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R/V Kairei Cruise Report

KR13-02

Survey of REY-rich mud around Minami-Torishima Island.

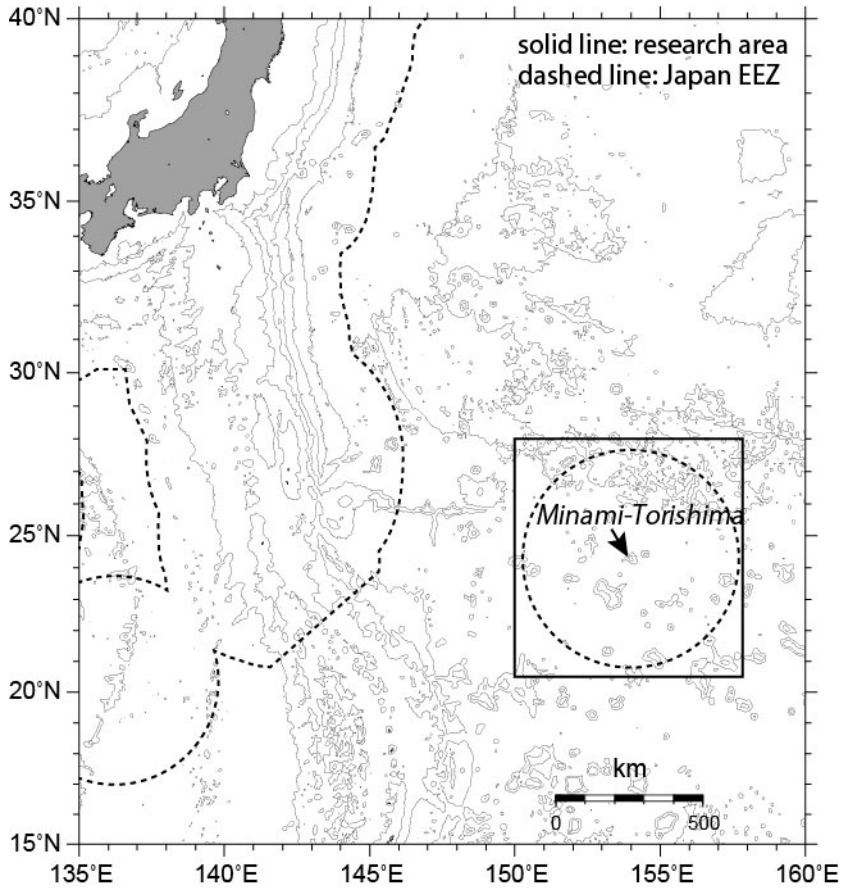
January 21 to January 31, 2013

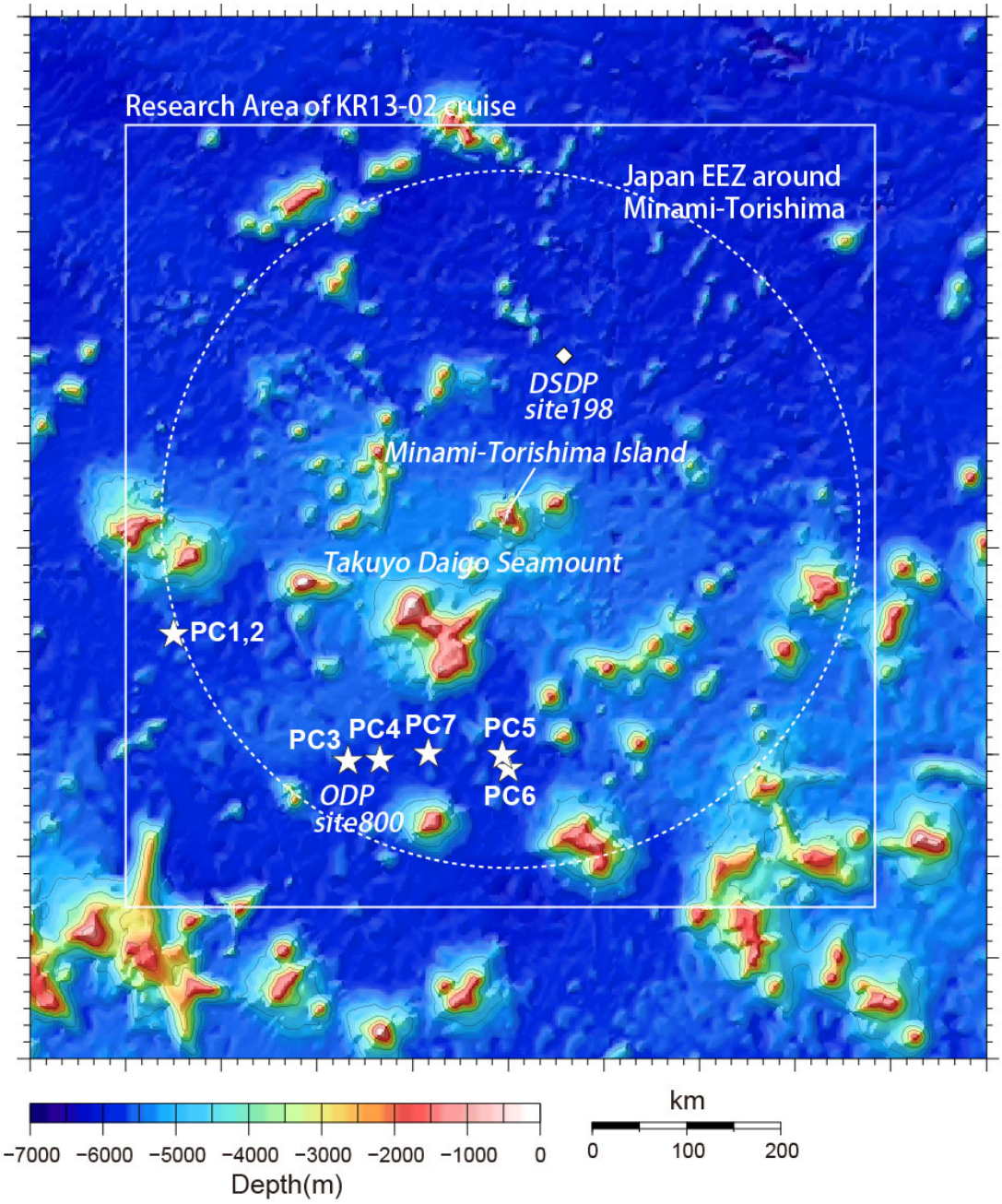
Japan Agency for Marine-Earth Science and Technology
(JAMSTEC)

Contents

1. Cruise Information

Cruise ID: KR13-02
Name of vessel: R/V Kairei
Title of the cruise: Survey of REY-rich mud around Minami-Torishima Island.
Title of proposal: Survey of REY-rich mud around Minami-Torishima Island.
Cruise period: Jan. 21 to Jan. 31, 2013
Ports of call: Yokosuka (JAMSTEC) to Yokosuka (JAMSTEC)
Research area: Off Minami-Torishima Island (Marcus Island)
Research Map





* Coordinates of the sites are confidential matter.

2. Researchers and Crews

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IINO, Tetsuharu [Marine Works Japan]

Crew:

Captain	ISHIWATA, M.
Chief Officer	MASUJIMA, H.
2nd Officer	KASUMATA, M.
3rd Officer	ASAJI, K.
Chief Engineer	ABE, T.
1st Engineer	NOGUCHI, K.
2nd Engineer	MIKAMI, R.

3rd Engineer	YOSHIMURA, S.
3rd Engineer	YASUE, Y.
3rd Engineer	KATAOKA, K.
Chief Radio officer	NASU, T.
2nd Electronic Operator	KATAGIRI, M.
3rd Electronic Operator	MABARA, T.
Boat Swain	TOGUCHI, T.
Able Seaman	MIURA, S.
Able Seaman	KONNO, Y.
Able Seaman	ABE, S.
Able Seaman	KAWABE, Y.
Able Seaman	MATSUO, Y.
Able Seaman	YOSHINO, Y.
Able Seaman	KOJIMA, S.
No.1 Oiler	OISHI, H.
Oiler	SUGI, S.
Oiler	UEDA, M.
Oiler	TAKAMIYA, A.
Oiler	SUMITOMO, S.
Chief Steward	YOSHIKAWA, T.
Steward	YUASA, K.
Steward	HASATANI, Y.
Steward	WADA, T.
Steward	KOSUJI, K.

3. Observation

3.1 Objectives & Background

Kato et al. (2011) reported that rare-earth elements and yttrium rich mud (REY-rich mud) is widely spread in the Pacific Ocean. Since then, Submarine Resources Research Project, JAMSTEC has started to review all cores in the Pacific Ocean previously obtained by JAMSTEC research vessels, to re-analysis and fill the gaps and empty areas of REY data reported in Kato et al (2011). At this time, we found that JAMSTEC had never collected sediment cores around Minami-Torishima island, where is only one Japanese exclusive economic zone (EEZ) existed on the Pacific plate and is expected for presence of REY-rich mud. Then we proposed a cruise for the first cruise to discover the distribution of REY-muds around Minami-Torishima island.

In this cruise, our objective was to confirm the presence of REY-rich mud around Minami-Torishima island, especially around Ocean Drilling Program (ODP) Leg 129 site 800, where REY-rich mud was confirmed in the drilled core at 10m beneath the sea floor (Kato et al., 2012).

Kato, Y., Fujinaga, K., Nakamura, K., Takaya, Y., Kitamura, K., Ohta, J., Toda, R., Nakashima, T. and Iwamori, H. (2011): Deep - sea mud in the Pacific Ocean as a potential resource for rare - earth elements. *Nature Geoscience*, **4**, 535 - 539. doi: 10.1038/NGEO1185.

Kato, Y., Fujinaga, K., Takaya, Y., Nakamura, K., and Iwamori, H. (2012): Is REY-rich mud a promising resource? *The Society of Resource Geology*, **62**, 37 (in Japanese).

3.2 Methods & Instruments

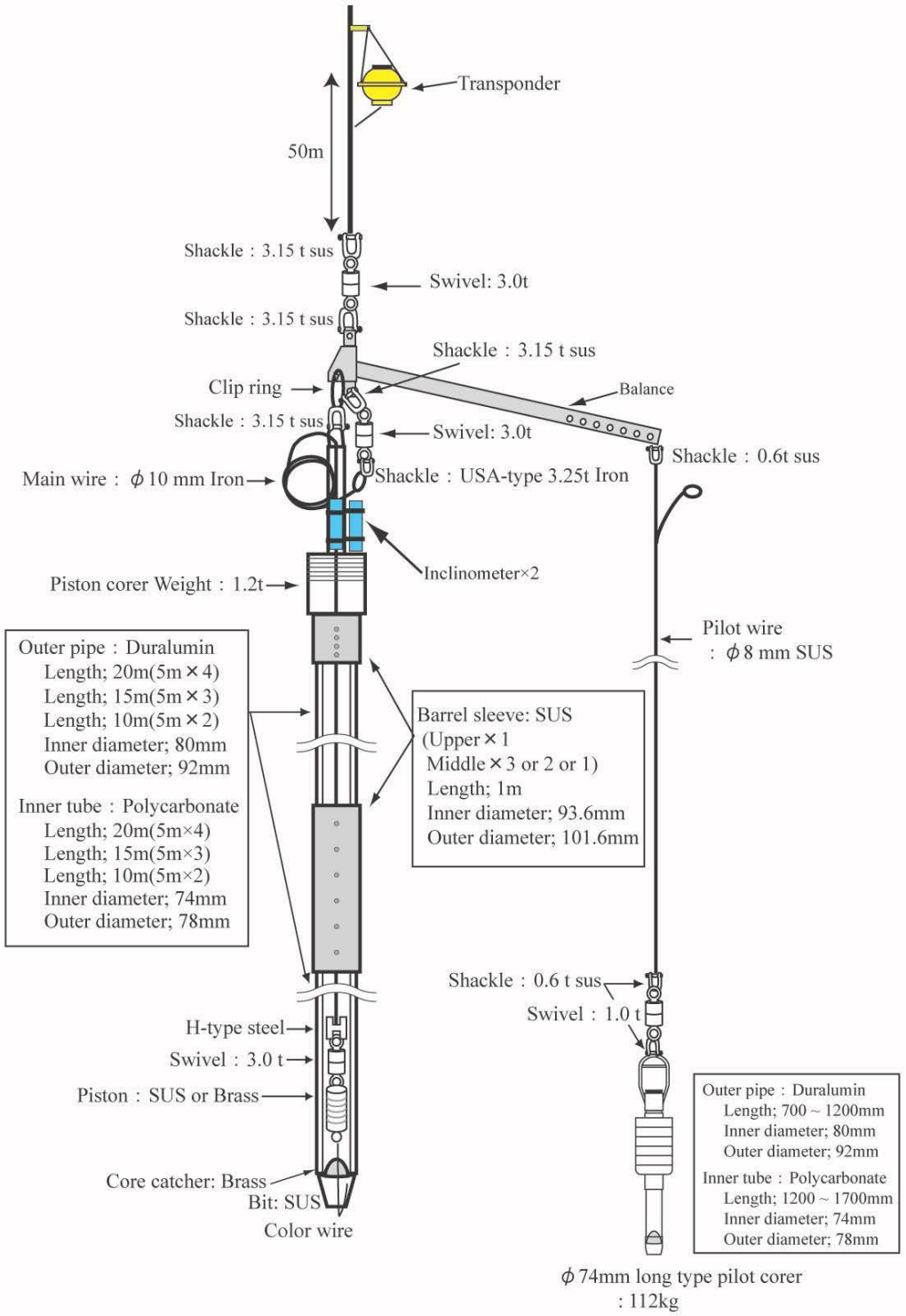
3.2.1 Sub-Bottom Profiler

The sub-bottom profiler was used throughout the cruise in the research area to confirm sub-seafloor sedimentary sequences such as chert layer, and for determination of coring site.

3.2.2 Piston Corer

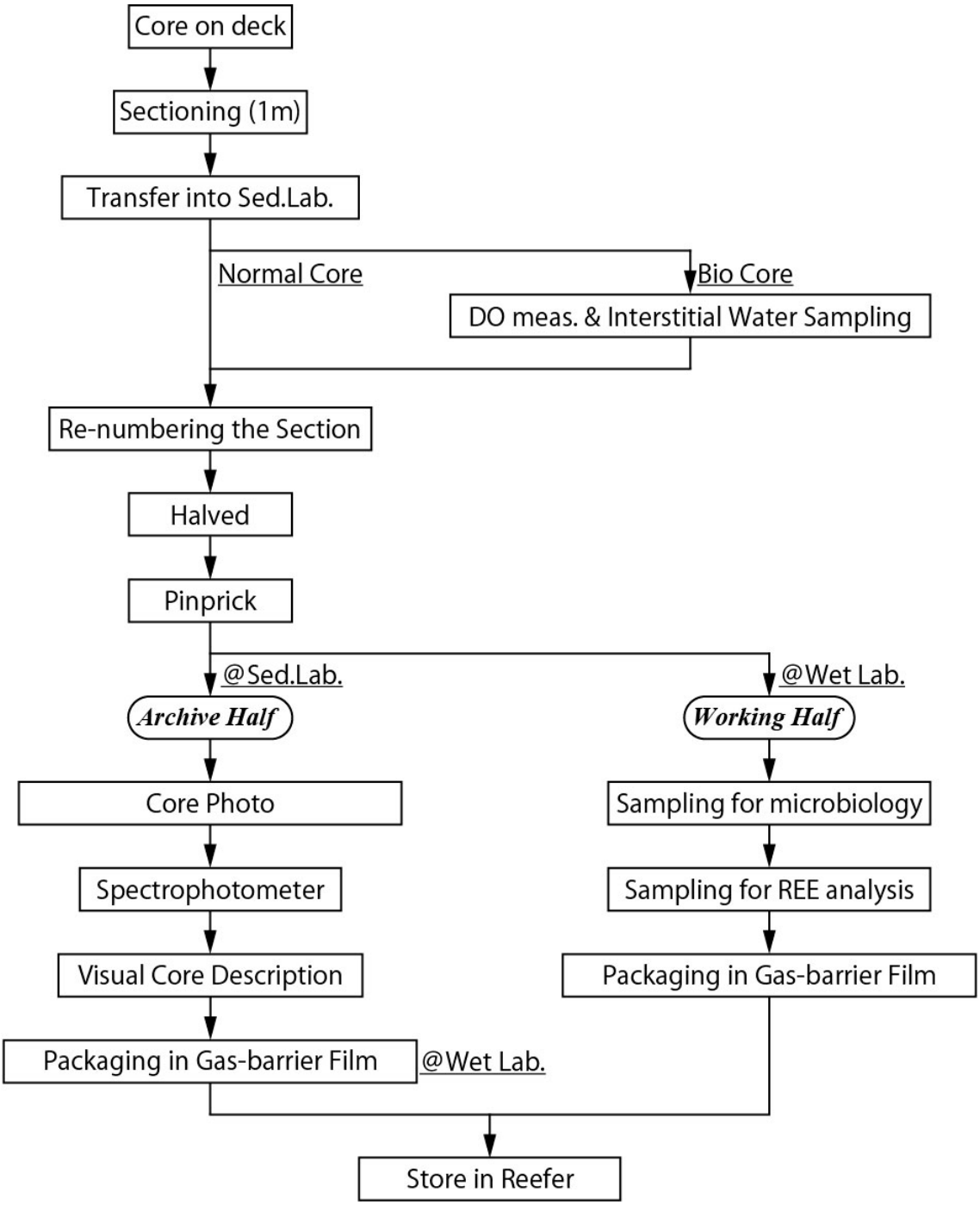
The piston corer system was used to collect sediment core sample for various analysis. Piston core sampler system consists of 1.2t-weight, 5m-long duralumin barrel with polycarbonate liner tube and a pilot core sampler. The inner diameter (I.D.) of polycarbonate liner tube is 74mm. The total weight of the system is approximately 1.4t in the air. The length of the core barrel was 20 or 15 or 10m that was decided by site survey data and the results of the first time coring. We used a φ74mm long type pilot corer (called "74 corer") for a pilot core sampler.

In this cruise, we used annealing polycarbonate liner tube. We used normal type pistons which are composing of brass or stainless steel body with two O-rings (size: P63). And we used a 10mm diameter main wire.



Construction of 20 or 15 or 10 m PistonCorer (KR13-02)

3.2.3 Core Flow



3.3 Preliminary Results

We obtained 7 sediment cores at 6 sites. The detail is confidential matter.

4. Notice of Using

This cruise report is a preliminary documentation as of the end of the cruise.

This report may not be corrected even if changes on contents may be found after its publication. This report may also be changed without notice. Data on this cruise report may be raw or unprocessed. If you are going to use or refer to the data written on this report, please ask the Chief Scientist for latest information.

Users of data or results on this cruise report are requested to submit their results to the Data Management Group of JAMSTEC.