

Chikyu Shallow Core Program (SCORE)

Proposal Cover Sheet

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| Received date | 27 Oct. 2020 |
| Proposal No. | 009-R2 |
| New / Revised | Revised |

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Basic Information

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| Title: | Reconstruction of the Kuroshio state for super interglacials during the Brunhes chron |
| Keywords: (5 or less) | Kuroshio, super interglacials, Brunhes chron, tephrostratigraphy |
| Area: | Northwest Pacific (off Shikoku) |

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Scientific Objectives (250 words or less)

We propose to drill at site SKK-02 off Shikoku in the Northwest Pacific to reconstruct high-resolution variability of the Kuroshio Current (KC) for the past super interglacials. The KC is a strong western boundary current and supplies heat and water vapor to the subarctic from the tropical Pacific, influencing climate conditions over the East Asia including the Japanese Islands. The past "super interglacials" are thought to be important analogues for the future global warming climate. However, there are no reliable information on the heat transport and temperature of the KC during the super interglacials due to a lack of the suitable sediment cores from the Northwest Pacific. The Mid-Brunhes Event is a climate shift in the Brunhes chron and correspond to the transition between MIS 12 and MIS 11. It is characterized by a clear increase in atmospheric CO₂ and polar ice volume. It is also important to understand the state of

the KC for the MBE. In this proposal, we show the following scientific objective.

Main Objective: How does the Kuroshio respond to “super interglacials” compared to today and to Mid-Brunhes Event with different atmospheric CO₂ level?

In addition, we would like to investigate the detailed tephrostratigraphy from caldera volcano in Kyushu Island since the obtained sediment cores should have many volcanic ashes. Its scientific objectives relate to the IODP Science Plan 2013-2023 Challenge 1 (How does Earth’s climate system respond to elevated levels of atmospheric CO₂?) within the Climate and Ocean Change theme.

Proposed Sites

| Site Name | Position (Lat, Lon) | Water Depth (m) | Penetration (m) | Primary or alternate |
|-----------------------|-------------------------|-----------------|-----------------|----------------------|
| SKK-02 | 32°26.48’N, 133°13.67’E | 2,877 | ~100 | Primary |
| SKK-01 (MD01-2422) | 32°08.7’N, 133°51.8’E | 2,737 | ~100 | alternate |

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

Non-standard Measurements

We propose to drill three holes at the proposed site to establish a complete continuous sedimentary sequence for high-resolution paleoceanographic research and tephrostratigraphy without coring gaps. After the drilling, we are planning to hold a sampling party at the Kochi Core Center (KCC) to measure additional non-destructive measurements, such as XRF-core scanner, and to take a high-resolution sampling for each individual analysis.

[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

ODP Legs 190/196

List potential hazards and preferred weather window

We want to avoid the typhoon season.

Proponent List

| First Name | Last Name | Affiliation | Country | Expertise |
|------------|------------|-------------------------------------|---------|------------------------|
| Minoru | Ikehara | Kochi University | Japan | Isotope geochemistry |
| Hiroshi | Nishi | Tohoku University | Japan | Planktic foraminifer |
| Tabito | Matsu'ura* | Minato-ku, Tokyo | Japan | Tephrostratigraphy |
| Kyoko | Hagino | Kochi University | Japan | Calcareous nannofossil |
| Keiji | Horikawa | Toyama University | Japan | Isotope geochemistry |
| Takuya | Itaki | Geological Survey of Japan | Japan | Radiolaria |
| Kyung Eun | Lee* | Korea Maritime and Ocean University | Korea | Organic geochemistry |
| Yuan-Pin | Chang* | National Sun Yat-sen University | Taiwan | Isotope geochemistry |
| Jianjun | Zou* | First Institute of Oceanography | China | Geochemistry |

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