

June 3, 2008

Cruise summary

1. Cruise number / ship name: YK08-05 / R/V Yokosuka

2. Title of the cruise: 2008 Deep Sea Research / Shinkai 6500 scientific dives: Izu-Ogasawara (Bonin) arc

3. Chief Scientist / affiliation: Hayato Ueda / Hirosaki University

4. Representative of scientific proposal / affiliation: Hayato Ueda / Hirosaki University

5. Proposal number and title

S08-22 Exhumation of ultramafic and high-pressure metamorphic rocks and solid material circulation in the infant Bonin subduction system.

6. Port calls

Departure: Yokohama (April 21, 2008)

Arrival: Yokosuka (April 30, 2008)

7. Investigation area

Area 1: Ohmachi Seamount (2200 - 3500 m bsl) 28°40.0' – 31°00.0'N, 139°00.0'E - 141°20.0'E

Area 2: Kita-Jokyo Seamount (2300 - 3900 m bsl) 31°20.0' – 31°40.0'N, 138°00.0'E - 138°30.0'E

8. Onboard Scientists

Hayato UEDA: Faculty of Education, Hirosaki University.

Yujiro OGAWA: Graduate School of Life and Environmental Sciences, University of Tsukuba.

Kiyooki NIIDA: Department of Natural History Sciences, Graduate School of Science, Hokkaido University.

Martin MESCHÉDE: Institute of Geography and Geology, University of Greifswald.

Tadashi USUKI: Institute of Earth Sciences, Academia Sinica.

Ken-ichi HIRAUCHI: Department of Earth and Planetary Systems Science, Graduate School of Science, Hiroshima University.

Ryo MIURA: Institute of Seismology and Volcanology, Graduate School of Science, Hokkaido University.

Toyoto AZUMA: Hidaka Mountains Museum / Department of Natural History Sciences, Graduate School of Science, Hokkaido University.

Takeshi IMAYAMA: Department of Natural History Sciences, Graduate School of Science, Hokkaido University.

Yuki MIYAJIMA: Department of Marine Mineral Resources, School of Marine Science and Technology, Tokai University.

Tae CHIBA: Graduate School of Life and Environmental Sciences, University of Tsukuba.

Takahiro SAITO: Faculty of Education, Hirosaki University.

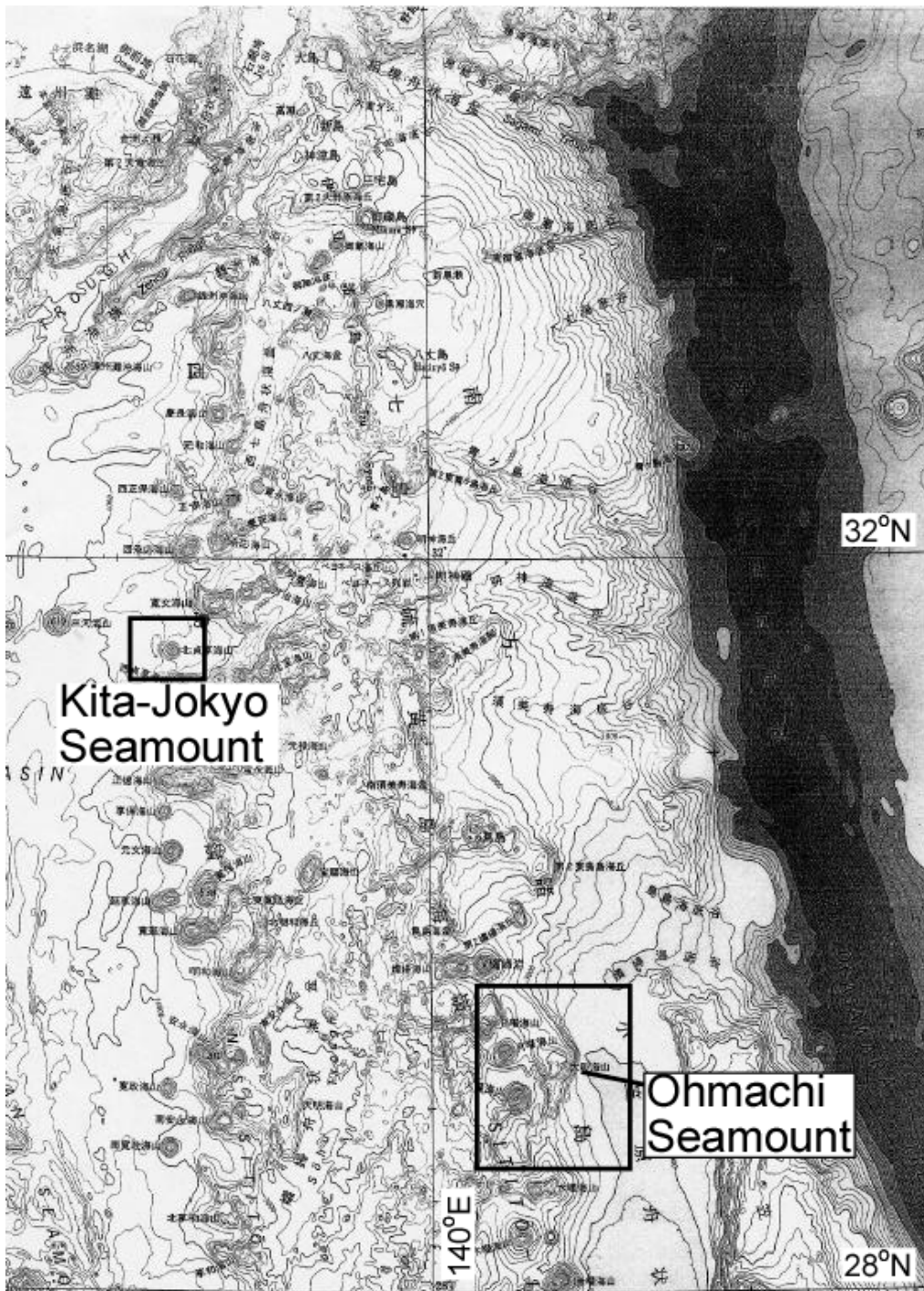


Fig. 1 Research areas of YK08-05 Cruise.

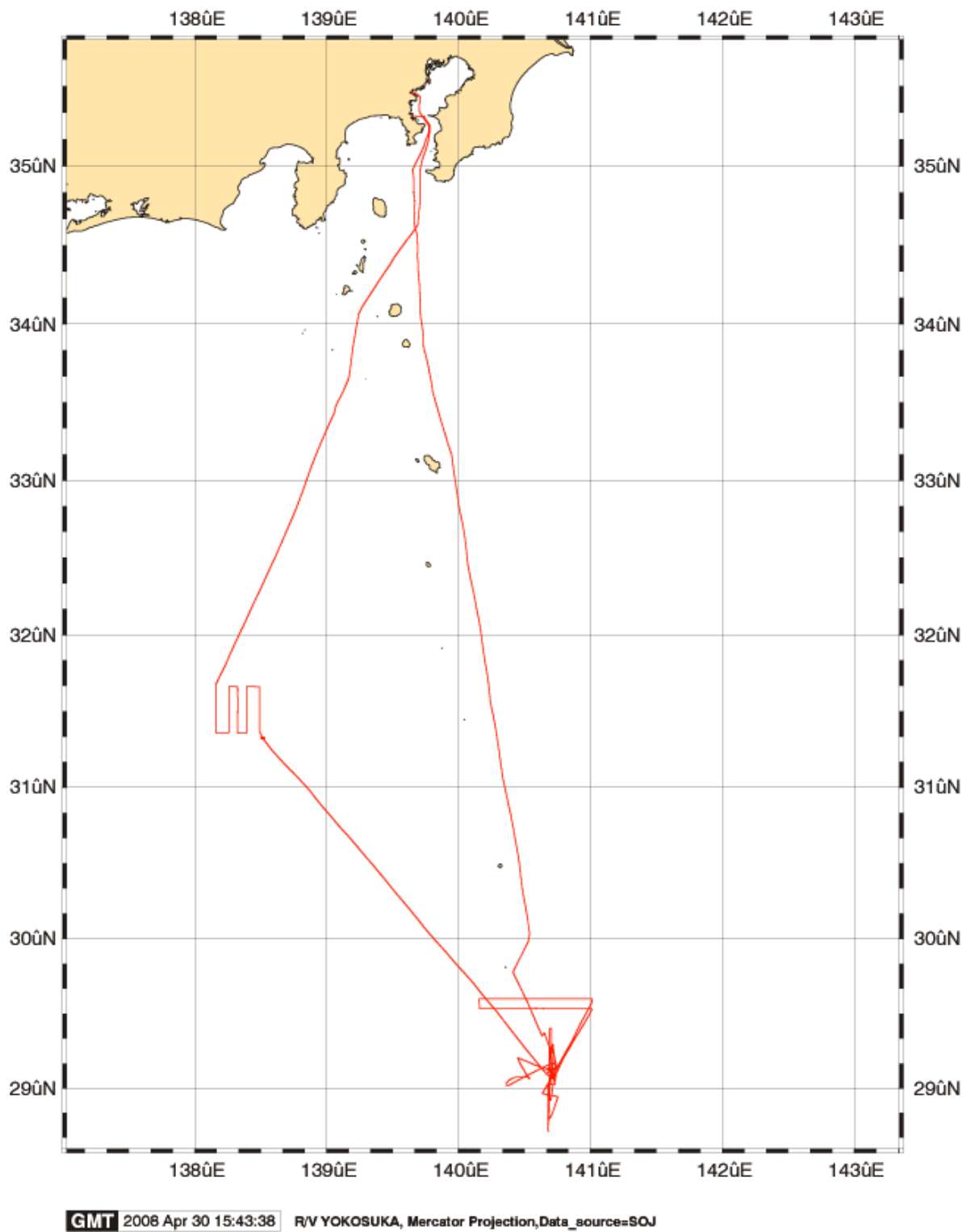


Fig.2 R/V Yokosuka track during the YK08-05 cruise.

9. Background and summary of the research

From the Ohmachi Seamount in the Izu-Bonin arc, previous submersible and dredge surveys recovered serpentinites and high-pressure metamorphic rocks from the sea floor. Since these rocks represent upper mantle rocks and fragments of subducted oceanic crust, respectively, the seamount is regarded as an important field to understand exhumation process of deep-seated rocks in subduction zones. Especially, the seamount is the only locality of eclogite facies metamorphic rocks in the world ocean floor. This cruise aimed *in-situ* observation of occurrences, sampling, and to elucidate distribution and geologic structures of serpentinite and metamorphic rocks through five dives of the submersible "Shinkai 6500". Bathymetric and sonar data were also acquired as site surveys in the Ohmachi seamount, and also in the Kita-Jokyo Seamount as a locality of metamorphic rocks of unknown nature.

The dive area was a fault scarp of the Quaternary Nishinoshima Rift which cuts the southwestern part of the Ohmachi Seamount. All dives landed at the foot of the scarp, and observed serpentinite exposures climbing up the slope. The dive 6k#1064 visited around the previously known locality of metamorphic rocks. Routes of the other four dives were set on unreached slope to fill the blanks of geologic information. In all dives, we observed exposures of serpentinite *in-situ*, and recovered totally 106 rock samples (>330 kg). Unfortunately, metamorphic rocks were not found in this cruise. Majority of the serpentinite samples was serpentine schist, with subordinate amounts of massive ones. In addition, brittle fault rocks of serpentinite breccia were found and recovered for the first time in the area. Before the cruise, we made a hypothesis that foliated serpentinite structurally overlay massive serpentinite based on the distribution of previously recovered rock samples. However, the result suggests more complicated distribution: the foliated rocks overlay the massive rocks in several dive routes, but vice versa in the others. We also successfully made direct measurements of dips and strikes of foliation using newly developed clinometer plate. The foliations struck generally to the north, with varying dips dominantly to the east. Based on these seafloor observations, mineralogical and textural examination of rock samples, and measurements of geologic structures, we will analyze exhumation history and resultant geologic structures.