



Natsushima “Cruise Report”

NT14-14

Rehabilitation of environmental disturbance caused by

mining of seafloor hydrothermal ore deposit

Wakamiko crater, Kagoshima Bay

Aug. 10, 2014 - Aug.13, 2014

Japan Agency for Marine-Earth Science and Technology

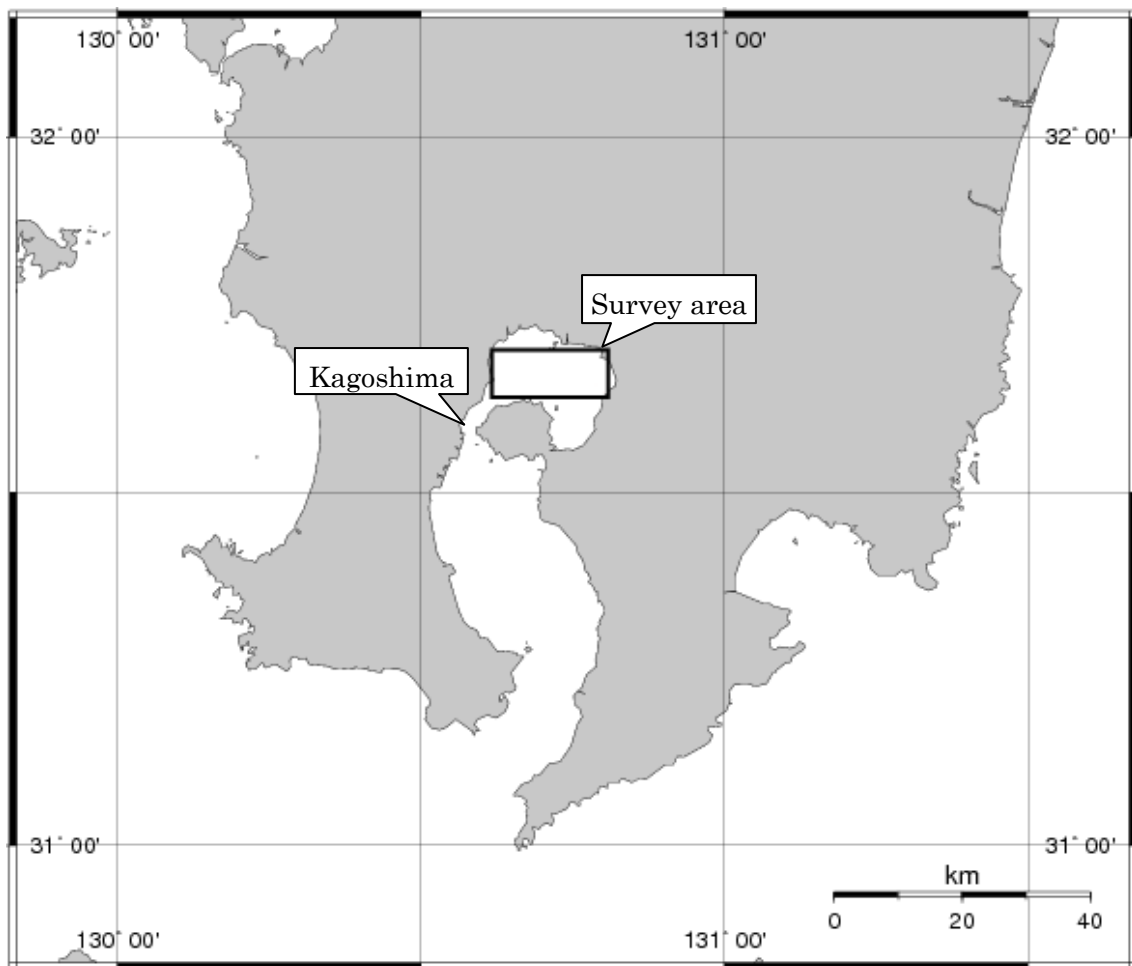
(JAMSTEC)

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1. Cruise Information

- Cruise ID: NT14-14
- Name of vessel: Natsushima
- Title of the cruise: Rehabilitation of environmental disturbance caused by mining of seafloor hydrothermal ore deposit
- Title of proposal: Rehabilitation of environmental disturbance caused by mining of seafloor hydrothermal ore deposit
- Cruise period: Aug. 10, 2014 - Aug. 13, 2014
- Ports of call: Kagoshima to Kagoshima
- Research area: Wakamiko crater, Kagoshima Bay
- Research Map



2. Researchers

- Chief scientist [Affiliation]: Toshiro Yamanaka [Okayama University]__
- Representative of the Science Party [Affiliation] : Toshiro Yamanaka [Okayama University]
- Science party

If more than one proposal is involved, include all of them.

Yuji Onishi	Graduate school of natural science and technology, Okayama University
Kazuna Kondo	<i>ditto</i>
Yusuke Okunishi	<i>ditto</i>
Ryoko Furukawa	Faculty of Science, Okayama University
Shogo Kawasumi	<i>ditto</i>
Mari Kobayashi	<i>ditto</i>
Keisuke Takahashi	Ube Industries, LTD.
Kotaro Yonezu	Graduate school of Technology, Kyushu University
Yukinori Okamura	<i>ditto</i>
Kenta Uno	Faculty of Technology, Kyushu University
Yasuhiro Yoshida	Center of Urban Infrastructure, Environment and Resources, Kyushu University
Kei Okamura	Center for Advanced Marine Core Research, Kochi University
Mayumi Hatta	<i>ditto</i>

3. Observation

3.1 Summary

The main purpose of this cruise was an understanding the technological properties physical property of seabed sealants which were designed for prevention and rehabilitation of seafloor disturbance and chemical pollution during and after mining of seafloor hydrothermal ore deposits. So far, a sealant had not been applied to deep seafloor and seafloor hydrothermal environment, therefore, it needed to test that the expected physical property was reproduced exactly on such environment. Four types of sealants were planed to inject into a frame (50 cm x 50 cm) settled on seafloor by a peristaltic pump and pushed out from plastic bag.

3.2 Preliminary result

During dive study, two types of sealants were behaved as we expected, but the others were stuck in the injection tube and some part of sealants spilled out the tube was dispersed in seawater. In general, behavior of a sealant has been expected based on material science and engineering, however, this result suggests that the effect of hydrostatic pressure has not been evaluated sufficiently.

During the test, we sampled seawater and sediment and monitored physicochemical changes using some sensors for evaluating chemical and physical effect of sealant injection into a seafloor.

3.3 Future studies

Sampled seawater and sediments will be measured at Okayama Univ., Kyushu Univ., and Kochi Univ. Major elements and dissolved gas species (methane, carbon dioxide) in seawater and pore-water squeezed from sediment samples will be measured by Yamanaka, Kondo, and Kobayashi (Okayama Univ.), and concentrations of DO, carbon dioxide, phosphate, nitrate, and thiosulfate and pH will be measured by Okamura and Hatta (Kochi Univ.). Rare earth elements and other heavy metals in seawater will be measured by Yonezu and Okamura (Kyushu Univ.). Chemical composition and mineralogy of the sediment samples will be measured by Yamanaka, Okunishi, Kobayashi, Furukawa and Kashimura (Okayama Univ.).

Physical property of the recovered sealant from seafloor will be measured by Takahashi (Ube Industries, Inc.), Uno and Yoshida (Kyushu Univ.).

Realtime monitoring data obtained during our dives (CTDDO, Turbidity, pH, ORP, and H₂S) will be compared with analytical data obtained from offshore based laboratory analyses by Okamura and Hatta (Kochi Univ.) and with video images by Takahashi (Ube Industries, Inc.).

4. Notice on Using

Notice on using: Insert the following notice to users regarding the data and samples obtained.

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 (i.e. taxonomic classifications) 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.