



INTERNATIONAL OCEAN DRILLING PROGRAMME

IODP³ Safety and Environment Advisory (SEA) Group Meeting

2 July 2025, Virtual Meeting

Roster

SEA Group Members:

Katharina Hockmuth (Chair)

Earl Doyle	University of Tasmania, ANZIC
Toby Harold	Independent consultant, USA
Tsukuru Hashimoto	Independent consultant, ECORD
Martin Hovland	ENEOS Xplora, Japan
Philippe Lapointe	Ambio Tech Team (advisor), ECORD
Jin-Oh Park	Independent consultant, France, ECORD
Donald Potts	University of Tokyo, Japan
Dieter Strack	University of California Santa Cruz, USA
Zhen Sun	Independent consultant, ECORD
	Guangzhou Marine Geological Survey China

Liaisons and Observers:

Chiara Amadori	IODP ³ Science Office, Proposals and Meetings Manager
Leo Barbosa	ECORD Science Operator
David McInroy	ECORD Science Operator
Antony Morris	IODP ³ Science Office, Lead Director/
Tim Reston	University of Birmingham, UK
Sasha Turchyn	IODP ³ MSP-FB Co-Chair

Proposal Proponents:

Peter Clift (P1005)	University College London, UK
Iain De Jonge-Anderson (P1005)	Heriott-Watt University, UK
Andrew Newton (P1012)	Queens University Belfast, UK
Mads Huuse (P1012)	University of Manchester, UK

Minutes

1. Welcome and Selection of SEA Group Chair

Antony Morris welcomed the attendees to the inaugural meeting of the SEA Group, thanked the members who were previously members of the International Ocean Discovery Program (“IODP2”) Environmental Protection and Safety Panel (EPSP) for agreeing to continue serving the scientific ocean drilling community as SEA Group members. He also welcomed the new members.

Prior to the meeting, Katharina Hockmuth indicated a willingness to serve as the new SEA Group Chair, and was elected unanimously by the other members, Katharina then began her new duties by chairing the rest of the meeting. She invited members to provide self-introductions.

2. Proposal Reviews

During the meeting, the SEA Group reviewed two Full proposals that were previously at the IODP2 Facility Boards, were resubmitted to IODP³ by the proponents, regraded by the IODP³ Science Evaluation Panel and forwarded to the IODP³ MSP Facility Board (MSP-FB). It was confirmed that there were no conflicts of interest associated with the proposals under review.

These proposals were:

Proposal Number	Type	Lead Proponent/Data Lead Proponent	Proposal Title
1005	IODP2 Full2	Peter Clift/Iain De Jonge-Anderson	Carbon Storage, Climate, Biosphere Change, and Continental Weathering on Plio-Pleistocene Low Latitude Shelves: Evidence from the Sunda Shelf
1012	IODP2 Full2	Andrew Newton/Mads Huuse	Late Cenozoic Glaciers, Landscapes, Climates, and Ecosystems of the North Sea (GLACE-NS)

The outcomes of these reviews are summarised in the following tables, with the full SEA Group reports appended to this document.

Proposal 1005 Full2:

Site	Latitude	Longitude	Water Depth (m)	Requested Drilling Depth (m)	Approved Depth (m)	SEA Group Decision	Remarks
SUNDA-01B (primary)	7.610807	104.2234	36	241	-	Not Approved	Various fluid escape structures including potential pockmarks seen in the seafloor reflection. The area around SP3121 (PQ09M34) is potentially a suitable area.
SUNDA-07B (primary)	8.798495	108.8440	122	176	-	Not Approved	The seismic section shows shallow gas structures throughout, although moving the potential site to the area of SP1989 (SHV93-07) may mitigate the risk.
SUNDA-08B (primary)	7.556853	106.7666	48	152	-	Not Approved	Vertical fluid escape structure close to the proposed site. The shallowest strata in this section are blanked, potentially due to the processing for multiple suppression. The area around SP2400 (08MELVCS107P1) is potentially a suitable area.
SUNDA-09B (primary)	8.254593	107.2233	52	197	-	Not Approved	The reflection pattern may indicate a fluid-charged strata at the bottom of the intended well. The minimal penetration seems to be acceptable but there is uncertainty about the location of the true seafloor.
SUNDA-11B (primary)	9.996128	108.4768	67	176	-	Not Approved	The two provided seismic sections are very different making it difficult to assess the 3D nature of the strata. The proposed location sits on an anticline and a fault structure is present at the seafloor. It might be suitable to explore the crossing with CP09-Tu93a as a potential site.
SUNDA-12B (primary)	8.688670	103.6776	41	160	-	Not Approved	Potential fluid escape structures and potential trapped gas close to the seafloor. The area around SP12320-12400 (PQ09M20) is potentially a suitable area.

Proposal 1012 Full 2:

Site	Latitude	Longitude	Water Depth (m)	Requested Drilling Depth (m)	Approved Depth (m)	SEA Group Decision	Remarks
NSN-01A (primary)	57.6967	1.555	93.7	1200	956	Approved to 956 mbsf only	Lithostratigraphic interpretation does not extend to the target depth, so the section below 956 mbsf needs re-evaluation before approval.
NSN-02A (alternate)	57.5118	1.229	90.21	1200	-	Requires re-evaluation	Some issues with stitching of the 3D cube, although no apparent safety concerns.
NSN-03A (alternate)	57.6756	1.6819	89.06	1200	-	Not approved	Safety concerns over bright spots in this section.
NSN-04A (alternate)	57.5078	1.3908	91	1200	-	Not approved	Seismic data of poor resolution. Potential mudflow structures, anticline and indications of over-consolidation.
NSC-01A (primary)	55.3042	3.6715	27.7	1200	1200	Approved	No safety concerns observed.
NSC-02A (alternate)	55.2189	3.7026	36.81	1200	1200	Approved	No safety concerns observed.
NSC-03A (alternate)	55.3494	3.6812	27.95	1200	1200	Approved	No safety concerns observed.
NSC-04A (alternate)	55.899	3.5534	59.9	1200	1200	Approved	No safety concerns observed.
NSS-01A (primary)	52.8975	3.6242	32	980	Eq. to 700 ms TWT	Requires re-evaluation	Seismic data of poor resolution. Safety issues in the lower part of the section due to potential presence of fluids.
NSS-02A (alternate)	52.9057	3.6062	26	980	Eq. to 700 ms TWT	Requires re-evaluation	Seismic data of poor resolution. Safety issues in the lower part of the section due to potential presence of fluids.

3. Other Business

The SEA Group members agreed to contribute to a review of the IODP2 “[EPSP Safety Review Report Guidelines May 2022](#)” to suggest revisions to the text, ahead of production of an equivalent document for IODP³ by the Science Office.

4. Next Meeting

The next SEA Group meeting will need to be scheduled in response to the outcomes of the next SEP meeting, at a date to be confirmed in advance.

SEA Group Report: P1005 – Carbon Storage, Climate, Biosphere Change, and Continental Weathering on Plio-Pleistocene Low Latitude Shelves: Evidence from the Sunda Shelf

Clift et al.

Summary:

The site survey data presented to the SEA Group is insufficient to assess the presence of a safe drilling environment.

The proponent team explained the difficulties of procuring datasets as well as metadata through industry partners, which the SEA Group appreciates.

Overall, the SEA Group concludes, in order to guarantee safe drilling operations for P1005 additional data need to be provided. At this stage, no proposed site can be cleared for drilling.

Outstanding Actions:

- **Proponents** to contact PetroVietnam and other (industry) partners for additional primarily higher-resolution seismic and bathymetry data, preferable of recent vintage and processed for optimal imaging of the shallow section above the Upper Miocene
- **Proponents** to provide several potential alternate sites for maximal operational safety and flexibility

Detailed report:

The SEA Group performed a review of all six submitted sites and notes that all of these sites are primary sites. No alternate sites have been provided by the proponents, which can impact safe operations offshore.

Overall, the SEA group identified major technical issues regarding the site survey data at all sites including:

- **Missing acquisition and processing metadata**
Different seismic surveys show major discrepancies at the cross points and are clearly processed to show the deeper strata, rather than the shallower target strata. Additional information is needed to clarify polarity, resolution and phase preservation of the dataset. Velocity data used for the conversion to depth as well as for the processing workflow is necessary to assess depth estimates and uncertainty.
- **Poor resolution of seafloor reflection and the shallowest target strata**
The seafloor reflection is not clearly visible in various sections, and the data processing is focused on deeper strata resulting in decreased the resolution of the target strata.

- **Missing hydroacoustic surveys leading to uncertainty of the site's water depth**
Especially for the use of a lift boat platform as it is indicated for 5 of the 6 sites, high-resolution bathymetry is necessary to allow safe operations. Potential fluid escape structures and faults at the seafloor could indicate pockmark structures in the area, which need to be fully identified so they can be avoided during drilling. Global bathymetry datasets such as GEBCO can only provide a rough estimate of the water depth.
- **Missing information on seafloor structures** including seafloor cables and pipelines etc.
- **Environmental considerations** such as marine mammal presence and protected areas

The Sunda Shelf hosts hydrocarbons in deeper strata, which is not the target of this proposal, however all provided site survey data shows indications of fluid migration along fault systems and bright spots through the target strata.

The SEA Group appreciates that the procurement of additional datasets is difficult, however without additional data in this highly complex geological region drilling cannot be safely conducted.

During the meeting the SEA Group indicated potential areas on the seismic lines provided, which might be safer to drill. However, given the highly complex geology these areas can only be a guideline and a thorough evaluation of the sites to assess the 3D structure (e.g. bright spots) need to be conducted by the proponent team.

SUNDA-1B: The SEA Group observed various fluid escape structures including potential pockmarks in the seafloor reflection. The area around SP3121 (PQ09M34) has been discussed as a potentially suitable area on the data provided. The SEA Group does not approve this site for drilling.

SUNDA-12B: The SEA Group observed potential fluid escape structures and potential trapped gas close to the seafloor. The area around SP12320- 12400 (PQ09M20) has been discussed as a potentially suitable area on the data provided. The SEA Group does not approve this site for drilling.

SUNDA-8B: The SEA Group observed a vertical fluid escape structure close to the proposed site. The shallowest strata in this section is blanked, potentially due to the processing for multiple suppression. The area around SP2400 (08MELVCS107P1) has been discussed as a potentially suitable area on the data provided. The SEA Group does not approve this site for drilling.

SUNDA-9B: The SEA Group queries the location of the true seafloor in this dataset. The reflection pattern can indicate a fluid-charged strata at the bottom of the intended well. The minimal penetration seems to be acceptable; however, the seafloor issue does not allow the approval of this site. The SEA Group does not approve this site for drilling.

SUNDA-11B: The SEA Group raises that the two provided seismic sections are very different making it difficult to assess the 3D nature of the strata. The proposed location sits on an anticline and a fault structure is present at the seafloor. Given the presence of other crosslines at the location, it might be suitable to explore the crossing with CP09-Tu93a as a potential site. The SEA Group does not approve this site for drilling.

SUNDA-7B: The SEA Group observed a channel levee system to the North connected to soft peaks as well as potential gas chimneys in the section. The seismic section shows shallow gas structures throughout, although moving the potential site to the area of SP1989 (SHV93-07) might help mitigate some of the risk. The SEA Group does not approve this site for drilling.

Overview table on proposed sites:

Proposed Site	Comments	Approval
SUNDA-1B	Degassing structures	Not approved
SUNDA-12B	Potential fluid escape structures	Not approved
SUNDA-8B	Vertical fluid escape feature, blanking of the shallow strata	Not approved
SUNDA-9B	Seafloor unclear, potential fluid-charged strata at maximum proposed depth	Not approved
SUNDA-11B	Seismic lines are very different, anticline and faults present	Not approved
SUNDA-7B	Gas escape features, shallow gas throughout	Not approved

This report has been collated by the SEA Group Chair Dr Hochmuth with input from all SEA Group members.

Note: The proponents have been in contact with the SEA Group after the meeting regarding initial contact with additional industry partners. This report reflects the discussion during the SEA Group meeting on the 2nd July 2025 only.

SEA Group Report: P1012 – Late Cenozoic Glaciers, Landscapes, Climates, and Ecosystems of the North Sea (GLACE-NS)

Newton et al.

Summary:

The SEA group was very impressed with the presentation and preparation of the site survey data of P1012. **Overall, the data quality is excellent, and the site selection is appropriate for safe drilling.**

The proponent team has recently collected a small high-resolution survey including hydroacoustics and new shallow seismic data in the area of the primary site NSC-04A, which are currently being processed. The SEA Group requests the additional data to be presented by the end of November given the likelihood of small-scale relocation of the primary site. ESO requests additional alternate sites in the same water depth close to the primary site in case of unexpected seafloor hazards.

The SEA Group confirms the site survey data and site location allows for this project to be implemented in 2026.

Outstanding Actions:

- **Proponents** to supply newly acquired site survey data with final proposed drilling coordinates (primary and alternate sites) by end of November 2025.
- **SEA Group** to perform online review of the final primary site and provided alternate sites.

Detailed report:

Based on the already ongoing discussion on the implementation of the project by ESO, the SEA group discussion mainly focussed on the sites selected in the Central Basin (NSC-01A to -04A), with special focus on the intended primary site NSC-04A. The other sites were assessed for completeness. However, the panel understands that those will not be drilled based with the drilling platform and implementation approach chosen.

The presented site survey data is of high quality and includes industry-standard 3D seismic as well as 2D seismic. The proponents employed a rigorous process to identify the scientifically most desirable sedimentary package, while avoiding geological hazards as well as known anthropogenic infrastructure and hazards. The proponents acquired additional small-scale site survey data in May 2025, which is currently being processed. These data include a small seismic survey, high-resolution bathymetry, subbottom profiler and sparker data in a 3D cube around the intended drill Site NSC-04A. The proponents expect the new dataset to provide improved imaging of the seafloor and subsurface down to 200 mbsf.

Primary Target Site NSC-04A:

The SEA group sees no safety concerns with this site selection and approves drilling to the full indicated penetration depth (1200 mbsf).

However several points have been identified, which need to be managed during the implementation of the project:

- Given the abundant hazards in the vicinity, deviation of the borehole is a risk and needs to be managed offshore. The SEA Group recommends the use of an azimuth log and constant monitoring during drilling operations.
- Pressure and biogenic gas need to be monitored throughout drilling
- Unexploded munition is a general hazard in the region, close-by alternate sites will increase the operational flexibility offshore

To finalize the site, the proponent team is asked to provide the new site survey data by end of November 2025 to the SEA Group. The new data are intended to be used further clarify the drilling location and identify close-by alternate sites.

Central Basin Sites:

NSC-01A, -02A and -03A have all been evaluated and no safety concerns have been raised. The SEA group approves those sites for drilling to the full indicated penetration depth.

Northern Basin Sites:

NSN-01A, -02A, -03A and -04A are unlikely to be implemented under the currently proposed implementation plan. The SEA group has evaluated the supplied site survey data for completeness and potential future drilling efforts.

Overall, the sites in the Northern Basin need some additional work to allow an approval for safe drilling operations.

NSN-01A's lithological prognosis is incomplete (956 mbsf instead of the target depth 1040 mbsf). The lower part of the strata needs to be re-evaluated to approve for drilling.

NSN-02A's data presentation shows some issues with the stitching of the 3D seismic cube. This site would need re-evaluation based on additional lines or slices from the 3D seismic cube.

NSN-03A shows several bright spots in the section, which the proposed site would penetrate. The bright spot at around 500ms is a major concern for safe drilling operations. The SEA group does not approve this site.

NSN-04A's site survey data is of comparable poor resolution. A major safety concern is the presence of a potential mud flow between 200-500 ms, a potential anticline and indications of overconsolidation. The SEA group does not approve this site.

Southern Basin Sites:

NSS-01A and NSS-02A are unlikely to be implemented under to current implementation plan. The SEA group has evaluated the supplied site survey data for completeness and potential future drilling efforts. Despite some limitations in seismic data quality, especially in depicting the seafloor, the SEA group approves drilling of both sites at the depth limit equivalent to 700 ms TWT above the unconformity.

Overall, the sites in the Southern Basin need additional work to allow an approval for safe drilling operations.

NSS-01A's site survey data is of comparably poor quality, especially in depicting the seafloor reflection. The change in formation could indicate the presence of fluids and would need a re-evaluation based on additional data. The SEA group approves this site for drilling above the unconformity (depth limit equivalent to the depth mbsf of 700ms TWT).

NSS-02A's site survey data is of comparably poor quality, especially in depicting the seafloor reflection. The change in formation geometry and reflectivity could indicate the presence of fluids and would need a re-evaluation based on additional data. The SEA group approves this site for drilling above the unconformity (depth limit equivalent to the depth mbsf of 700ms TWT).

Overview table on proposed sites:

Proposed Site	Comments	Approval
NSC-01A	No safety concerns observed	Yes, to full depth (1200 mbsf)
NSC-02A	No safety concerns observed	Yes, to full depth (1200 mbsf)
NSC-03A	No safety concerns observed	Yes, to full depth (1200 mbsf)
NSC-04A	No safety concerns observed	Yes, to full depth (1200 mbsf)
NSN-01A	Incomplete lithostratigraphic prognosis, some concerns about the deeper part of the section	Would need re-evaluation, however, can be approved to 956mbsf
NSN-02A	Visualisation issues of the 3D cube, no apparent safety concerns	Would need re-evaluation
NSN-03A	Various safety concerns in this section	Not approved
NSN-04A	Potential mudflow structures and other safety concerns	Not approved
NSS-01A	Some visualisation issues, safety issues in the lower part of the section	The deeper section would need re-evaluation, however approved to the equivalent depth (mbsf) of 700ms (above unconformity)
NSS-02A	Some visualisation issues, safety issues in the lower part of the section	The deeper section would need re-evaluation, however approved to the equivalent depth (mbsf) 700ms (above unconformity)

This report has been collated by the SEA Group Chair Dr Hochmuth with input from all SEA Group members.