

Chikyu Shallow Core Program (SCORE)

Proposal Cover Sheet

Received date	26 April 2019
Proposal No.	006-R
New / Revised	Revised

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Basic Information

Title:	Cenozoic ecological history in the North Pacific pelagic realm from ocean to sediment.
Keywords: (5 or less)	pelagic ocean, productivity, subsurface biosphere, evolution, eolian dust
Area:	North of Minamitorishima Island, western North Pacific
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Scientific Objectives (250 words or less)

The response of biological activity in pelagic ocean to global environmental changes is not well understood. In the last 6 years, multiple piston cores (~15 m length) have been recovered around Minamitorishima Island as a part of the research on seafloor mineral resources. Detailed analyses of these cores discovered previously unrecognized biological events. Extraordinary concentrations of biogenic apatite and systematic changes in bacteriogenic magnetite morphology suggest significant variation in fish abundance in the water and bacterial ecology in the sediment. These findings prove that pelagic clay has recorded ecological history in the open ocean and underlying deep-sea sediments. Meanwhile, regional acoustic surveys revealed that the upper ~50 m of sediment column in the Minamitorishima area has experienced local hiatus. Notably, the piston cores were mostly taken from the area where the upper sediment is missing, because the lower sediment is economically more valuable. This strategy compromised the stratigraphic context of the piston core data. Consequently, the timing and possible causes of the newly discovered biological events as well as the hiatus itself remain obscure. To overcome this problem, we propose to drill the most complete sedimentary sequence around Minamitorishima Island. The recovered cores will be analyzed for high-resolution inorganic chemistry, paleomagnetism, mineralogy, and sedimentary

texture to define chronology and cause(s) of the major biological and sedimentological events.

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)	Primary or alternate
MM1	25°50.1962'N, 154°35.0243'E	5869	100	Primary
MM2	26°04.1725'N, 153°04.4509'E	5925	45	Alternate

[Note: Only shallow-penetration coring (about <100 m below seafloor) is available.]

Non-standard Measurements

On board paleomagnetic measurements on archive halves as in IODP cruises.

[Note: Please describe above any non-standard measurements needed to achieve the proposed scientific objectives. Standard measurements are X-ray CT, Multi-sensor core logger, and split surface image.]

List previous drilling in area

DSDP Site 198, ODP Site 800.

List potential hazards and preferred weather window

Avoid the typhoon season of August, September, and October.

Proponent List

First Name	Last Name	Affiliation	Country	Expertise
Yoichi	Usui	JAMSTEC	Japan	Paleomagnetism
Kentaro	Nakamura	Univ. Tokyo	Japan	Geochemistry
Koichi	Iijima	JAMSTEC	Japan	Sedimentology
Kazutaka	Yasukawa	Univ. Tokyo	Japan	Geochemistry
Junichiro	Ohta*	Chiba Inst. Tech.	Japan	Biostratigraphy

[Note: For proponents who do not have J-DESC memberships, please put an asterisk (*) AFTER his/her last name.]