	Site #: NT2-03A		Date For	m Submitted: Oct. 1, 2003	
Water Depth (m): 2240	Sed. Penetration (m): 350	00	Basement Penetration (m): 0		
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$	
Are high temperatures expected at this si	te?	Yes	No	✓	
The high temperatures expected at this si			110		
Are there any other special requirements	for logging at this site?	Yes	No	$\checkmark$	

\_\_\_\_

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB, VSP Hydrofracturing, Packer injection test CORK and Geodetic/Seismic borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

Т

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

 $\checkmark$ 

Р	roposal #:	Site #: NT2-03A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusa	1.RCB to 3500 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in e program.	astern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault a	zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon	(June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #:		Site #: NT2-03A		Date Form S	Submitted: Oct. 1, 2		
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
300 1800 3400	Unconformity Fault fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002 New Revise

603B-Full2



#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation
Date Form Submitted:	Oct. 1, 2003
Site Specific Objectives with Priority (Must include general objectives in proposal)	Total history of the splay fault system through continuous coring the Kumano foreac basin sediments: Objective 1 is the primary target of this site. Total history of the splay fault system is depicted by integrating the results from NT1b-05A as a reference for this site. Drilling the underlying acoustic basement is planned to clarify the structure of pst accretionary complex, but is also used as a pilot drilling for the future riser-based proposal. Priority:4
List Previous Drilling in Area:	None

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-04A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 23.4 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 34.6 E	Distance to Land:	37 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	1,990 m

# Section C: Operational Information

	Sediments						Basement			
Proposed		,400					200			
Penetration: (m)	What is the total s	ness? 1,400	n	1			300			
			,			To	otal Penetra	ation: 1	,700 m	
General Lithologies:	Forearc basin					•				
	laying on a			nt o	f Te	ertially				
Coring Dian	accretionary of	compl	ex							
Coring Plan: (Specify or Circle)	1-2-3-APC	/PC* 🗆	XCB MD	Св∗□	PCS	🗆 RCB 🗹 Re-		HRGB	Under Developme	
Wireline Logging	Standard Te	ools			Spec	ial Tools		]	LWD	
Plan:	Neutron-Porosity	✓	Borehole Tel		r 🔲	Formation Fluid S		Density-N	eutron	
	Litho-Density	Z	Nuclear Magi Resonance	netic		Borehole Tempera & Pressure	ature 🗸	Resistivity-	Gamma Ray 🗖	
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seismic	° [	Acoustic		
	Resistivity	Z	Side-Wall Cor Sampling	e						
	Acoustic		Sumpling							
	Formation Image					Others (	)	Others (FM	ſI)	
Max.Borehole Temp. :	Expected value (1	For Rise	r Drilling) °C							
-	70		_							
Mud Logging: (Riser Holes Only)	Cuttings Sam									
(10000 110000 0100))	_		m	to		m,			ntervals	
	from	1 <u> </u>	m	to		m,		m ir	ntervals	
Estimated days									g Intervals: 51	
Estimated days:	Drilling/Coring:		Logging				Total On	n-Site: 18		
Future Plan:	Longterm Boreho	ole Obse	rvation Plan/H	Re-entr	y Plan	ı				
Hazards/	Please check follo	owing L	ist of Potentia	l Hazai	rds			What	s your Weathe	
Weather:	Shallow Gas	Com	plicated Seabed			rothermal Activity	_	window? (Pr	eferable perio	
	l	Cond						May – Au	ith the reasons	
	Hydrocarbon [	_	Seabed			lide and Turbidity Cu	rrent		risk in lat	
	Shallow Water Flow		Tents	Z	Wieur	ane Hydrate	Z	August to then low		
	Abnormal Pressure [	Frac	tured Zone		Diapir	and Mud Volcano		November	throug	
	Man-made Objects	Fau Fau	lt	Z	High 7	Temperature		March)		
	H <sub>2</sub> S [	High	Dip Angle		Ice Co	nditions				
	CO <sub>2</sub> [									

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised

osal #	•		Site #:	NT2-04ADate Form Submitted: Oct. 1, 2003
	Data Type	SSP Requir- ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s)       :Location of Site on line (SP or Time JAMSTEC Line-I (Feb. 2003)         Crossing Lines(s):       JAMSTEC Line (Feb. 2003)
2	Deep Penetration seismic reflection		YES	Primary Line(s):     Location of Site on line (SP or Time KR0108-4       Crossing Lines(s):     Image: Crossing Lines(s)
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and migration velocity from MCS lines. OBS data also available.
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb. 2003
5a	Refraction (surface)		YES	Two-ship COP (max. offset 20km) was obtained by JAMSTEC in \$2002
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (1997)
6	3.5 kHz		NO	Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data by JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using IZANAGI side scan sonar
8b	Side-looking sonar (bottom)		NO	
9	Photography or Video		YES	Taken by submersibles of JASMTEC
10	Heat Flow		YES	Obtained from surface ship, submersibles, long-erm monitoring and BSR
11a	Magnetics		YES	Compiled map published from AIST, Japan
11b	Gravity		YES	Compiled map published from AIST, Japan
12	Sediment cores		YES	Gravity and piston cores
13	Rock sampling		YES	Taken by submersible and ROV
14a	Water current data		YES	Available on JODC web page (http://www.jodc.go.jp/)
14b 15	Ice Conditions OBS microseismicity			Being processed now
16	Navigation		YES	
	Other	+		

SSP Classification of Site: SSP Watchdog: Date of Last Review: SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised 1

Proposal #:	Site #: NT2-04A		Date For	m Submitted: Oct. 1, 2003	
Water Depth (m): 1990	Sed. Penetration (m): 140	00	Basement Penetration (m): 300		
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$	
Are high termoretures expected at this si	ta)	Vac.	No	_1	
Are high temperatures expected at this si	te?	Yes	No	$\checkmark$	
Are there any other special requirements	for logging at this site?	Yes	No	$\checkmark$	
If "Yes" Please describe requireme	nts:				

\_\_\_\_\_

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP		

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

Τ

#### Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

Р	roposal #:	Site #: NT2-04A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusa	l.RCB to 1700 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in e program.	astern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault z	zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon	(June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

#### Form 5 – Lithologic Summary

New

Revised

Proposal #:		Site #: NT2-04A		Date Form Submitted: Oct. 1, 2003			
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
1400	Unconformity	Holoc ene to late Tertial y	1.5- 2.0km/s	Turbidite & hemipelagic sediments	Forearc basin		Fan deposits?

#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002 New

603B-Full2



#### Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation					
Date Form Submitted:	Oct. 1, 2003					
	Characterization of active splay fault and fluid flow regime by core sampling, logging, cross-					
	hole experiments and long-term monitoring.					
Site Specific Objectives with Priority (Must include general objectives in proposal)	Focuses are placed on mechanical and hydrological properties (e.g. strength, pore pressure, permeability, porosity), fluid budget, origin of the fluid, detection of episodic flow. Borehole long-term observatory for hydrogeological properties is planned as well as cross-hole experiment.					
	Priority:3 (Alternate site for NT2-01A/B)					
List Previous Drilling in Area:	None					

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-06A/B	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 06.6 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 31.3 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2.990 m

# Section C: Operational Information

	Sediments							Basement		
Proposed	1000						0			
Penetration: (m)	What is the total sed. thickness? $>3,000$ m						0			
							To	tal Penetra	tion: 70	0 m
General Lithologies:			f splay faults acted turbid		sisti	ng of				
Coring Plan: (Specify or Circle)	1-2-3-APO VPC* □ XCB MDCB*□ PCS RCB Re-entry HRGB□ * Systems Currently Under Developm							nder Development		
Wireline Logging	Standard 7	Fools			Spec	ial Tool	s			WD
Plan:	Neutron-Porosity Litho-Density	<b>V</b>	Borehole Te Nuclear Mag Resonance		r 🗖	Formation Borehole ' & Pressure	Temperat		Density-Neu Resistivity-O	itron 🗹 Gamma Ray
	Gamma Ray	<b>V</b>	Geochemical			Borehole	Seismic		Acoustic	
	Resistivity		Side-Wall Con Sampling	re						
	Formation Image					Others (		)	Others ( FMI	[ )
Max.Borehole Temp. :	Expected value20		iser Drilling) °C							
Mud Logging:	Cuttings Sampling Intervals									
(Riser Holes Only)	fro	m	<u>200</u> m	to	3	800	m,	5	m int	ervals
	fro	m	<u>700</u> m	to	9	000	m,	5	m int	ervals
								Б	Basic Sampling	Intervals: 5m
Estimated days:	Drilling/Coring:	: 15	Logging	g: 5				Total On-	Site: 40	
Future Plan:	(20 da	(strai ys)	n/tilt), seism eriments (5	ic an	d hy		c (P,T	) sensor	rs with casi	ng
Hazards/	Please check for	•							What is	your Weather
Weather:	Shallow Gas		omplicated Seabed ondition		Hyd	rothermal Ac	ctivity		wit	ferable period h the reasons)
	Hydrocarbon	□ s	oft Seabed		Lands	lide and Turt	bidity Curr	rent	May – Aug	gust risk in late
	Shallow Water Flow		Currents	<b>V</b>	Meth	ane Hydrate			August to	September, pressure in
	Abnormal Pressure	D F	ractured Zone		Diapin	and Mud Vo	olcano		November	through
	Man-made Objects	4	Fault	Z	High	Femperature			March)	
	H <sub>2</sub> S	D F	ligh Dip Angle		Ice Co	onditions				
	CO <sub>2</sub>									

Site #: NT2-06A/B

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

roposal #:

New

Revised

Date Form Submitted: Oct. 1, 2003

1				
	Data Type	SSP Requir- ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s)       :Location of Site on line (SP or Time only)         JAMSTEC Line-I (Feb. 2003)       Crossing Lines(s):         JAMSTEC Line-9 (Feb. 2003)
2	Deep Penetration seismic reflection		YES	Primary Line(s): KR0108-4 Crossing Lines(s):
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and migration velocity from MCS lines. OBS data also available.
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb. 2003
5a	Refraction (surface)		YES	Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. 2002
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (1997)
6	3.5 kHz		NO	Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data by JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using IZANAGI side scan sonar
8b	Side-looking sonar (bottom)		NO	
9	Photography or Video		YES	Taken by submersibles of JASMTEC
10	Heat Flow		YES	Obtained from surface ship, submersibles, long-erm monitoring and BSR
11a	Magnetics		YES	Compiled map published from AIST, Japan
11b	Gravity		YES	Compiled map published from AIST, Japan
12	Sediment cores		YES	Gravity and piston cores
13	Rock sampling		YES	Taken by submersible and ROV
14a	Water current data		YES	Available on JODC web page (http://www.jodc.go.jp/)
14b	Ice Conditions			
15	OBS microseismicity			Being processed now
16	Navigation		YES	
17	Other			

 SSP Classification of Site:
 SSP Watchdog:
 Date of Last Review:

 SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

Proposal #:	Site #: NT2-06A/B		Date For	m Submitted: Oct. 1, 2003	
Water Depth (m): 2990	Sed. Penetration (m): 100	00	Basement Penetration (m): 0		
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes	No	$\checkmark$	
A . 1 . 1	( )	V	N		
Are high temperatures expected at this si	te?	Yes	No		
Are there any other special requirements	for logging at this site?	Yes 🗆	No		
The more any other spectal requirements	for logging at this site.	105 =	110	₩-	

\_\_\_\_

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	Cross-hole hydrologic and electrical experiment.RABHydrofracturing, Packer injection testCORK and Geodetic borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

Т

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

Р	roposal #:	Site #: NT2-06A/B	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusa	1.RCB to 1000 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in ea program.	astern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault z	zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (	(June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

### Form 5 – Lithologic Summary

New

Revised

Proposal #	:	Site #: NT2-06A/B		Date Form Submitted: Oct. 1, 2003			
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
300	Unconformity fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002

Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation						
Date Form Submitted:	Oct. 1, 2003						
	Study the progressive change in the fault properties by intersecting the splay fault at						
Site Specific Objectives with Priority	intermediate depth of 2km. Integration with NT2-01A and NT2-03A are essential.						
(Must include general objectives in proposal)	Priority:2 (Alternate site for NT2-02A)						
List Previous Drilling in Area:	None						

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-07A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 08.6 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 30.0 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2,260 m



New

Revised

# Section C: Operational Information

	Sediments					Basement				
Proposed	2000									
Penetration: (m)	What is the total sed. thickness? >3,000 m			0						
()	which is the total sea, the chess, a speed				Total Penetration:			m		
General Lithologies:	Slope basin sediment on top, fractured									
	section acros		<b>.</b> .		under	lying				
	deformed, co	mpact	ed turbidit	e						
Coring Plan: (Specify or Circle)	1-2-3-APC	VPC*	XCB MD	Св∗□	PCS	] RCB 🗹 R		HRGB	ntly Under De	velopment
Wireline Logging	Standard T	tandard Tools			Special Tools			LWD		
Plan:	Neutron-Porosity	✓	Borehole Tel			rmation Fluid		Densit	y-Neutron	
	Litho-Density	$\checkmark$	Nuclear Mag Resonance	netic		orehole Tempe Pressure	erature 🗸		ivity-Gamma	<sup>I Ray</sup>
	Gamma Ray	<b>V</b>	Geochemical			orehole Seism	nic [	Acoust	ic	
	Resistivity	Z	Side-Wall Cor Sampling	e						
	Acoustic									
	Formation Image				Ot	hers (	)	Others	(FMI	)
Max.Borehole Temp. :	Expected value (		r Drilling) °C							
-	40-		-							
Mud Logging: (Riser Holes Only)	Cuttings Sam									
(Riser Holes Only)	fror			to			5		n intervals	
	fror	n <u>17</u>	<u>00</u> m	to	190	<u>00</u> m,	5	1	n intervals	5
							i	Basic Sam	pling Inter	vals: 5m
Estimated days:	Drilling/Coring:		Logging				Total On	-Site: 35		
Future Plan:	: Longterm Borehole Observation Plan/Re-entry Plan									
Hazards/	Please check foll	owing L	st of Potential	Haza	rds			W	hat is your	Weather
Weather:	Shallow Gas		plicated Seabed			nermal Activity	_		(Preferabl	e period
		Cond	ition					Mara	with the i	reasons)
	Hydrocarbon	—	Seabed			and Turbidity C	Current		- August oon risk	in late
	Shallow Water Flow		Currents		Methane Hydrate		Z	August to September then low pressure		tember,
	Abnormal Pressure	Fract	ured Zone		Diapir and	d Mud Volcano		Novemb		hrough
	Man-made Objects	Fau	lt	<b>V</b>	High Tem	perature		March)		
	H <sub>2</sub> S	High	Dip Angle		Ice Condi	itions				
	CO <sub>2</sub>									

Site #: NT2-07A

#### Form 2 - Site Survey Detail

Please fill out information in all gray boxes

roposal #:

New

Revised 🗸

Date Form Submitted: Oct. 1, 2003

SSP Requir-Exists Data Type In DB Details of available data and data that are still to be collected ements Primary Line(s) :Location of Site on line (SP or Time only) 1 JAMSTEC Line-I (Feb. 2003) High resolution YES seismic reflection Crossing Lines(s): JAMSTEC Line-9 (Feb. 2003) Primary Line(s): 2 Location of Site on line (SP or Time only) KR0108-4 **Deep Penetration** YES seismic reflection Crossing Lines(s): YES 3 Seismic Velocity<sup>†</sup> Stacking velocity and migration velocity from MCS lines. OBS data also available. Seismic Grid YES Acquired by JAMSTEC in Feb. 2003 4 Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. Refraction YES 5a (surface) 2002 Refraction YES OBS data by Nakanishi et al. (1997) 5b (near bottom) Location of Site on line (Time) 3.5 kHz NO 6 7 Multi-narrow beam data by JAMSTEC R/V Yokosuka Swath YES bathymetry Side-looking 8a YES Some data collected using IZANAGI side scan sonar sonar (surface) NO 8b Side-looking sonar (bottom) 9 Photography YES Taken by submersibles of JASMTEC or Video 10 Heat Flow YES Obtained from surface ship, submersibles, long-erm monitoring and BSR Magnetics YES Compiled map published from AIST, Japan 11a YES Compiled map published from AIST, Japan 11b Gravity 12 Sediment cores YES Gravity and piston cores 13 Rock sampling YES Taken by submersible and ROV Water current data YES Available on JODC web page (http://www.jodc.go.jp/) 14a Ice Conditions 14b 15 OBS Being processed now microseismicity Navigation YES 16 17 Other

 SSP Classification of Site:
 SSP Watchdog:
 Date of Last Review:

 SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

#### Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

 $\checkmark$ 

Proposal #:	Site #: NT2-07A		Date For	m Submitted: Oct. 1, 2003		
Water Depth (m): 2260	Depth (m): 2260 Sed. Penetration (m): 2000			Basement Penetration (m): 0		
Do you need to use the conical side-entry	Yes	No	$\checkmark$			
Are high temperatures expected at this si	Yes	No	✓			
The high temperatures expected at this si			110			
Are there any other special requirements	Yes 🗆	No	$\checkmark$			

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB preferred	2

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

P	roposal #:	Site #: NT2-07A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refu	usal.RCB to 2000 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in program.	eastern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fau	lt zone, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoc	on (June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

# Form 5 – Lithologic Summary

New

Revised

Proposal #		Site #: NT	2-07A	Date Form S	Submitted: Oct. 1, 2	003	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
400 1800	faults, etc	Holoc ene to Mioce ne	( <i>km/sec</i> ) 1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism	accum. (m/My)	



## Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 M arch 2002 New

Revised	

## Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Drilling and Observatory Phase 2 Mechanical and Hydrologic State of Mega-Splay Faults: Implications for Seismogenic Faulting and Tsunami Generation				
Date Form Submitted:	Oct. 1, 2003				
	Study the progressive change in the fault properties by intersecting the splay fault at				
Site Specific Objectives with	intermediate depth of 3.5km. Integration with NT2-01A and NT2-02A are essential.				
Priority (Must include general objectives in proposal) Priority:1 (Alternate site for NT2-03A)					
List Previous Drilling in Area:	None				

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-08A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Southwestern Nankai Trough off Kumano
Latitude:	Deg: 33	Min: 10.8 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 28.6 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary:	Alt:	Water Depth:	2,170 m

# Section C: Operational Information

	Sediments						Basement			
Proposed Penetration:			3500				0			
(m)	What is the total	sed. thick	ness? >3,000	n	1			0		
			,				Total Penet	ration:	2,200	m
General Lithologies:	Slope basir		ment on	top,		tured				
	section acros		<b>T A</b>		under	lying				
Coring Plan:		deformed, compacted turbidite Continuous coring may be replaced with ordinary/LWD lo 1-2-3-APC VPC* C XCB MDCB* PCS RCB Re-entry								
(Specify or Circle)										
	1-2-3-APC	VPC* ∟	I XCB⊠ MD	CB∗∟	PCS L			HRGB Systems Currer	ntly Under Dev	velopment
Wireline Logging Plan:	Standard Tools Special Tools							LWD		
Flaii.	Neutron-Porosity	$\checkmark$	Borehole Te			ormation Fluid		Density	y-Neutron	
	Litho-Density	Z	Nuclear Mag Resonance	netic		orehole Temp Pressure	berature		vity-Gamma	Ray
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seisi	mic	Acousti	c	
	Resistivity	Z	Side-Wall Co Sampling	re						
	Acoustic		Bamping							
	Formation Image				0	thers (	)	Others	FMI	)
Max.Borehole	Expected value		er Drilling) °C							
Temp. :		-100	_							
Mud Logging: (Riser Holes Only)	Cuttings San									
(Riser Holes Only)	fro		7 <u>00</u> m	to			5		n intervals	
	fro	m <u>33</u>	<u>300</u> m	to	350	<u>00</u> m,	5_	n	n intervals	
								Basic Sam	oling Interv	als: 5m
Estimated days:	Drilling/Coring:		Logging	-			Total O	on-Site: 250		
Future Plan:	Longterm Boreh				•	1 • /1		(100	1 0)	
	Geodetic	(strain/	tilt), seism	nc an	d hyd	rologic (ł	(T) sense	ors (100	days?)	
Hazards/	Please check for	lowing L	ist of Potentia	l Haza	rds			Wł	at is your V	Veather
Weather:	Shallow Gas	Com	plicated Seabed	_		hermal Activity	_		(Preferable	e period
			lition			1.00		May _	with the r August	easons)
	Hydrocarbon		Seabed			e and Turbidity e Hydrate			on risk i	in late
	Shallow Water Flow		irents	Z	Wieulali	e riyurate	Z	August then lo	-	ember, ire in
	Abnormal Pressure	Frac	tured Zone		Diapir ar	nd Mud Volcano		Novemb	-	hrough
	Man-made Objects	Fau	ılt		High Ter	nperature		March)		
	$H_2S$	High	n Dip Angle		Ice Cond	litions				
	CO <sub>2</sub>									

## Form 2 - Site Survey Detail

Please fill out information in all gray boxes

New

Revised 

oposal #:			Site #: NT2-08ADate Form Submitted: Oct. 1, 2003			
	Data Type	SSP Requir- ements	Exists In DB	Details of available	data and data that are still to be collected	
1	High resolution seismic reflection		YES	Primary Line(s) JAMSTEC Line-I (Feb. 2003) Crossing Lines(s): JAMSTEC Line	:Location of Site on line (SP or Time of 2-9 (Feb. 2003)	
2	Deep Penetration seismic reflection		YES	Primary Line(s): KR0108-4 Crossing Lines(s):	Location of Site on line (SP or Time or	
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and migratic OBS data also available.	on velocity from MCS lines.	
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb	b. 2003	
5a	Refraction (surface)		YES	Two-ship COP (max. offset 2002	20km) was obtained by JAMSTEC in Se	
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (	(1997)	
6	3.5 kHz		NO		Location of Site on line (Time)	
7	Swath bathymetry		YES	Multi-narrow beam data by JA	MSTEC R/V Yokosuka	
8a	Side-looking sonar (surface)		YES	Some data collected using IZA	ANAGI side scan sonar	
8b	Side-looking sonar (bottom)		NO			
9	Photography or Video		YES	Taken by submersibles of JAS	MTEC	
10	Heat Flow		YES	Obtained from surface ship, su	ubmersibles, long-erm monitoring and BSR	
11a	Magnetics		YES	Compiled map published from	n AIST, Japan	
11b	Gravity		YES	Compiled map published from	n AIST, Japan	
12	Sediment cores		YES	Gravity and piston cores		
13	Rock sampling		YES	Taken by submersible and RO		
14a	Water current data		YES	Available on JODC web page	(http://www.jodc.go.jp/)	
14b	Ice Conditions					
15	OBS microseismicity			Being processed now		
16	Navigation		YES			
17	Other					

SSP Classification of Site: SSP Watchdog: Date of Last Review: SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

## Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

New Revised

 $\checkmark$ 

Proposal #:	Site #: NT2-08A		Date Form	n Submitted: Oct. 1, 2003
Water Depth (m): 2170	Sed. Penetration (m): 350	00	Basement	Penetration (m): 0
Do you need to use the conical side-entry	v sub (CSES) at this site?	Yes 🗆	No	
Are high temperatures expected at this signature	te?	Yes	No	
Are there any other special requirements	for logging at this site?	Yes 🗆	No	$\checkmark$

\_\_\_\_\_

If "Yes" Please describe requirements:

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic		
FMS	Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB, VSP Hydrofracturing, Packer injection test CORK and Geodetic/Seismic borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of penetration or significant basement
borehole@ldeo.columbia.edu	penetration of significant basement
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

Т

# Form 4 – Pollution & Safety Hazard Summary

# iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New

Revised

 $\checkmark$ 

P	roposal #:	Site #: NT2-08A	Date Form Submitted: Oct. 1, 2003
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusal	.RCB to 3500 m
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct drilling in ea program.	stern Nankai in 2004. This datawill be used for ur
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.		
6	What "special" precautions will be taken during drilling?	Yes, During drilling into the fault ze	one, hole may collapse.
7	What abandonment procedures do you plan to follow:	None	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (	June – October)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

# Form 5 – Lithologic Summary

New

Revised

Proposal #	:	Site #: NT	2-08A	Date Form S	Submitted: Oct. 1, 2	.003	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
300 1800 3400	Unconformity Fault fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		
300 1800	Unconformity Fault	ene to Mioce	1.6-	sediments to old accretionary			

			Received 1 April 2004
IODP P	roposal Cover S	heet	603C-Full
New	Revised	Addendum	
			— Above For Official Use Only —

Please fill out information in all gray boxes

Title:

Proponent(s):

NanTroSEIZE Drilling and Observatory Phase 3: A Window into the Seismogenic Zone 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,

	Kohtaro Ujiie, Kelin Wang		
Keywords:	Seismogenic zone, fault mechanics, borehole observatory,	Area:	Southwestern
(5 or less)	tsunamigenesis	Alca.	Japan margin

Demian Saffer, Arito Sakaguchi, Masanao Shinohara, Ralph Stephen, Akito Tsutsumi,

**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. Downhole 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.

Proposedctivities 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.

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

Proposed Sites:

	te Summary Forn I Site Information	ns:	603C	-Full
Please fill out informati Revised 7 March 2002	on in all gray boxes		New	Revised
Section A: Proposa	al Information			
Title of Proposal:	NanTroSEIZE I	Drilling and Observate Seismogenie	•	Window into the
Date Form Submitted:	Apr. 1, 2003 Sample and instrument	decollement, mega-splay,	and wall rock of	lower prism to address
Site Specific Objectives with Priority (Must include general objectives in proposal)	-	ry, and temporal change ob		

List Previous Drilling in Area:

## Section B: General Site Information

None

Site Name: (e.g. SWPAC-01A)	NT3-01A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	SouthwesternNankai Trough off Kumano
Latitude:	Deg: 33	Min: 17.6 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 38.6 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary: X	Alt:	Water Depth:	1,950 m

# Section C: Operational Information

		Se	diments				Ba	asement	
Proposed		580	0 - 6000					200	
Penetration: (m)	What is the total	sed thick	ness? >5.500	n	1				
()	What is the total	sea. men	1055		-	Ĩ	Total Penetra	ntion: 6,200 m	
General Lithologies:	Slope basin	Slope basin clastic sediments, accreted and							
	deformed tre	ench t	urbidites, l	nemip	ela	gic and			
	pelagic mud		±						
Coring Plan: (Specify or Circle)	Continuous		•	-			gging in i	intervals	
(specify of circle)	1-2-3-APC PC* X MD * PCS CB Re try HGB								
Wireline Logging	Standard 7	「ools			Spec	cial Tools		LWD	
Plan:	Neutron-Porosity	✓	Borehole Te			Formation Fluid S		Density-Neutron	
	Litho-Density	✓	Nuclear Mag Resonance	netic		Borehole Temper & Pressure	rature	Resistivity-Gamma Ray	
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seism	ic 🔽	Acoustic	
	Resistivity	Z	Side-Wall Co	re					
	Acoustic		Sampling		_				
	Formation Image					Others (	)	Others (FMI )	
Max.Borehole Temp. :	Expected value 150-170								
Mud Logging:	Cuttings San	pling l	ntervals						
(Riser Holes Only)	fro	m <u>150</u>	)0 m	to	_36	<u>600</u> m,	_5	m intervals	
		m 430		to	62		5	m intervals	
			_					Basic Sampling Intervals: 5m	
Estimated days:	Drilling/Coring:	???	Logging	g: ??			Total On-		
Future Plan:	Longterm Boreh	ole Obse	ervation Plan/	Re-entr	y Pla	n			
	Long-term	observ	atory insta	llatio	n ar	nd data telem	netry/reco	ording	
Hazards/ Weather:	Please check fol	lowing L	ist of Potentia	l Hazar	ds.			What is your Weather	
weather.	Shallow Gas		plicated Seabed dition		Нус	Irothermal Activity		window? (Preferable period with the reasons)	
	Hydrocarbon	Soft	Seabed		Lands	slide and Turbidity C	urrent	May – August optimal	
	Shallow Water Flow	Cu Cu	rrents	V	Metl	hane Hydrate	Z	(typhoon risk in late August to September)	
	Abnormal Pressure	Frac	tured Zone		Diapi	r and Mud Volcano		August to September)	
	Man-made Objects	Fat	ılt	⊿	High	Temperature			
	H <sub>2</sub> S	Higl	n Dip Angle		Ice C	onditions			
	CO <sub>2</sub>								

## Form 2 - Site Survey Detail

## iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New Revised
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osal #	<i>t</i> :		Site #:	NT3-01A	Date Form Submitted: Apr. 1, 2003
	Data Type	SSP Requir- ements	Exists In DB		ta and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s) : JAMSTEC Line-L (Feb. 2003) Crossing Lines(s): JAMSTEC Line-9 (	Location of Site on line (SP or Time only) Feb. 2003)
2	Deep Penetration seismic reflection		YES	Primary Line(s): KR0108-5 Crossing Lines(s):	Location of Site on line (SP or Time only)
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and PODM m OBS wide-angle data also availa	igration velocity from MCS lines. able.
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb.	2003, also IFREE lines from 1998 - 2003
5a	Refraction (surface)		YES	Two-ship COP (max. offset 2 2002	0km) was obtained by JAMSTEC in Se
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (19	997)
6	3.5 kHz		NO		Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data by JAM	ASTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using IZAN	JAGI side scan sonar
8b	Side-looking sonar (bottom)		NO		
9	Photography or Video		YES	Taken by submersibles of JASM	ITEC
10	Heat Flow		YES	Obtained from surface ship, sub	mersibles, long-term monitoring and BSR
11a	Magnetics		YES	Compiled map published from A	AIST, Japan
11b	Gravity		YES	Compiled map published from A	AIST, Japan
12	Sediment cores		YES	Gravity and piston cores	
13	Rock sampling		YES	Taken by submersible and ROV	
14a	Water current data		YES	Available on JODC web page (h	http://www.jodc.go.jp/)
14b	Ice Conditions	_			
15	OBS microseismicity		YES	Obana et al., in press	
16	Navigation		YES		
17	Other	1	1		

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

## Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

·		New Revised
Proposal #:	Site #: NT3-01A	Date Form Submitted: Apr. 1, 2003
Water Depth (m): 1950	Sed. Penetration (m): 6000	Basement Penetration (m): 200
Do you need to use the conical side-entry Are high temperatures expected at this si Are there any other special requirements If "Yes" Please describe requireme	te?Yes $\checkmark$ Nofor logging at this site?Yes $\square$ No	$\checkmark$

\_\_\_\_\_

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic	Yes, dipole sonic, LWD sonic for physical properties	
FMS	Preferably FMI & RAB. Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV	Perhaps?	
Resistivity-Laterolog	LWD resistivity	
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB, VSP Hydrofracturing, Packer injection test Geodetic/Seismic and multi-level packer borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

## Form 4 – Pollution & Safety Hazard Summary

Please fill out information in all gray boxes

New Revised

Proposal #:		Site #: NT3-01A	Date Form Submitted: Apr. 1, 2003
1 Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.) APC to refusal, then XCB to refusal.RCB to e		APC to refusal, then XCB to refusal. RCB to 620	00 m or 200 m into basement.
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct BSR drilling in eastern N our program.	Jankai in 2004. This data will be used for
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	Except for normal gas hydrate occurrence, none	е.
6	What "special" precautions will be taken during drilling?	Fault zones are likely unstable and overpress kicks.	sured, prone to collapse, possible pressure
7	What abandonment procedures do you plan to follow:	Unknown at this time for riser operations	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (June – Octo	ber)
9	Summary: What do you consider the major risks in drilling at this site?	Current, shallow overpressure (but latter is prol	bably not major

# Form 5 – Lithologic Summary

	ODI Site Sui	J					
Proposal #:	Proposal #: Site #: NT3-01A			Date Form Submitted: Apr. 1, 2003			
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
200 1000 4500 6000	Unconformity Unconformity Fault fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

	te Summary Forr	ns:	603C-	-Full	
Form 1 - Genera Please fill out informati Revised 7 March 2002	I Site Information	r	New 🗸	Revised	
Section A: Propos	al Information				
Title of Proposal:	NanTroSEIZE	Drilling and Observator Seismogenic	-	Window into the	
Date Form Submitted:	_	decollement, mega-splay, a		lower prism to ac	ldress
Site Specific Objectives with Priority (Must include general objectives in proposal)	Priority:2	ry, and temporal enange obje			
	None				

List Previous Drilling in Area:

## Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT3-02A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	SouthwesternNankai Trough off Kumano
Latitude:	Deg: 33	Min: 12.9 N	Jurisdiction:	Within Japanese EEZ
Longitude:	Deg: 136	Min: 27.4 E	Distance to Land:	45 NM
Coordinates System:	WGS 84			
Priority of Site:	Primary: X	Alt: X	Water Depth:	1,950 m

# Section C: Operational Information

		Se	diments				Basement		
Proposed	5800 - 6000				200				
Penetration: (m)	What is the total	sed thick	ness? >5.500	n	1				
()	What is the total	sea. men	1055		-	Ĩ	Total Penetra	ntion: 6,200 m	
General Lithologies:	Slope basin	clasti	c sedimen	ts, ac	cret	ted and			
	deformed tre	ench t	urbidites, l	nemip	ela	gic and			
	pelagic mud		±						
Coring Plan: (Specify or Circle)		Continuous coring may be replaced with LWD logging in intervals							
(specify of circle)	1-2-3-APC	C* XC	MD * P			ellatry HIGB	□ * Sy.	stems Currently Under Development	
Wireline Logging	Standard 7	「ools			Spec	cial Tools		LWD	
Plan:	Neutron-Porosity	✓	Borehole Te			Formation Fluid S		Density-Neutron	
	Litho-Density	✓	Nuclear Mag Resonance	netic		Borehole Temper & Pressure	rature	Resistivity-Gamma Ray	
	Gamma Ray	<b>V</b>	Geochemical			Borehole Seism	ic 🔽	Acoustic	
	Resistivity	Z	Side-Wall Co	re					
	Acoustic		Sampling		_				
	Formation Image					Others (	)	Others (FMI )	
Max.Borehole Temp. :	Expected value 150-170								
Mud Logging:	Cuttings San	pling l	ntervals						
(Riser Holes Only)	fro	m <u>150</u>	)0 m	to	_36	<u>600</u> m,	_5	m intervals	
		m 430		to	62		5	m intervals	
			_					Basic Sampling Intervals: 5m	
Estimated days:	Drilling/Coring:	???	Logging	g: ??			Total On-		
Future Plan:	Longterm Boreh	ole Obse	ervation Plan/	Re-entr	y Pla	n			
	Long-term	observ	atory insta	llatio	n ar	nd data telem	netry/reco	ording	
Hazards/ Weather:	Please check fol	lowing L	ist of Potentia	l Hazar	ds.			What is your Weather	
weather.	Shallow Gas		plicated Seabed dition		Нус	Irothermal Activity		window? (Preferable period with the reasons)	
	Hydrocarbon	Soft	Seabed		Lands	slide and Turbidity C	urrent	May – August optimal	
	Shallow Water Flow	Cu Cu	rrents	V	Metl	hane Hydrate	Z	(typhoon risk in late August to September)	
	Abnormal Pressure	Frac	tured Zone		Diapi	r and Mud Volcano		August to September)	
	Man-made Objects	Fat	ılt	⊿	High	Temperature			
	H <sub>2</sub> S	Higl	n Dip Angle		Ice C	onditions			
	CO <sub>2</sub>								

## Form 2 - Site Survey Detail

## iSAS/IODP Site Summary Forms:

Please fill out information in all gray boxes

New		Revised	
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Proposal #	ŧ:		Site #:	NT3-02A Date Form Submitted: Apr. 1, 2003
	Data Type	SSP Requir- ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection		YES	Primary Line(s)       :Location of Site on line (SP or Time only)         JAMSTEC Line-B (Feb. 2003)         Crossing Lines(s):       JAMSTEC Line-9 (Feb. 2003)
2	Deep Penetration seismic reflection		YES	Primary Line(s):       Location of Site on line (SP or Time only)         KR0108-5, 3         Crossing Lines(s):
3	Seismic Velocity <sup>†</sup>		YES	Stacking velocity and PODM migration velocity from MCS lines. OBS wide-angle data also available.
4	Seismic Grid		YES	Acquired by JAMSTEC in Feb. 2003, also IFREE lines from 1998 - 2003
5a	Refraction (surface)		YES	Two-ship COP (max. offset 20km) was obtained by JAMSTEC in Sep. 2002
5b	Refraction (near bottom)		YES	OBS data by Nakanishi et al. (1997)
6	3.5 kHz		NO	Location of Site on line (Time)
7	Swath bathymetry		YES	Multi-narrow beam data by JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		YES	Some data collected using IZANAGI side scan sonar
8b	Side-looking sonar (bottom)		NO	
9	Photography or Video		YES	Taken by submersibles of JASMTEC
10	Heat Flow		YES	Obtained from surface ship, submersibles, long-term monitoring and BSR
11a	Magnetics		YES	Compiled map published from AIST, Japan
11b	Gravity		YES	Compiled map published from AIST, Japan
12	Sediment cores		YES	Gravity and piston cores
13	Rock sampling		YES	Taken by submersible and ROV
14a	Water current data		YES	Available on JODC web page (http://www.jodc.go.jp/)
14b	Ice Conditions			
15	OBS microseismicity		YES	Obana et al., in press
16	Navigation		YES	
17	Other			

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

## Form 3 - Detailed Logging Plan

# iSAS/IODP Site Summary Forms:

·		New Revised
Proposal #:	Site #: NT3-01A	Date Form Submitted: Apr. 1, 2003
Water Depth (m): 1950	Sed. Penetration (m): 6000	Basement Penetration (m): 200
Do you need to use the conical side-entry Are high temperatures expected at this si Are there any other special requirements If "Yes" Please describe requireme	te?Yes $\checkmark$ Nofor logging at this site?Yes $\square$ No	$\checkmark$

\_\_\_\_\_

What do you estimate the total logging time for this site to be:\_\_\_\_\_

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electro-magnetic properties in sedimentary sequences and basement.	1
Acoustic	Yes, dipole sonic, LWD sonic for physical properties	
FMS	Preferably FMI & RAB. Imaging of sedimentary structures and fractures.Core-log correlation of structural features.	1
BHTV	Perhaps?	
Resistivity-Laterolog	LWD resistivity	
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, bulk density, and lithology in unstable borehole environments.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	RAB, VSP Hydrofracturing, Packer injection test Geodetic/Seismic and multi-level packer borehole observatory	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group at:	Note: Sites with greater than 400 m of penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

## Form 4 – Pollution & Safety Hazard Summary

Please fill out information in all gray boxes

New Revised

Proposal #:		Site #: NT3-01A	Date Form Submitted: Apr. 1, 2003				
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, then XCB to refusal. RCB to 620	sal, then XCB to refusal. RCB to 6200 m or 200 m into basement.				
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	JNOC will conduct BSR drilling in eastern N our program.	Jankai in 2004. This data will be used for				
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None					
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile shows BSRs					
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	Except for normal gas hydrate occurrence, none	е.				
6	What "special" precautions will be taken during drilling?	Fault zones are likely unstable and overpress kicks.	sured, prone to collapse, possible pressure				
7	What abandonment procedures do you plan to follow:	Unknown at this time for riser operations					
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (June – Octo	ber)				
9	Summary: What do you consider the major risks in drilling at this site?	Current, shallow overpressure (but latter is prol	bably not major				

# Form 5 – Lithologic Summary

ISAS/10D1 Site Summary Forms.					•••••	7	-
Proposal #:		Site #: NT	'3-01A	Date Form S	Submitted: Apr. 1, 2	2003	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
200 1000 4500 6000	Unconformity Unconformity Fault fault	Holoc ene to Mioce ne	1.6- 2.5km/s	Slope sediments to old accretionary rocks	Accretionary prism		

				I ··· ···		
IOD	P Proposal Cover Sheet	dum		603E	)-Full2	
	mation in all gray boxes		A	lbove For Oj	fficial Use Only	
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 obs	servato	ories	Area:	Nankai Trough Shikoku Basin	
	Contact Informati	on:				
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					

Received 1 April 2005

Permission to post abstract on IODP-MI Sapporo Web site: X 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.

Cite Name	Desidion	Water	Pe	enetration (	m)	
Site Name	Position	Depth (m)	Sed	Sed Bsm Total		Brief Site-specific Objectives
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.

#### Proposed Sites:



#### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New

Revised [

#### Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites
Date Form Submitted: Site Specific Objectives with Priority (Must include general objectives in proposal)	Sept. 30, 2004 One CORK hole with screened interval in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement. Reference site to characterize hydrology of Shikoku Basin strata and upper igneous crust where a bathymetric mound is underlain by a basement high. Objectives are to show how stratigraphy, basement topography, and thermal structure affect the physical and hydrologic properties of subduction inputs.
List Previous Drilling in Area:	This site would be a return to NT1-01A, which is proposed to be drilled in 603A-Full2 (NantroSEIZE Reference Sites).

## Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT1-01A If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #		Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 32 N	Min: :44.8878	Jurisdiction:	Japan
Longitude:	Deg: 136 E	Min: 55.0236	Distance to Land:	130 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, O	ther ( )		
Priority of Site:	Primary:x	Alt:	Water Depth:	3540 m

	<b>C</b> 1				Decoment					
<b>D</b> 1	Sediments				Basement					
Proposed	460					4	0			
Penetration: (m)	With set in the state lar		460	m						
	What is the total s	ed. unickn	less? 400	III			To	tal Panatr	ation: 500	m
General Lithologies:	Possible silt/mud turbidites and ash layers Basalt							ation. 500		
General Ennotogies.	Hemipelagic				11 10	iyers	Dase	an		
	Thempelagic	muu	and muusu	JIIC						
Coring Plan:	Limited cori	no as	necessary t	0 001	nfiri	m sere	en loca	ations fo	or CORKs	
(Specify or check)		· ·	•							
	1-2-3-APC 🛛 V	PC*	CB DIDCB	*	¢S	R	Re		s  Under	Development
Wireline Logging	Standard T	ools			Snec	cial Too	ale		LWI	
Plan:					-					
	Neutron-Porosity		Borehole Tele					Sampling	Density-Neutron	n 🗆
	Litho-Density		Nuclear Magne Resonance	etic		& Pressu	e Tempera ure		Resistivity-Gami	na Ray 🗆
	Gamma Ray		Geochemical				e Seismic	Γ	Acoustic	
	Guinniù Ruy		Geoenemieur					nts if needed		
	Resistivity		Side-Wall Core	e			om previou		. 10	
	i constituty		Sampling			drilling.	omproviou	5 (1 mase 1)		
	Acoustic									
	Formation Image					Others (		)	Others (	)
Max.Borehole	Expected value (I	For Rise	r Drilling)							
Temp. :			-°C							
Mud Logging:	Cuttings Sam	pling I	ntervals							
(Riser Holes Only)	from	1	m	to			m,		m interv	als
		1					m,		m interv	als
		·					,			
Estimated days:		_							Basic Sampling Int	ervals: 5m
•	Drilling/Coring: :					-	CORKs)	Total On	i-Site: 17	
Future Plan:	Longterm Boreho						. 1	1.	1. ,	
	Long term me	onitori	ing (CORK	.s) 01	bas	semen	t and o	verlying	g sediments.	
Hazards/ Weather:	Please check foll	owing Li	ist of Potential	Haza	rds				What is your V	
weather.	Shallow Gas	Comp	olicated Seabed Co	ndition	Hyd	rothermal	Activity		window? (Pre period with the	ferable reasons)
		_								( cusons)
	Hydrocarbon	Soft	Seabed		Lands	slide and T	urbidity Cu	rrent	April-July:	n
	Shallow Water Flow	Curre	ents		Meth	ane Hydrat	e		Avoid typhoc season	011
	Abnormal Pressure	Fract	ured Zone		Diapi	r and Mud	Volcano			
		<b>-</b>								
	Man-made Objects	- Fault			High	Temperatu	re			
	H <sub>2</sub> S	High	Dip Angle		Ice C	onditions				
		_								
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

### **IODP Site Summary Forms:**

Site #: NT1-01A

Please fill out information in all gray boxes

'roposal #: 603D-Full

Other

17

New

SSP Requir-Exists Data Type Details of available data and data that are still to be collected ements In DB Primary Line(s) :Location of Site on line (SP or Time only) 1 No High resolution seismic reflection Crossing Lines(s): Primary Line(s): KR9806-2 SP2710 2 Yes Location of Site on line (SP or Time only) **Deep Penetration** seismic reflection Crossing Lines(s): KR0211-S0 Stacking velocity and migration velocity from MCS lines. OBS data. 3 Seismic Velocity<sup>†</sup> Yes 4 Seismic Grid Yes 5a Refraction Yes Two ship COP (maximum offset 20 km) obtained by JAMSTEC. (surface) OBS data by Nakanishi et al. (1997) 5b Refraction Yes (near bottom) Location of Site on line (Time) 3.5 kHz 6 7 Swath Yes Multi-narrow-beam data by JAMSTEC R/V Yokusuka. bathymetry 8a Side-looking No sonar (surface) 8b Side-looking No sonar (bottom) 9 Photography No or Video 10 Heat Flow Yes. Compiled map published from AIST, Japan. 11a Magnetics Yes Compiled map published from AIST, Japan. 11b Gravity Yes 12 Sediment cores No 13 Rock sampling No Available on JODC web page (http://www.jodc.go.jp) Water current data 14a Ice Conditions 14b OBS Yes 15 microseismicity Yes Navigation 16

SSP Classification of Site: SSP Watchdog: Date of Last Review: SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

Revised

Date Form Submitted: Sept. 30, 2004

## Form 3 - Detailed Logging Plan

## **IODP Site Summary Forms:**

New	Re

Proposal #: 603D-Full	Site #: NT1-01A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 3540	Sed. Penetration (m): 460	Basement Penetration (m): 40

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗌	No	•
Are high temperatures expected at this site?	Yes 🗌	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	
If "Yes" Please describe requirements: No logging planned. S	ite will have bee	n logged in	previous phase.

CORK installation only

What do you estimate the total logging time for this site to be: 12 days install casing/CORKS

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

## Form 4 – Pollution & Safety Hazard Summary

## **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

Р	roposal #: 603D-Full	Site #: NT1-01A	Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited coring to confir	m monitoring intervals for CORK. CORK installation
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	None	
7	What abandonment procedures do you plan to follow:	None. Holes will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current. Typhoon	a season (June to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

## Form 5 – Lithologic Summary

New Revised							
Proposal #: 603D-Full Site #: NT1-01A Date Form Submitted: Sept. 30, 2004							
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environme nt	Avg. rate of sed. accum. (m/My)	Comments
seafloor			1.6-1.9	Hemipelagite	Backarc basin Floor	23 m/my	
460	Unconformity	20 Ma	2.0	Volcanic sediment and basement basalt	Backarc basin spreading ridge		
560	Total depth						

New

# 603D-Full2

### Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New Revised

Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites				
Submitted: Site Specific Objectives with Priority	Sept. 30, 2004 One CORK hole with screened interval in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement. Reference site to characterize hydrology of Shikoku Basin strata and upper igneous crust where basement topography is relatively flat. Objectives are to document how stratigraphy, basement topography, and thermal structure affect the physical and				
	hydrologic properties of subduction inputs. This site would be a return to NT1-02A, which is proposed to be drilled in 603A-Full2 (NantroSEIZE Reference Sites).				

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT1-02A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 32 N	Min: :47.4996	Jurisdiction:	Japan
Longitude:	Deg: 137 E	Min: 9.2784	Distance to Land:	145 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Ot	her ( )		
Priority of Site:	Primary:x	Alt:	Water Depth:	4210 m

	Sediments				Basement					
Proposed	730			/	40					
Penetration:	/30					4	ΗŪ			
(m)	What is the total s	ed. thickr	ness? 730	m	1					
							To	otal Penetr	ation: 770	m
General Lithologies:	Possible silt/	'mud t	urbidites an	nd as	sh la	ayers	Basa	alt	L.	
	Hemipelagic					5				
	1 0									
Coring Plan:	Limited cori	ng as i	necessary t	o coi	nfiri	m scre	een loca	ations fo	or CORKs	
(Specify or check)	1-2-3-APC 🔲 V	- РС* Г		*	rs	R	Re	н∏⊮в		
	1-2-5-74 C L V				<b>F</b> 0		Ite_Itu y		stems Currently Under 1	Development
Wireline Logging	Standard To	ools		;	Spec	cial To	ols		LWD	)
Plan:	Neutron-Porosity		Borehole Tele	viewer		Format	tion Fluid S	Sampling	] Density-Neutron	
	Lidha Danaita		Nuclear Magne	etic			le Tempera		Resistivity-Gamm	
	Litho-Density		Resonance			& Press	ure		Resistivity-Gamin	а кау 🗆
	Gamma Ray		Geochemical			Borehol	le Seismic		Acoustic	
			Side-Wall Core			Limited	l measureme	ents if needed	to	
	Resistivity	_	Sampling	·			rom previou	is (Phase I)		
			F 0			drilling.				
	Acoustic					Otherne (		``	Others (	
Max.Borehole	Formation Image Expected value (I	For Rise	r Drilling)			Others (		)	Others (	)
Temp. :		or Rise	-°C							
Mud Logging:	Cuttings Sam	pling I	ntervals							
(Riser Holes Only)	from	1	m	to			m,		m interva	ls
	from	ı	m	to			m,		m interva	ls
								Ŀ	Basic Sampling Inte	rvals: 5m
Estimated days:	Drilling/Coring:	6 days	Logging:	12 (ii	nstall	casing/	CORKs)	Total On	-Site: 18 days	
Future Plan:	Longterm Boreho									
	Long term me	onitori	ing (CORK	s) of	fbas	semen	it and o	verlying	g sediments.	
									1	
Hazards/	Please check foll	owing Li	ist of Potential	Haza	rds				What is your W	
Weather:	Shallow Gas		olicated Seabed Co	ndition	Hyd	lrothermal	Activity		window? (Pref period with the r	erable easons)
	-	Soft	Seabed		Land	clide and T	Furbidity Cu		April-July:	cusonsy
	liyuloculoon		Seubeu		Dunu	shee and h	fullolatly eu		Avoid typhoo	n
	Shallow Water Flow	Curre	ents		Meth	ane Hydra	te		season	-
	Abnormal Pressure	Fract	ured Zone		Diapi	ir and Muc	l Volcano			
	Man-made Objects	- Fault			High	Temperati	ure			
	H <sub>2</sub> S	High	Dip Angle		Ice C	onditions				
		_								
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

#### **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

'roposal #: 603D-Full Site #: NT1-02A Date Form Submitted: Sept. 30, 2004 SSP Requir-Exists Data Type Details of available data and data that are still to be collected ements In DB Primary Line(s) :Location of Site on line (SP or Time only) 1 No High resolution seismic reflection Crossing Lines(s): Primary Line(s): KR9806-1 SP1740 2 Yes Location of Site on line (SP or Time only) **Deep Penetration** seismic reflection Crossing Lines(s): KR0211-S0 nearby Stacking velocity and migration velocity from MCS lines. OBS data. 3 Seismic Velocity<sup>†</sup> Yes 4 Seismic Grid Yes 5a Refraction Yes Two ship COP (maximum offset 20 km) obtained by JAMSTEC. (surface) OBS data by Nakanishi et al. (1997) 5b Refraction Yes (near bottom) Location of Site on line (Time) 3.5 kHz 6 7 Swath Yes Multi-narrow-beam data by JAMSTEC R/V Yokusuka. bathymetry 8a Side-looking No sonar (surface) Side-looking 8b No sonar (bottom) 9 Photography No or Video 10 Heat Flow Yes. Compiled map published from AIST, Japan. 11a Magnetics Yes Compiled map published from AIST, Japan. 11b Gravity Yes 12 Sediment cores No 13 Rock sampling No Available on JODC web page (http://www.jodc.go.jp) Water current data 14a Ice Conditions 14b OBS Yes 15 microseismicity Yes Navigation 16 Other 17

 SSP Classification of Site:
 SSP Watchdog:
 Date of Last Review:

 SSP Comments:
 Date of Last Review:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

all gray boxes

## Form 3 - Detailed Logging Plan

## **IODP Site Summary Forms:**

Γ

New	Revised

Proposal #: 603D-Full	Site #: NT1-02A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 4210	Sed. Penetration (m): 730	Basement Penetration (m): 40

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗌	No	
Are high temperatures expected at this site?	Yes 🗆	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	
If "Yes" Please describe requirements: No logging planned. S	ite will have bee	n logged in	previous phase.

CORK installation only

What do you estimate the total logging time for this site to be: 12 days (CORK/casing install)

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

## Form 4 – Pollution & Safety Hazard Summary

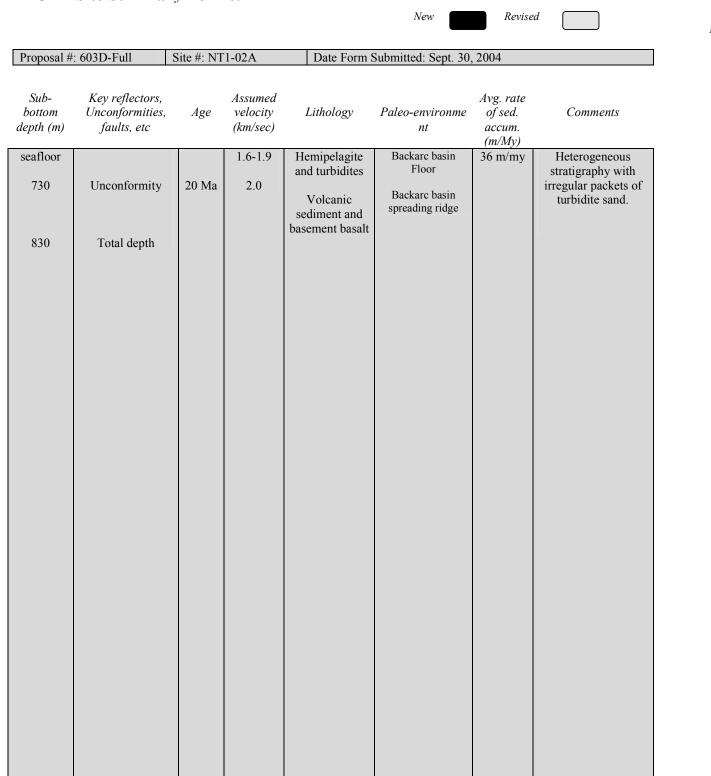
# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New	Revised

Р	roposal #: 603D-Full	Site #: NT1-02A	Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited coring to confirm monitor	ring intervals for CORK. CORK installation
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	May need casing of sandy turbidites prinstallation.	rior to basement drilling/basement CORK
7	What abandonment procedures do you plan to follow:	None. Holes will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current. Typhoon season (J	une to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

#### Form 5 – Lithologic Summary



New



## Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New Revised

Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites
Date Form Submitted:	Sept. 30, 2004
Site Specific Objectives with Priority	Reference site to characterize hydrology of decollement and underlying turbidites at the toe of the accretionary prism and to monitor micro-seismicity and strain. Objectives are to install CORK to monitor hydrologic properties and fluid-flow signals within and below the frontal décollement zone.
(Must include general objectives in proposal)	
List Previous Drilling in Area:	This site would be a return to NT1-03A, which is proposed to be drilled in 603A-Full2 (NantroSEIZE Reference Sites).

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT1-03A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 33 N	Min: 1.23258	Jurisdiction:	Japan
Longitude:	Deg: 136 E	Min: 47.94852	Distance to Land:	100 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Ot	her ( )		
Priority of Site:	Primary:x	Alt:	Water Depth:	4125 m

	Sediments				Basement					
Proposed Penetration:	1200									
(m)	What is the total s	ed. thickr	ness? 1740	m	l					
							Tot	tal Penetra	ation: 1200	m
General Lithologies:		sand	turbidites	·	sh	layers,				
	emipelagic m	nud an	d mudston	e						
Coring Plan:	Limited cori	ng as i	necessary (	to coi	nfirr	n screet	n loca	tions fo	r CORKs	
(Specify or check)	1-2-3-APC 🔲 V	PC*	CB DIDCB	*	CS	R <b>GB</b> R	ehtry	Н∏јВ		
Wireline Logging	Standard T	aala	 [					* Sy:	stems Currently Unde	
Plan:	Standard T				-	ial Tool		r <b>–</b>		
	Neutron-Porosity		Borehole Tele Nuclear Magn			Formation Borehole 7		ampling 🗌 ure		
	Litho-Density		Resonance			& Pressure	-		Resistivity-Gan	nma Ray 🗀
	Gamma Ray		Geochemical			Borehole S	Seismic		Acoustic	
	Resistivity		Side-Wall Cor	e		Limited me fill gaps fron		ts if needed t	to	
	Resistivity		Sampling			drilling.	ii pievious	(Thase I)		
	Acoustic									
Max.Borehole	Formation Image Expected value (I	For Rise	r Drilling)		-	Others (		)	Others (	)
Temp. :			-°C							
Mud Logging:	Cuttings Sam	pling I	ntervals							
(Riser Holes Only)	fron	n	m	to			m,		m inter	vals
	fron	n	m	to			m,		m inter	vals
								В	asic Sampling In	tervals: 5m
Estimated days:	Drilling/Coring:	-				casing/CO	RKs)	Total On-	Site: 18 days	
Future Plan:	Longterm Boreho Long term me						and de	collem	ent	
		0111011		(3) 01	un	oranes a	and ac	Concin	ciit.	
Hazards/	Please check foll	owing L	ist of Potentia	l Haza	rds				What is your	
Weather:	Shallow Gas	Comp	olicated Seabed Co	ondition	Hydi	rothermal Ac	tivity		window? (Pr period with the	
	Hydrocarbon	Soft	Seabed		Lands	lide and Turt	oidity Cur	rent	April-July:	
	Shallow Water Flow	Curre	ents		Metha	ine Hydrate			Avoid typho season	on
	Abnormal Pressure	Fract	ured Zone		Diapir	and Mud Vo	olcano		5645011	
	Man-made Objects	Fault			High 1	Femperature				
	H <sub>2</sub> S	High	Dip Angle		Ice Co	onditions				
	CO <sub>2</sub>									

#### Form 2 - Site Survey Detail

#### **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

'roposal #: 603D-Full Site #: NT1-03A Date Form Submitted: Sept. 30, 2004 SSP Requir-Exists Data Type Details of available data and data that are still to be collected ements In DB Primary Line(s) :Location of Site on line (SP or Time only) 1 No High resolution seismic reflection Crossing Lines(s): Primary Line(s): KR0108-4 SP16550 2 Yes Location of Site on line (SP or Time only) **Deep Penetration** seismic reflection Crossing Lines(s): Stacking velocity and migration velocity from MCS lines. OBS data. 3 Seismic Velocity<sup>†</sup> Yes 4 Seismic Grid Yes 5a Refraction Yes Two ship COP (maximum offset 20 km) obtained by JAMSTEC. (surface) OBS data by Nakanishi et al. (1997) 5b Refraction Yes (near bottom) Location of Site on line (Time) 3.5 kHz 6 7 Swath Yes Multi-narrow-beam data by JAMSTEC R/V Yokusuka. bathymetry 8a Side-looking No sonar (surface) 8b Side-looking No sonar (bottom) 9 Photography No or Video 10 Heat Flow Yes. Compiled map published from AIST, Japan. 11a Magnetics Yes Compiled map published from AIST, Japan. 11b Gravity Yes 12 Sediment cores No 13 Rock sampling No Available on JODC web page (http://www.jodc.go.jp) Water current data 14a Ice Conditions 14b OBS Yes 15 microseismicity Yes Navigation 16 Other 17

 SSP Classification of Site:
 SSP Watchdog:
 Date of Last Review:

 SSP Comments:
 Date of Last Review:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

# Form 3 - Detailed Logging Plan

# **IODP Site Summary Forms:**

New	Re

Proposal #: 603D-Full	Site #: NT1-03A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 4125	Sed. Penetration (m): 1200	Basement Penetration (m): 0
	· · · ·	

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗌	No	•
Are high temperatures expected at this site?	Yes 🗌	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	
If "Yes" Please describe requirements: No logging planned. S	ite will have been	n logged in	previous phase.

CORK installation only

What do you estimate the total logging time for this site to be: 12 days (CORK/casing install)

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

# Form 4 – Pollution & Safety Hazard Summary

# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

Р	roposal #: 603D-Full	Site #: NT1-03A	Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited coring to confirm	n monitoring intervals for CORK. CORK installation
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	May need shallow casing to to stab	ilize sandy turbidites.
7	What abandonment procedures do you plan to follow:	None. Holes will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current. Typhoon	season (June to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current, instability of accreted tren	ch turbidites.

# Form 5 – Lithologic Summary

IODP	Site Summa	ry Forn	18:		New	Revise	ed
Proposal #	: 603D-Full	Site #: NT	1-03A	Date Form S	Submitted: Sept. 30,	, 2004	
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environme nt	Avg. rate of sed. accum. (m/My)	Comments
seafloor			1.5	Hemipelagite + volcanic ash	Upper Shikoku Basin		
230	Fault	Quater nary	1.6-1.8	turbidites	Trench wedge		Probably contains thick layers of unconsolidated sands.
790	Reflector	Pleisto cene	1.9	hemipelagite and volcanic ash	Upper Shikoku Basin		
1000	Reflector	Plio- Mioce ne	2.4	hemipelagite + turbidite	Lowe Shikoku Basin		Heterogeneous stratigraphy with irregular packets of sand or sandstone
1200	Total depth						

New



## Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New Revised

Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites							
Date Form Submitted:	Sept. 30, 2004 One CORK hole with screened interval in turbidites and sealed basement.							
Site Specific Objectives with Priority	Companion CORK hole with fully cased sediment and open basement. Objectives are to document variations in turbidite and basement fluid flow between NT1-02A and deformation front.							
(Must include general objectives in proposal)	No seisstific deilling in immediate sinisite DSDD 97 ODD 121, 100 and 100							
List Previous Drilling in Area:	No scientific drilling in immediate vicinity. DSDP 87, ODP 131, 190, and 196 were conducted about 200 km SW of this proposal's sites.							

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT1-05A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 33 N	Min: 01.3482	Jurisdiction:	Japan
Longitude:	Deg: 137 E	Min: 3.3432	Distance to Land:	120 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Ot	her ( )	·	
Priority of Site:	Primary:	Alt:x	Water Depth:	4310 m

# Section C: Operational Information

	Sediments				Basement		
Proposed Penetration:	1528			40			
(m)	What is the total sed. thickr	less? 1528	m				
	~ 44 44 4				Penetrat	tion: 1568 m	
General Lithologies:	Possible silt/mud t Hemipelagic mud		-	s Basalt			
	memperagic muu						
Coring Plan: (Specify or check)	APC/XCB to refus	al, RCB to TI	).				
(specify or eneck)	1-2-3-APC <b>■</b> VPC*	CB DCB*	CS R	Rehtry	H <b></b> B * Svst	tems Currently Under Development	
Wireline Logging	Standard Tools		Special	Tools	595	LWD	
Plan:	Neutron-Porosity	Borehole Teleview	rer 🗌 🛛 For	mation Fluid Sam	oling 🗌	Density-Neutron	
	Litho-Density	Nuclear Magnetic Resonance		ehole Temperature ressure		Resistivity-Gamma Ray	
	Gamma Ray	Geochemical	□ Bore	ehole Seismic		Acoustic	
	Resistivity	Side-Wall Core Sampling					
	Acoustic	Sumpling					
	Formation Image		Othe	rs (	)	Others ( )	
Max.Borehole Temp. :	Expected value (For Rise	r Drilling) °C					
Mud Logging:	Cuttings Sampling I	ntervals					
(Riser Holes Only)	from	m t	.0	m,		m intervals	
	from	m t		m,		m intervals	
					Bc	asic Sampling Intervals: 5m	
Estimated days:	Drilling/Coring: 18 days	Logging: 7 lo 12 CORK/ca		То	tal On-S	Site: 37 days	
Future Plan:	Longterm Borehole Obse	rvation Plan/Re-en	ntry Plan	. 1	1 •	1.	
	Long term monitori	ng (CORKs) (	of basem	ent and over	lying	sediments.	
Hazards/	Please check following L	ist of Potential Ha	ards			What is your Weather	
Weather:	Shallow Gas Comp	licated Seabed Condition		mal Activity	_	window? (Preferable	
						period with the reasons)	
	Hydrocarbon Soft	Seabed	Landslide a	nd Turbidity Current		April-July: Avoid typhoon	
	Shallow Water Flow  Curre	ents	Methane H	ydrate		season	
	Abnormal Pressure 🔲 Fract	ured Zone	Diapir and	Mud Volcano			
	Man-made Objects 🔲 Fault		High Temp	erature			
	H <sub>2</sub> S High	Dip Angle	Ice Conditi	ons			
	CO <sub>2</sub>						

# Form 2 - Site Survey Detail

## **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

'roposal #	oposal #: 603D-Full Site #: NT1-05A Date Form Submitted: Sept. 30, 2			Date Form Submitted: Sept. 30, 2004	
	Data Type	SSP Requir- ements	Exists In DB		and data that are still to be collected
1	High resolution seismic reflection		No	Primary Line(s) Crossing Lines(s):	:Location of Site on line (SP or Time only)
2	Deep Penetration seismic reflection		Yes	Primary Line(s): KR9806-1 SP2922 Crossing Lines(s): KY0314-100 SP 3	Location of Site on line (SP or Time only)
3	Seismic Velocity <sup>†</sup>		Yes	Stacking velocity and migration v	velocity from MCS lines. OBS data.
4	Seismic Grid		Yes		
5a	Refraction (surface)		Yes	Two ship COP (maximum offset 2	20 km) obtained by JAMSTEC.
5b	Refraction (near bottom)		Yes	OBS data by Nakanishi et al. (199	97)
6	3.5 kHz				Location of Site on line (Time)
7	Swath bathymetry		Yes	Multi-narrow-beam data by JAM	STEC R/V Yokusuka.
8a	Side-looking sonar (surface)		No		
8b	Side-looking sonar (bottom)		No		
9	Photography or Video		No		
10	Heat Flow		Yes.		
11a	Magnetics		Yes	Compiled map published from Al	IST, Japan.
11b	Gravity		Yes	Compiled map published from Al	IST, Japan.
12	Sediment cores		No		
13	Rock sampling		No		
14a	Water current data			Available on JODC web page (htt	tp://www.jodc.go.jp)
14b	Ice Conditions				
15	OBS microseismicity		Yes		
16	Navigation		Yes		
17	Other				

SSP Classification of Site: SSP Watchdog: Date of Last Review: SSP Comments:

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

# Form 3 - Detailed Logging Plan

# **IODP Site Summary Forms:**

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#### New

Revised

Proposal #: 603D-Full	Site #: NT1-05A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 4310	Sed. Penetration (m): 1528	Basement Penetration (m): 40

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗆	No	
Are high temperatures expected at this site?	Yes 🗌	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	
If "Yes" Please describe requirements:			

What do you estimate the total logging time for this site to be: 7 days logging, 12 days CORK/casing install

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity	Estimation of water content in sedimentary sequences and basement.	1
Litho-Density	Estimation of water content, bulk density, and mineral composition in sedimentary sequences and basement.	1
Natural Gamma Ray	Estimation of clay contents and mineral composition in sedimentary sequences and basement.	1
Resistivity-Induction	Estimation of water content and electromagnetic properties in sedimentary sequence and basement.	1
Acoustic	Determination of in situ velocity and estimation of physical properties. Comparsion with seismic velocity and create synthetic seismograms.	1
FMS	Imaging of sedimentary structures and fractures. Core-log correlation of structural features.	2
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)	Estimation of water contents, bulk density and lithology in unstable borehole environments.	1
Resitivity-Gamma Ray (LWD)	Estimation of water contents, electro-magnetic properties, and lithology in unstable borehole environment.	1
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	Packer: hydrologic tests of sediment + basement VSP: core-log-seismic integration CORK: monitoring of sediment P, T, chem	1

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of penetration or significant basement
at: borehole@ldeo.columbia.edu	penetration of significant basement penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	

Т

# Form 4 – Pollution & Safety Hazard Summary

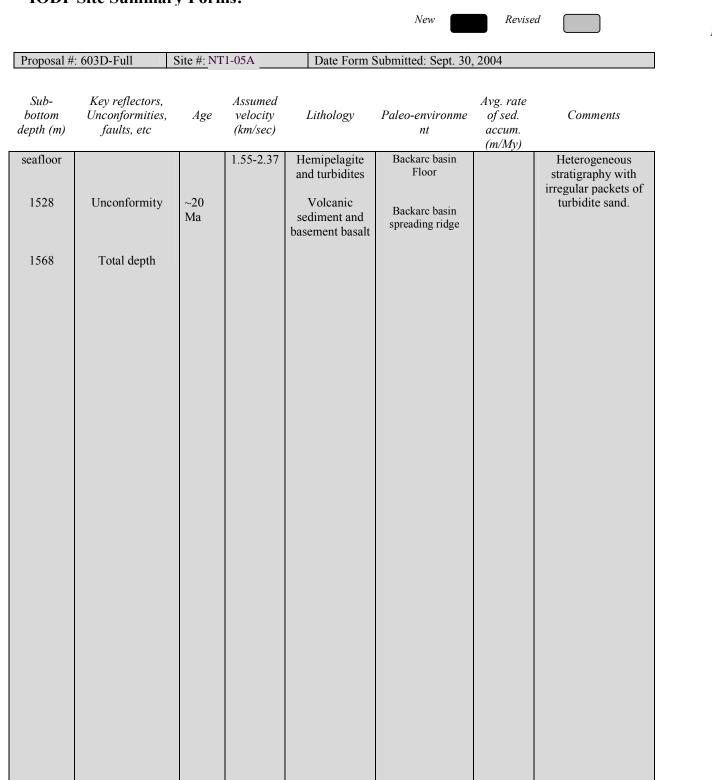
# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New Revised

Р	roposal #: 603D-Full	Site #: NT1-05A	Date Form Submitted: Sept. 30, 2004
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	APC to refusal, XCB to refusal.	RCB to TD, log. CORK installation.
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	May need casing of sandy t installation.	urbidites prior to basement drilling/basement CORK
7	What abandonment procedures do you plan to follow:	None. Holes will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current. Typho	on season (June to Oct)
9	Summary: What do you consider the major risks in drilling at this site?	Current	

#### Form 5 – Lithologic Summary



New

# iSAS/IODP Site Summary Forms: Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002



Section A: Proposal Information

Title of Proposal:	NanTroSEIZE Reference Sites: Sampling and Measuring Inputs to the Seismogenic Zone						
Date Form Submitted:	3/31/05						
Site Specific Objectives with Priority (Must include general objectives in proposal)	One CORK hole with screened interval in turbidites and sealed basement. Companion CORK hole with fully cased sediment and open basement. Reference site to characterize hydrology of Shikoku Basin strata and upper igneous crust where basement topography is relatively flat. Objectives are to document how stratigraphy, basement topography, and thermal structure affect the physical and hydrologic properties of subduction inputs.						
List Previous Drilling in Area:	This site would be a return to NT1-06A, proposed as an alternate to NT1-02A from proposal 603A-Full2 (NantroSEIZE Reference Sites).						

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT01-06A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Nankai Trough off Kii
Latitude:	Deg: 32 N	Min: 51.35	Jurisdiction:	Japan
Longitude:	Deg: 137 E	Min: 17.58	Distance to Land:	145 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Other	r ( )		
Priority of Site:	Primary:	Alt: X	Water Depth:	4200 m

# Section C: Operational Information

	S	Basement					
Proposed	990 m			40 m			
Penetration: (m)	What is the total sed. this	ckness? 990 m					
				Te	otal Penetra	tion: 1030	m
General Lithologies:	Silt and sand tur	bidites, ash layers	,	Basalt		·	
	hemipelagic muc	d and mudstone					
Coring Plan:	Limited coring a	s necessary to con	firm of	roon loor	ations for	COPKa	
(Specify or check)	e	5					
	1-2-3-APC VPC	C* XCB MDCB*	PCS []	RCB 🕅 Re		HRGB	elopment
Wireline Logging Plan:	Standard Tools	S	Special 7	Tools		LWD	
I lall.	Neutron-Porosity	Borehole Televiewer	Form	nation Fluid	Sampling 🗌		
	Litho-Density	Nuclear Magnetic		ehole Temper	<sup>rature</sup> 🖂	Resistivity-Gamma	<sup>Ray</sup> □
	Gamma Ray	Resonance Geochemical	_	essure nole Seismic		Acoustic	
				d measuremen			
	Resistivity	Side-Wall Core Sampling		ps from previo			
		Sampling	drillin	ıg.			
	Acoustic Formation Image		Othe	re ( )		Others ()	
Max.Borehole	Tormation image —	alue (For Riser	Oute	.5 (	)	Others ( )	
Temp. :	_	ming)					
Mud Logging:	Cuttings Sampling	0/					
(Riser Holes Only)	from	-		m,		m intervals	
	from	m to		m,		m intervals	
	B	asic Sampling In	tervals	: 5m			
Estimated days:	Drilling/Coring: 7 days	s Logging: 12 da	ys (casing	/CORK)	Total On-	Site: 19 days	
Future Plan:	Lon	gterm Borehole (	Theory	ation Pla	n/Ro_on	try Plan	
	CORK observato	•	JUSCIV	ation 1 17	111/ IXC-CII	ti y 1 ian	
<b>II 1</b> - /		, y					
Hazards/ Weather:		following List o			ards	What is your Wea window? (Prefere	
	Shallow Gas	omplicated Seabed Condition	Hydrotheri	nal Activity		period with the rea	
	Hydrocarbon S	oft Seabed	Landslide at	nd Turbidity Cu	urrent	April-July :	
	Shallow Water Flow	Currents	Methane Hy	drate		avoid typhoon season	
	Abnormal Pressure 🔲 Fi	ractured Zone	Diapir and N	Iud Volcano			
	Man-made Objects 🔲 Fa	ault	High Tempe	rature			
	H <sub>2</sub> S H	ligh Dip Angle	Ice Conditio	ns			
	CO <sub>2</sub>						

# Form 2 - Site Survey Detail

osal	l #: 603A-Full Site #: NT01-06A		Site #:	: NT01-06A New Revised
	Data Type	SSP Requir- ements	Exists In DB	Details of available data and data that are still to be collected
1	High resolution seismic reflection		Yes	Primary Line(s)       :Location of Site on line (SP or Time only)         odkm03-103-1 SP2860       Crossing Lines(s): odkm03-ACA SP2175
2	Deep Penetration seismic reflection		Yes	Primary Line(s):       Location of Site on line (SP or Time only)         KR9806-1 nearby         Crossing Lines(s):         KR0211-S0 nearby
3	Seismic Velocity <sup>†</sup>		Yes	Stacking velocity and migration velocity from MCS lines. OBS data
4	Seismic Grid		Yes	
5a	Refraction (surface)		Yes	Two ship COP (maximum offset 20 km) obtained by JAMSTEC at the e of September, 2002.
5b	Refraction (near bottom)		Yes	OBS data by Nakanishi et al. (1997)
6	3.5 kHz		No	Location of Site on line (Time)
7	Swath bathymetry		Yes	Multi-narrow-beam data by JAMSTEC R/V Yokosuka
8a	Side-looking sonar (surface)		No	
8b	Side-looking sonar (bottom)		No	
9	Photography or Video		No	
10	Heat Flow		Yes	
11a	Magnetics		Yes	Compiled map published from AIST, Japan
11b	Gravity		Yes	Compiled map published from AIST, Japan
12	Sediment cores		No	
13	Rock sampling		No	
14a	Water current data			Available on JODC web page (http://www.jodc.go.jp)
14b	Ice Conditions			
15	OBS microseismicity		Yes	
16	Navigation		Yes	

# Form 3 - Detailed Logging Plan

			New Revis	ed 🦳
Proposal #: 603D-Full2		Site #: NT01-06A	Date Form Submitted: 3	3/31/05
Water Depth (m): 4200		Sed. Penetration (m): 990	Basement Penetration (1	m): 40
Do you need to use the conical s Are high temperatures expected Are there any other special requ If "Yes" Please describe re	at this si irements	te? Yes $\square$ No	$\stackrel{\boxtimes}{\boxtimes}$ n logged in previous phase	Se
What do you estimate the total l	ogging ti	me for this site to be: <u>12 days casing</u>	CORK install	Relevance
Measurement Type		Scientific Objective		(1=high, 3=Low)
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK			

# iSAS/IODP Site Summary Forms:

# iSAS/IODP Site Summary Forms: Form 4 – Pollu

# Form 4 – Pollution & Safety Hazard Summary

Please fill out information in all gray boxes

New	Revised		
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Р	roposal #: 603D-Full2	Site #: NT01-06A	Date Form Submitted: 3/31/05
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited coring to confirm monitorin installation	g intervals for CORK. CORK
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None	
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None	
4	Are there any indications of gas hydrates at this location?	No	
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No	
6	What "special" precautions will be taken during drilling?	Standard monitoring of C $_1$ to C $_n$ ; shallow casi sandy turbidite layers.	ng may be needed to stabilize shallow
7	What abandonment procedures do you plan to follow:	None. Will be CORKed.	
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio current, typhoon (June to Oct	t.)
9	Summary: What do you consider the major risks in drilling at this site?	Kuroshio Current	

	ODP Site Su				New	Rev	ised
Proposal #	: 603D-Full2	Site #: NT	01-06A	Date Form S	Submitted: 3/31/05		
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo- environment	Avg. rate of sed. accum. (m/My)	Comments
990	unconformity	Holocene to lower Miocene	1.6-1.9	Hemipelagite + volcanic ash + turbidites	backarc basin floor	36 m/My	Heterogeneous stratigraphy with irregular packets of turbidite sand
		20 Ma	2.0	volcanic sediment and basement basalt	backarc basin		

# Form 5 – Lithologic Summary

# 603D-Full2

## Form 1 - General Site Information

Please fill out information in all gray boxes Revised 7 March 2002 New Revised

Section A: Proposal Information

Title of Proposal:	The Nankai Trough Seismogenic Zone Experiment: Observatory Science at the Reference Sites
Date Form Submitted:	Sept. 30, 2004 CORK monitoring for material properties, strain, geochemistry seaward of deep
Site Specific Objectives with Priority	riser hole (NT3-01). Monitoring intervals in clay-rich horizon (for strain) and in sandy horizon (for diffusive signal). Target depths will be refined based on prior drilling.
(Must include general objectives in proposal)	
List Previous Drilling in Area:	This site would be a return to NT2-04A which is proposed to be drilled in 603B-Full2.

#### Section B: General Site Information

Site Name: (e.g. SWPAC-01A)	NT2-04A	If site is a reoccupation of an old DSDP/ODP Site, Please include former Site #	Area or Location:	Kumano Basin off Kii
Latitude:	Deg: 33 N	Min: 23.4	Jurisdiction:	Japan
Longitude:	Deg: 136 E	Min: 34.6'	Distance to Land:	60 km to Cape Shiono-Misaki
Coordinates System:	WGS 84, Ot	her ( )		
Priority of Site:	Primary:x	Alt:	Water Depth:	1990 m

	Sediments						Basement			
Proposed	1400					40				
Penetration:			2 1400							
(m)	What is the total	sed. thickn	less? 1400	m	1		Tota	1 Penetra	ution: 1440 m	
General Lithologies:	Forearc b	asin s	sediment	unco	onfo	rmably	1014	ii i enetre		
	laying on a					2				
	Complex.									
Coring Plan: (Specify or check)	Limited cor	ing as i	necessary t	o coi	nfir	m screen	locati	ions fo	r CORKs	
(specify or enecty	1-2-3-APC	VPC*	]CB _IDCB	*	¢S	R <b>GB</b> Re	htry	H⊟B * Sv	stems Currently Under Developm	nent
Wireline Logging	Standard 7	Tools			Spec	cial Tools			LWD	
Plan:	Neutron-Porosity		Borehole Tele	viewer		Formation I	Fluid Sa	mpling 🗌	] Density-Neutron	
	Litho-Density		Nuclear Magn Resonance	etic		Borehole Ter & Pressure	mperatui	re	Resistivity-Gamma Ray	
	Gamma Ray		Geochemical			Borehole Se	ismic		Acoustic	
			Side-Wall Core	2		Limited measu	irements i	f needed to		
	Resistivity		Sampling	5		ll gaps from pr	evious (Pl	hase I)		
	Acoustic					tilling.				
	Formation Image					Others (		)	Others ( )	
Max.Borehole Temp. :	Expected value	For Rise	r Drilling) ≏C							
Mud Logging:	Cuttings Sam	npling II	- • /							
(Riser Holes Only)	from	n	m	to		1	m, _		m intervals	
	from	n	m	to		1	m, _		m intervals	
								В	asic Sampling Intervals:	5m
Estimated days:	Drilling/Coring:	4	Logging	6 cas	ing/C	CORK instal	1 1	Fotal On-	Site: 10 days	
Future Plan:	Longterm Boreh				y Pla	ın				
	Long term m	onitori	ng (CORK	(s).						
Hazards/										
Weather:	Please check fol Shallow Gas	0	<i>ist of Potentia</i> licated Seabed Co			rothermal Activ	vity		What is your Weather window? (Preferable	
	Silanow Gas		meated Seabed Ce		IIyu	notiterinai Activ	vity		period with the reasons	
	Hydrocarbon	Soft S	Seabed		Land	slide and Turbic	dity Curre		April-July:	
	Shallow Water Flow	Curre	ents		Meth	ane Hydrate			Avoid typhoon season	
	Abnormal Pressure	Fract	ured Zone		Diapi	r and Mud Volc	cano			
	Man-made Objects	🔲 Fault			High	Temperature				
	$H_2S$	High	Dip Angle		Ice C	onditions				
	CO <sub>2</sub>									

# Form 2 - Site Survey Detail

# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New

Revised

'roposal #: 603D-Full		Site #:	NT2-04A	Date Form Submitted: Sept. 30, 2004	
	Data Type	SSP Requir- ements	Exists In DB	Details of available data	and data that are still to be collected
1	High resolution seismic reflection		Yes	Primary Line(s) JAMSTEC Line 1 Feb. 2003) Crossing Lines(s): JAMSTEC Line (I	:Location of Site on line (SP or Time only) Feb. 2003)
2	Deep Penetration seismic reflection		Yes	Primary Line(s): KR0108-4 Crossing Lines(s):	Location of Site on line (SP or Time only)
3	Seismic Velocity <sup>†</sup>		Yes	Stacking velocity and migration v	velocity from MCS lines. OBS data.
4	Seismic Grid		Yes		
5a	Refraction (surface)		Yes	Two ship COP (maximum offset	20 km) obtained by JAMSTEC.
5b	Refraction (near bottom)		Yes	OBS data by Nakanishi et al. (199	97)
6	3.5 kHz				Location of Site on line (Time)
7	Swath bathymetry		Yes	Multi-narrow-beam data by JAM	STEC R/V Yokusuka.
8a	Side-looking sonar (surface)		Yes	Some data collected using IZANA	AGI side scan sonar.
8b	Side-looking sonar (bottom)		No		
9	Photography or Video		Yes	Taken by JAMSTEC submersible	?S.
10	Heat Flow		Yes.		
11a	Magnetics		Yes	Compiled map published from Al	IST, Japan.
11b	Gravity		Yes	Compiled map published from Al	IST, Japan.
12	Sediment cores		Yes	Gravity and piston cores.	
13	Rock sampling		No		
14a	Water current data			Available on JODC web page (htt	tp://www.jodc.go.jp)
14b	Ice Conditions				
15	OBS microseismicity		Yes		
16	Navigation		Yes		
17	Other				

SSP Classification of Site:	SSP Watchdog:	Date of Last Review:
SSP Comments:		

X=required; X\*=may be required for specific sites; Y=recommended; Y\*=may be recommended for specific sites; R=required for re-entry sites; T=required for high temperature environments; † Accurate velocity information is required for holes deeper than 400m.

# Form 3 - Detailed Logging Plan

# **IODP Site Summary Forms:**

New	Revised

Proposal #: 603D-Full	Site #: NT2-04A	Date Form Submitted: Sept. 30, 2004
Water Depth (m): 1990	Sed. Penetration (m): 1400	Basement Penetration (m): 40

Do you need to use the conical side-entry sub (CSES) at this site?	Yes 🗆	No	•
Are high temperatures expected at this site?	Yes 🗆	No	
Are there any other special requirements for logging at this site?	Yes 🗆	No	•
If "Yes" Please describe requirements: No logging planned. S	ite will have bee	n logged in	previous phase.

CORK installation only

What do you estimate the total logging time for this site to be: 6 days (install casing/CORK)

Measurement Type	Scientific Objective	Relevance (1=high, 3=Low)
Neutron-Porosity		
Litho-Density		
Natural Gamma Ray		
Resistivity-Induction		
Acoustic		
FMS		
BHTV		
Resistivity-Laterolog		
Magnetic/Susceptibility		
Density-Neutron (LWD)		
Resitivity-Gamma Ray (LWD)		
Other: Special tools (CORK, PACKER, VSP, PCS, FWS, WSP	CORK	

For help in determining logging times, please contact the ODP-LDEO Wireline Logging Services group	Note: Sites with greater than 400 m of
at:	penetration or significant basement
borehole@ldeo.columbia.edu	penetration require deployment of
http://www.ldeo.columbia.edu/BRG/brg_home.html	standard toolstrings.
Phone/Fax: (914) 365-8674 / (914) 365-3182	-

# Form 4 – Pollution & Safety Hazard Summary

# **IODP Site Summary Forms:**

Please fill out information in all gray boxes

New	Revised
New	Revised

Proposal #: 603D-Full		Site #: NT2-04A		Date Form Submitted: Sept. 30, 2004		
1	Summary of Operations at site: (Example: Triple-APC to refusal, XCB 10 m into basement, log as shown on page 3.)	RCB with limited co installation	ring to confirm monitori	ing intervals for CORK to 1450 m. CORK		
2	Based on Previous DSDP/ODP drilling, list all hydrocarbon occurrences of greater than background levels. Give nature of show, age and depth of rock:	None				
3	From Available information, list all commercial drilling in this area that produced or yielded significant hydrocarbon shows. Give depths and ages of hydrocarbon-bearing deposits.	None				
4	Are there any indications of gas hydrates at this location?	Yes, MCS profile sho	ows BSR.			
5	Are there reasons to expect hydrocarbon accumulations at this site? Please give details.	No				
6	What "special" precautions will be taken during drilling?	May need casing to to	o stabilize shallow sedim	ents.		
7	What abandonment procedures do you plan to follow:	None. Holes will be (	CORKed.			
8	Please list other natural or manmade hazards which may effect ship's operations: (e.g. ice, currents, cables)	Strong Kuroshio curr	ent. Typhoon season (Jur	ne to Oct)		
9	Summary: What do you consider the major risks in drilling at this site?	Current, instability of	f shallow sediments.			

# Form 5 – Lithologic Summary

		_,			New	Revise	d	
Proposal #	: 603D-Full	Site #: NT	2-04A	Date Form	Submitted: Sept. 30	, 2004		
Sub- bottom depth (m)	Key reflectors, Unconformities, faults, etc	Age	Assumed velocity (km/sec)	Lithology	Paleo-environme nt	Avg. rate of sed. accum. (m/My)	Comments	
seafloor 1400	Unconformity	Holocen e to Late tertiary	1.5-2	Turbidites and hemipelagic sediments	Forearc basin sediments			
1450	Total depth							

New