Chikyu Shallow Core Program (SCORE)

Proposal Cover Sheet

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Basic Information

Title:	Deep Learning of Deep Life: Exploring impact of submarine landslides on the deep biosphere-evolution off Cape Erimo
Keywords: (5 or less)	deep biosphere, mass-transport deposits, submarine landslides, paleo-seismicity, biogenic methane
Area:	Hidaka Trough Off Cape Erimo

Lead Proponent:	Fumio Inagaki
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Scientific Objectives (250 words or less)

Over the past 15 years, scientific ocean drilling has explored the deep subseafloor biosphere down to ~2.5 km below the ocean floor, ensuring that microbial activity in sediments plays significant roles in the global carbon and other element cycles. However, it still remains unknown if adaptation and evolution occur in the deep subseafloor biosphere, especially in response to abrupt environmental changes. To address this important scientific question, we propose here to drill and cut core down to ~100 meters below the ocean floor off Cape Erimo, Hokkaido Island, Japan, where Pliocene-Pleistocene sedimentary sequence is intercalated with multiple mass-transport deposits (MTDs) caused by earthquake-triggered submarine landslides and/or climate changes. The state-of-the-art transdisciplinary analytical approaches will apply to sediment core samples, allowing us to establish high-resolution depth/age profiles of various environmental factors that can be processed through deep learning architectures.

Proposed Sites

Site Name	Position (Lat, Lon)	Water Depth (m)	Penetration (m)	Primary or alternate
ERIMO-1	41º48'08.33" N, 142º21'27.88" E	1,075	100	Primary

Non-standard Measurements

We propose the minimum onboard scientific activity such as time/temperature-sensitive sampling and measurements, and will organize the onshore scientific party at the Kochi Core Center (KCC) after the coring expedition.

- Establish two adjacent drill holes (Holes A and B) at the same site and cut two sequential sediment columns down to ~100 mbsf using HPCS technology. This two-adjacent-holes strategy will allow us to process time/temperature-sensitive samples without loss of data quality and succession of cores.
- Cores obtained from Hole A will be used mainly for geological characterizations (e.g., X-ray CT scan, multi-scan core logger [MSCL], physical properties, paleoceanography) along the standard core flow.
- Measure *in-situ* temperatures using APCT-3 sensor at Hole A.
- Cores from Hole B will be used mainly for geochemical and microbiological analyses (e.g., gas, porewater, DNA, activity). X-ray CT scan image of cores will be immediately obtained after recovery, followed by core processing under the cool (i.e., ~4ºC) and strict quality assurance and quality control (QA/QC) condition, according to the procedure of onboard sampling during IODP Expeditions 337 and 370 (Inagaki et al., 2013; Heuer et al., 2017). These samples have to be anaerobically processed under the super-clean condition, and immediately stored at 4ºC or −80ºC onboard.
- Collect headspace gas and plug samples from the section end of Hole B cores.
- Collect porewater samples using Rhizons sampler and/or standard procedures established in previous scientific ocean drilling.

[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

IODP Site C0020 (JAMSTEC Site C9001) off Shimokita Peninsula.

List potential hazards and preferred weather window

The target sedimentary sequence is situated in the methane hydrate-stability zone. We would request the expedition in September 2017.

Proponent List

First Name	Last Name	Affiliation	Country	Expertise
Fumio	Inagaki	JAMSTEC ODS/KOCHI	Japan	Geomicrobiology
Osamu	Takano*	JAPEX Co., JOGMEC	Japan	Sedimentology
Kai-Uwe	Hinrichs*	MARUM, Univ. Bremen	Germany	Geochemistry
Yasuhiro	Yamada	JAMSTEC ODS	Japan	Struct. Geology

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