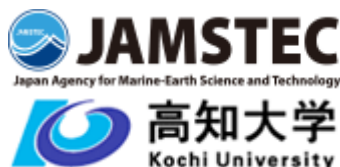

Press Releases



February 9, 2016
JAMSTEC
Kochi University

Cobalt-rich Ferromanganese Crust Extended beyond 5,500m Depth in Ocean - A big leap for elucidation of genesis -

Overview

A research team formed by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC: Asahiko Taira, President) and Kochi University (Hiroshi Wakiguchi, President) carried out a research cruise of cobalt-rich ferromanganese crusts in the southern slope of the Takuyo Daigo Seamount located 1,800 km southeast of Japan^{*1} ([figure 1](#)), using a remotely operated vehicle, *Kaiko Mk-IV* ([figure 2](#)). As a result, the team found cobalt-rich ferromanganese crusts thoroughly covered the seamount slope, which are extended even beyond depths of 5,500m. Such a large scale discovery of cobalt-rich ferromanganese crusts in the deep sea is the first in the world. Samples were also collected to elucidate the genetic processes and concentration mechanism of useful metals.

Cobalt-rich ferromanganese crusts are a promising resource^{*2} for useful metals and rare earth elements as they contain relatively large amounts of cobalt, nickel, and platinum. This scientific achievement is expected to lead to further technology development of marine resource survey.

This project has been implemented as part of "Scientific Research on Genesis of Marine Resources" for "Next-generation Technology for Ocean Resources Exploration," an initiative that is part of the "Cross-ministerial Strategic Innovation Promotion Program (SIP)"^{*3} by the Japanese government."

*1 Deep sea research vessel *KAIKEI* Cruise KR16-01 leg1

Cruise period: January 9 - January 30, 2016

Chief Scientist: Koichi Iijima, Research and Development Center for Submarine Resources, JAMSTEC

*2 Economic value of cobalt-rich ferromanganese crusts

According to Japan Project-Industry Council (JAPIC), economic value of cobalt-rich ferromanganese crusts is estimated to be 100 trillion yen on the assumption that yield of minerals is 45% in Japanese exclusive economic zone. No commercial mining is realized so far. Environmental assessment technology is necessary to establish mining technology. It has been addressed by one of issues in the Cross-ministerial Strategic Innovation Promotion Program (SIP), "Research and Development of Monitoring and Forecasting Systems for Marine Ecosystem Management," which aims to set global standards for evaluation methods. At JAMSTEC, Hiroyuki Yamamoto is leading the project as leader at Ecosystem

Observation and Evaluation Methodology Research Unit, Project Team for Development of New-generation Research Protocol for Submarine Resources represents.

***3 Cross-ministerial Strategic Innovation Promotion Program (SIP)**

In 2014, the Cross-ministerial Strategic Innovation Promotion Program (SIP) was established with a 5-year plan as a national project for science, technology, and innovation, spearheaded by the Council for Science, Technology and Innovation (CSTI) as it exercises its headquarters function to accomplish its role in leading science, technology and innovation beyond the framework of government ministries and traditional disciplines. A total of 11 issues has been identified by the CSTI. JAMSTEC is responsible for the "Next-generation Technology for Ocean Resources Exploration (Zipangu in the Ocean: Tetsuro Urabe acting as Program Director, Professor Emeritus at Graduate School of Science, the University of Tokyo / Advisor at Japan Mining Engineering & Training Center), carrying out scientific research on ocean resource genesis, development of ocean resource exploration technology and ecosystem research with its long-term monitoring technology. The plan thus far is that these technologies will be directly applicable to private sectors.

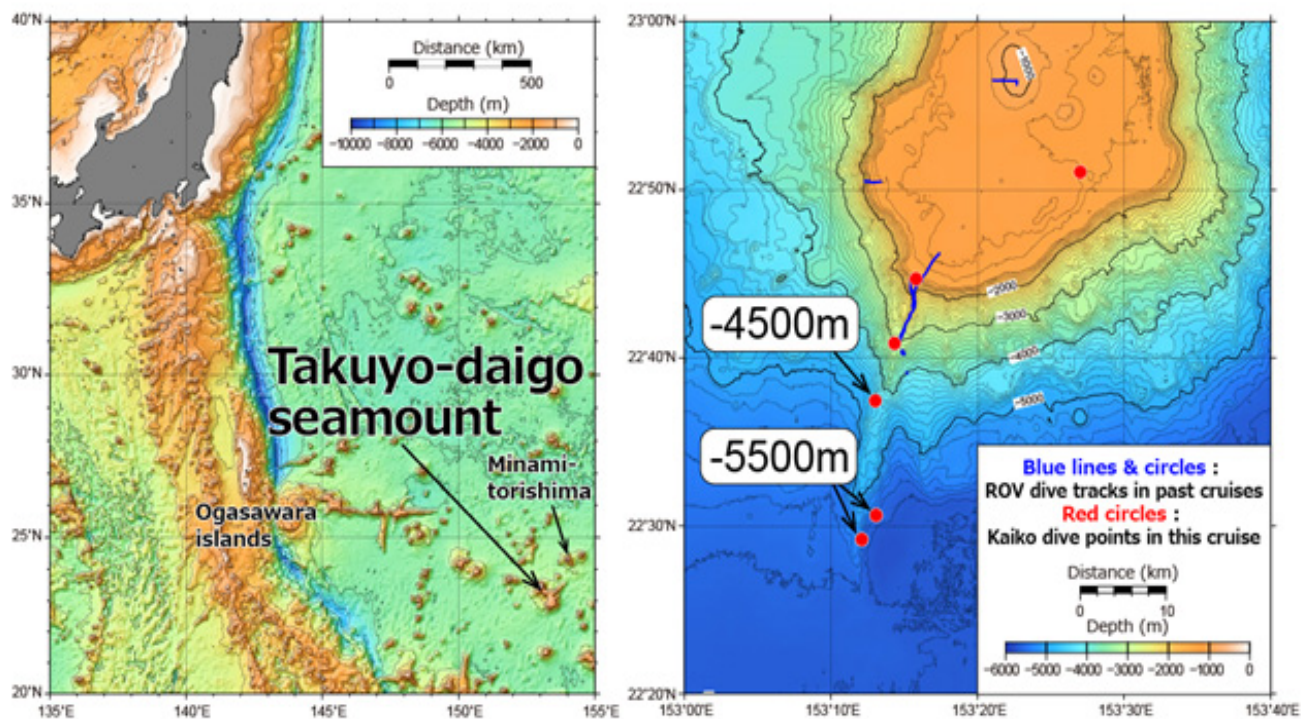


Figure 1: Left) Location of Takuyo-daigo Seamount; Right) Bathymetric chart of Takuyo-daigo Seamount. The red circles indicate dive points where cobalt-rich crusts have been discovered in this cruise, while the blue lines and circles previous ones.

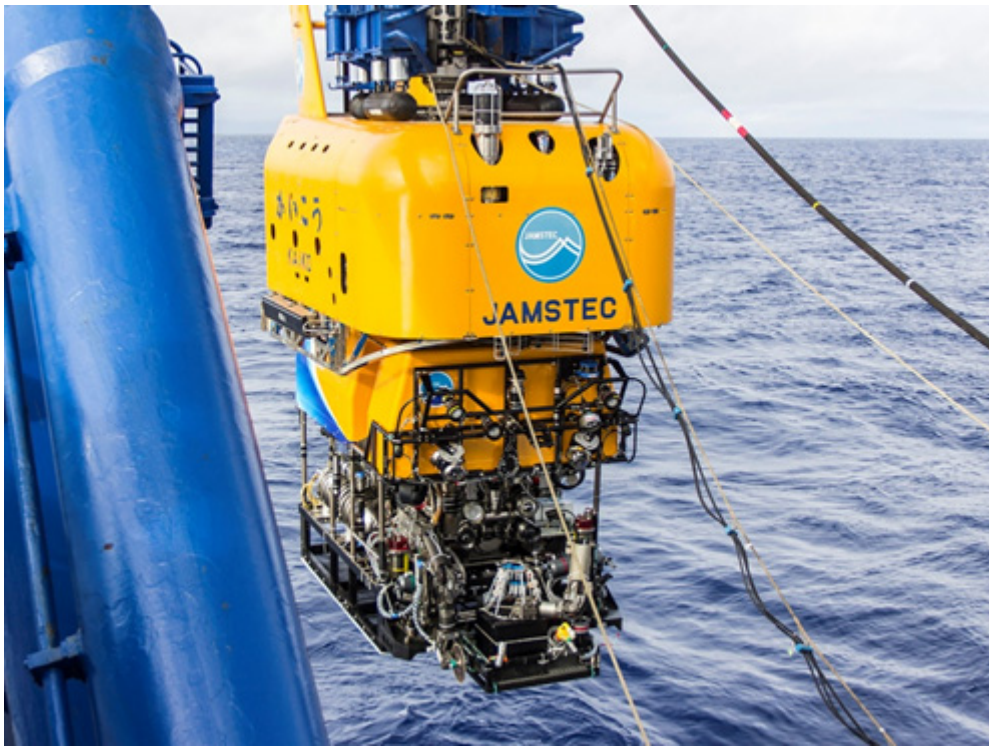


Figure 2: Kaiko Mk-IV

The *Kaiko Mk-IV* is capable of diving to a maximum depth of 7,000m with power enough to perform heavy work. It is also equipped with high-resolution HDTV camera, still camera, and TV camera with fisheye wide angle lens.



Figure 3: Cobalt-rich ferromanganese crust found at depths of 4,500m.

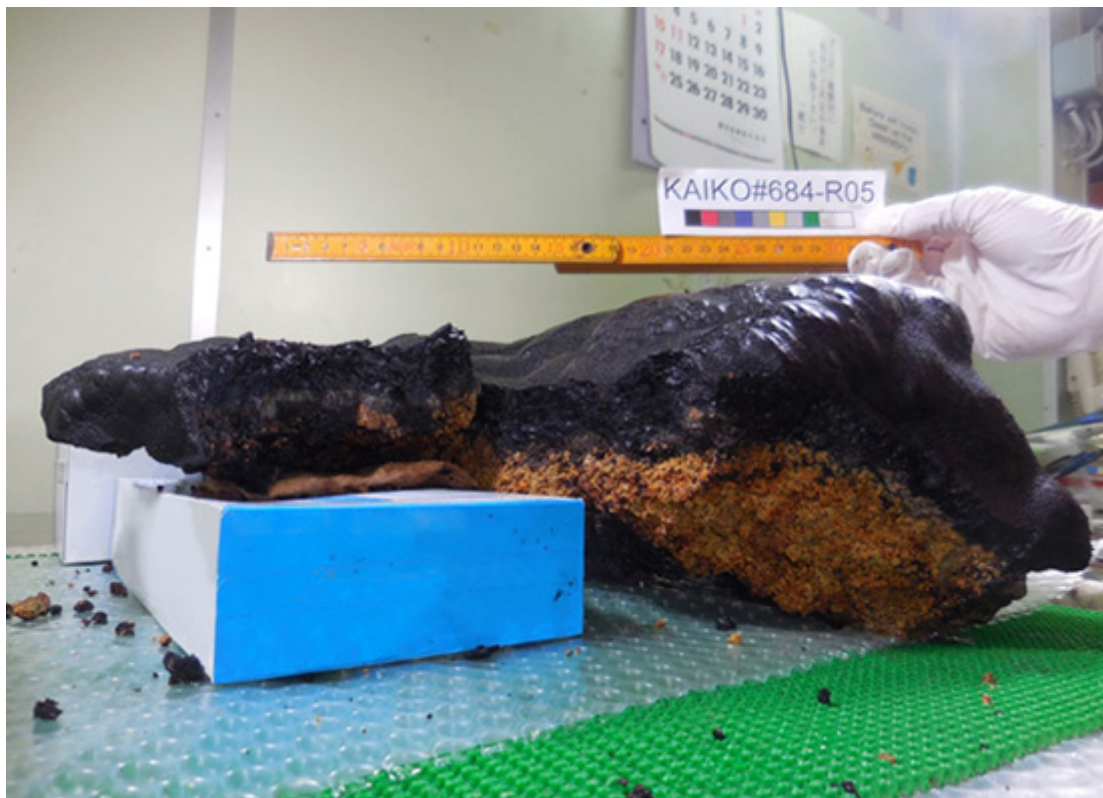


Figure 4: A sample of cobalt-rich ferromanganese crust collected at depths of 4,500m



Figure 5: Cobalt-rich ferromanganese crusts found at depths of 5,500m.



Figure 6: A sample of cobalt-rich ferromanganese crust collected at depths of 5,500m

Research cruise of cobalt-rich ferromanganese crusts by *Kaiko MK-IV* (Video)

Contacts:

(For this study)

JAMSTEC, Project Team for Development of New-generation Research Protocol for Submarine Resources

Katsuhiko Suzuki, Unit Leader

Koichi Iijima, Engineer

Kochi University

Akira Usui, Professor

(For press release)

JAMSTEC

Hiroyasu Matsui, Press Division, Public Relations Department

Kochi University

Katsuhiko Hayashi, Strategic Communications