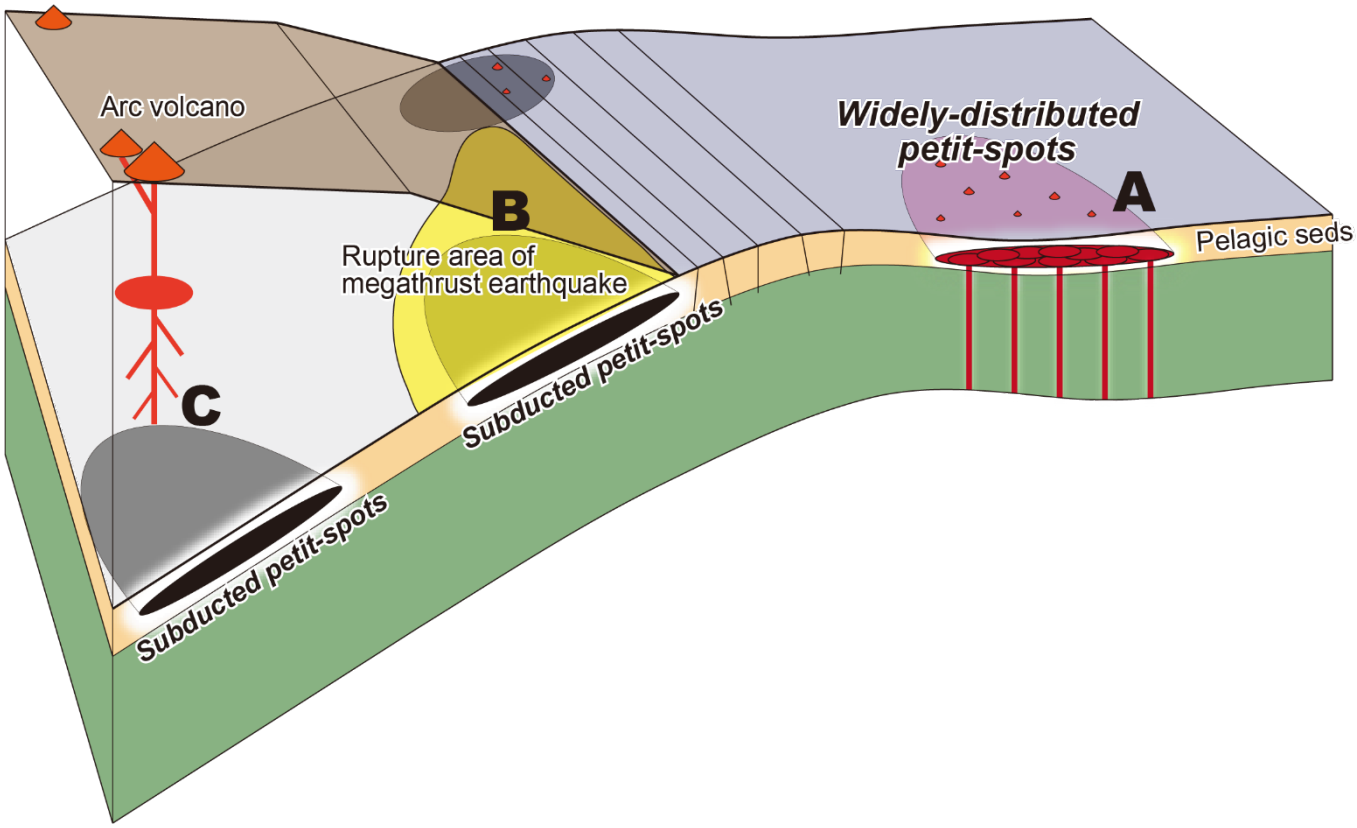
INTERNATIONAL OCEAN DRILLING PROGRAMME



CALL FOR PARTICIPATION

IODP³ Expedition 502:
Impact of Petit-Spot Magmatism on Subduction Zone Seismicity and the Global Geochemical Cycle

Deadline: 28 March 2025

25 February 2025

Call for Participation in IODP^3 Expedition 502:

Impact of Petit-Spot Magmatism on Subduction Zone Seismicity and the Global Geochemical Cycle

Co-Chief Scientists: Asuka Yamaguchi & Hiroko Kitajima
Expedition Project Manager: Natsumi Okutsu

Introduction

MarE3 currently plans to implement IODP^3 Expedition 502: Impact of Petit-Spot Magmatism on Subduction Zone Seismicity and the Global Geochemical Cycle, planned to begin on 31 October 2025 and finish on 24 November 2025. IODP^3 Expedition 502 will visit one site (Proposed Site TPC-01A) located off the central Japan Trench on the incoming Pacific Plate at 5485 meter water depth (**Figure 1**). The operational sequence to be completed by D/V *Chikyu* during IODP^3 Expedition 502 consists of drilling three adjacent holes, one for wireline logging (8-1/2-inch) and the other two (10-5/8-inch) for coring with the Hydraulic Piston Coring System (HPCS) and the Rotary Coring Bit (RCB) to 160 m below seafloor (mbsf) to continuously recover the full sediment sequence.

Scientific Objectives of the Expedition

The goal of this project is to elucidate the existence of widely-distributed petit-spot volcanism that may significantly impact the generation of megathrust earthquakes and the Earth's geochemical cycles. Only ocean drilling can assess the nature of the acoustic basement beneath regions of anomalously thin sediment cover. For this purpose, we also plan to sample the sediment cover, including gases and pore fluids.

1. If the acoustic basement consists of extrusive rocks, then lavas or volcanic breccias will be sampled. In the case of intrusive rocks, fragments of thermally affected sediment will also be recoverable.
2. Determine the ages of all recovered sediments using magnetostratigraphy, tephrochronology, and biostratigraphy.
3. Geochemistry for the basalt samples will characterize the geochemical signature of this petit-spot magmatism and allow us to better assess its influence on subduction zone magmatism.

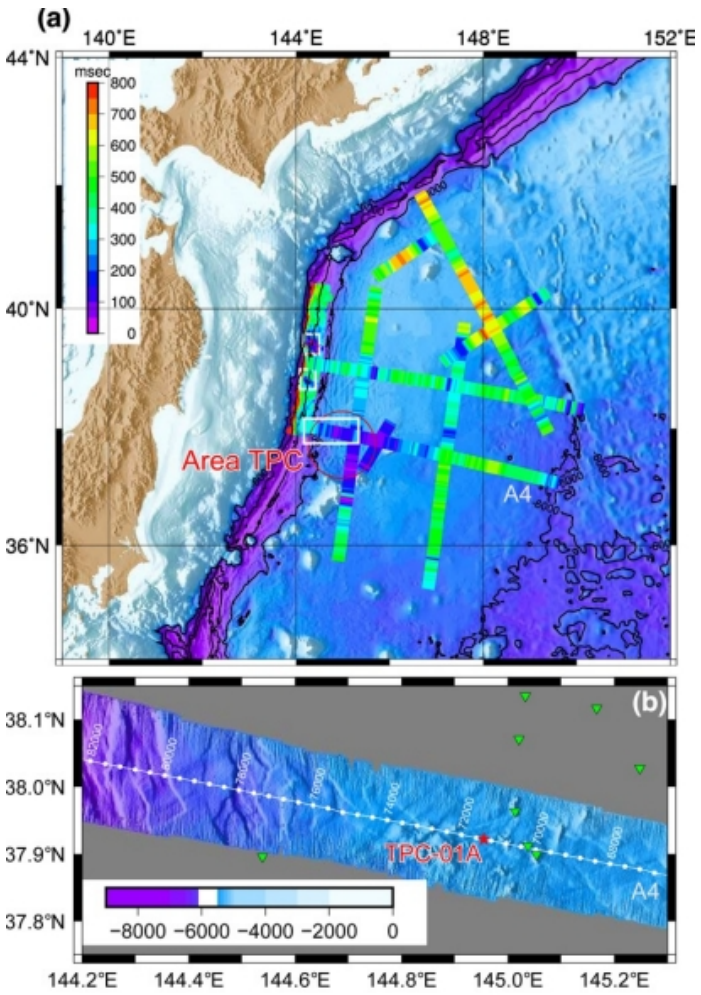


Figure 1. Proposed IODP^3 Expedition 502 drilling Site TPC-01A.

Secondary science objectives include carrying out other geological, geochemical, and microbiological observations to the greatest extent possible during drilling in accordance with the **D/V *Chikyu* Standard Measurements** Document. Please read the Expedition 502 Scientific Prospectus available on the **IODP^3 Expedition page** for further details.

Operation Plan

The general operations plan and time estimates are provided in **Table 1**. The operational sequence to be completed during IODP^3 Expedition 502 consists of:

1. Drilling one 8-1/2-inch hole to 225 m below seafloor, and then perform wireline logging in this hole;

2. Two 10-5/8-inch coring holes: one with the Hydraulic Piston Coring System/Extended Shoe Coring System (HPCS/ESCS) to 60 m below seafloor and one with the Rotary Coring Bit (RCB) to 160 m below seafloor.

Table 1. Operations schedule for IODP[3] Expedition 502.

Exp.	Operation	Hole Size (inch)	Depth (m)	Day(s)	Subtotal (d)	Total (d)
502	Portcall in Shiogama			1	1	
	Transit			2	3	3
	Drilling	8-1/2	225	5	5	
	TPC-01A: WL	8-1/2	160	3	8	
	TPC-01A: HPCS/ESCS	10-5/8	60-65	3	11	
	TPC-01A: RCB	10-5/8	160	8	19	19
Shiogama crew change				1	1	20
Contingency Time				3.5	3.5	23.5

Expedition Schedule

Current plans have the expedition beginning in Shiogama, Japan on 31 October 2025 and ending in portcall in Shiogama, Japan on 24 November 2025. This schedule is subject to change. Updates and the latest information can be found on the **MarE3 website**.

The total number of planned offshore operations days will be 24 days. The offshore Science Team will be about ~25 scientists and will be onboard almost three and-a-half weeks. The onshore Expedition Science Team will additionally include scientists who are not part of the offshore team.

Expedition Science Team

Scientists with interest and expertise in (i) volcanological, petrological and geochemical process of seafloor and subseafloor petit-spot magmatism, (ii) sedimentation and deformation processes of the Pacific Plate at the outer rise of the Japan Trench, (iii) material transfer and physical property changes during magma-sediment interaction, (iv) age dating of sediment and igneous rock based on biostratigraphy, paleomagnetism, tephrochronology, and radiometric dating, (v) geochemical anomaly and heat transfer related to petit-spot volcanism and fluid circulation, (vi) core-log-seismic integration and stratigraphic correlation with previous DSDP/ODP/IODP sites and seismic lines, (vii) rock mechanics of subduction input material and its impact on earthquakes in subduction zones, (viii) global geochemical cycle and mass flux of subduction zones, (ix) biogeochemistry and deep subsurface biology, (x) and/or other related topics or fields are invited to apply. Shipboard duties will likely include logging, lithology (sedimentology and igneous petrology), structural geology, physical properties, paleomagnetism, microbiology, micropaleontology, geochemistry (organic and inorganic) and core-log-seismic integration. We also welcome applications with a research plan as contribution to achieving the expedition objectives without involvement in the offshore operations.

NOTE: All expedition schedules are subject to change based on Fiscal Year budgetary situation

and site conditions.

How to Apply

Applications must be submitted to the IODP^3 Science Office by the deadline of **midnight GMT on Friday 28 March 2025** using the **IODP^3 Gateway** system, accessed via "Apply to Participate" on the **IODP^3 website** or directly at **gateway.iodp3.org**.

Information on requesting an IODP^3 Gateway account and on the content required in applications to this call is also available in the IODP^3 **Guide for Applicants** (Note that the applicant roles for this call are **Offshore and Onshore** and **Research plan only**; see Section 3.1 in the guide).

Applications received by the deadline will be evaluated by the IODP^3 Programme Member Offices in April 2025 and shortlisted candidates will be considered for selection by MarE3 and the Co-Chief Scientists thereafter.

- For further expedition details from MarE3, please contact:
  Natsumi Okutsu, Expedition Project Manager/Staff Scientist, okutsun@jamstec.go.jp
- For further scientific details, please contact:
  Asuka Yamaguchi, Expedition 502 Co-Chief Scientist, asuka@aori.u-tokyo.ac.jp
  Hiroko Kitajima, Expedition 502 Co-Chief Scientist, kitaji@tamu.edu
- For enquiries about the application process and IODP^3 Gateway, please contact:
  Jodie Fisher, IODP^3 Science Office, **applications@iodp3.org**