

KCC - J-DESC

Repository Core Re-Discovery

Program (ReCoRD)

Proposal Form

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Basic Information

Title:	The Japan Sea paleoceanography and paleoclimatology during the Miocene
Keywords: (5 or less)	paleoclimate, Miocene, non-destructive measurement, the Japan Sea, tephra
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Granted. Not Granted.

Scientific Objectives (250 words or less)

To understand the oceanic environment changes in the warmer-than-today world are important for addressing future global warming. In this project, we reconstruct short time scale oceanographic changes of the Japan Sea during the warm Miocene period. To understand oceanographic condition properly, comparison of sediments deposited at different water depth at the same time is necessary. Since sediments taken by IODP Exp. 346 provide many scientific results, the Miocene oceanographic reconstruction is limited because comparison of different water depth is available only during sort period. During ODP Leg 127, many Miocene sediments were drilled from the deeper part of the Japan Sea. However, high-resolution (less than orbital scale) oceanographic reconstruction has not been conducted enough.

Therefore, in this project, our objective is to reconstruct millennial-scale, three dimensional oceanographic changes during the Miocene. We will especially focus on;

- a) centennial to millennial scale oceanographic changes recorded in laminated sediments.
- b) rapid warming event and subsequent oceanographic condition.

The detailed objective is;

- 1) Revise age models of Leg 127 cores by tephra dating, revising biostratigraphy, and correlation of cores to Exp. 346 cores utilizing chemical composition (XRF core scanner), CT, and logging data.
- 2) Reconstruct the high-resolution oceanographic condition changes for each Site utilizing XRF core scanner result and core observation, and compare the reconstructed conditions with other Sites deposited in different water depth at the same time, including on-land sections.
- 3) Sampling of the sediments for further analysis to more precisely understand oceanographic changes and background climate changes.

Proposed Target Cores

Leg/Exp.	Site-Hole	Cores
Leg127	Site 794 Hole B	1R-27R
Leg 127	Site 795 Hole B	1R-33R
Leg 127	Site 797 Hole B	24X-53X
Leg 127	Site 797 Hole C	1R-8R
Exp. 346	Site U1425 Hole B	23H-54H
Exp. 346	Site U1425 Hole D	20H-67H
Exp. 346	Site U1430 Hole A	9H-29H
Exo. 346	Site U1430 Hole B	9H-27H

Add lines as needed
 [Note: Only cores in KCC are available.]

Proposed analysis prior to sampling

X-ray core scanner (ITRAX): Sites U1425, 794, 795, 797 (well-preserved interval only)
 X-ray CT: Sites U1425, 794, 795, 797
 split core image (WH and AH): Sites 794, 795, 797
 microscopic imaging of smear slide: Sites 794, 795, 797

[Note: Please describe above any analysis needed prior to sampling. Standard set is X-ray CT, split core image (WH and/or AH), microscopic imaging of smear slide and/or thin section.]

Summary of previous studies of the target cores

For Leg 127 Sites, correlation of Miocene sediments obtained from Sites 794 and 797 were proposed using FMS data (Tada, 1994). The paleontological analysis (Benthic and planktonic foraminifers, Diatoms, Nonnofossils, Radiolarians) were conducted and reveal biostratigraphy of the sediments (Brunner, 1992; Nomura, 1992; Rahman, 1992, etc.). Depositional water depths are also reconstructed from benthic foraminifer analysis (Nomura, 1992). From the paleontological analysis, the sedimentological analysis (degree of lamina preservation etc.), geochemical analysis, and biogenic silica analysis, paleoceanographic condition (Myr time scale) was reconstructed for each sedimentological Units (Tada, 1994).

Using Miocene sediments recovered from Sites U1425 and U1430, paleoceanographic condition (100kyr time scale) were recovered from Radiolaria fossils, carbon and nitrogen isotope, major and trace element analysis (Matsuzaki et al., 2018; 2020; Zhai et al., 2021). The sediments sources were reconstructed from XRD data and chemical composition of the sediments (Shen et al., 2017; Anderson et al., 2019; Lee et al., 2022). Using carbon isotope of black carbon in the sediments of Site U1430, the historical changes of vegetation types of source areas were reconstructed (Shen et al., 2018). The age models for Sites U1425 and U1430 were constructed by cyclostratigraphy (Kuwokawa et al., 2019).

Proponent List

Name	Affiliation	Position	Country	Expertise
Arisa Seki	Shinshu University	JSPS research fellow RPD	Japan	Geochemistry (XRF core scanner analysis)
Ryuji Tada *	Chiba Institute of Technology	Principal Research Scientist	Japan	sedimentology
Tomohisa Irino	Hokkaido University	Associate Professor	Japan	physical property

Kenji M. Matsuzaki	The University of Tokyo	Assistant professor	Japan	microbiology (Radiolarians)
Jumpei Yoshioka	The University of Tokyo	Doctor course student	Japan	Cyclostratigraphy, U-Pb dating of tephra layer

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