



DATA STATEMENT FOR THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) OF SCIENTIFIC ACTIVITIES

This form is required to apply for authorization and permits under the Antarctic Treaty and Protocol to the Antarctic Treaty on Environmental Protection.

The application applies to Spanish nationals and/or other nationals who carry out scientific activities in the Antarctic Treaty area.

Any modification in the activities declared in this document must be communicated to the Technical Secretariat of the Spanish Polar Committee for evaluation and authorization before its start

Principal Investigator (add all project IPs)

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Centre and organisation

Monterey Bay Aquarium Research Institute

Other centres involved

University of Barcelona, University of Haifa, GEOMAR, University of Milano Bicocca

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Telephone

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Number of people who will participate in the campaign^{1 2}

Six

Indicate the previous experience in Antarctica of each of the people participating in the project³

- Aaron Micallef, MBARI – Micallef has participated in two expeditions in the Antarctic Peninsula: *National Geographic Explorer* in Jan 2024, collecting water samples and seafloor video imagery from a zodiac; *R/V Falkor (too)* in Dec 2024 – Jan 2025, collecting multibeam echosounder data, sub bottom profiles, ROV imagery and sediment/biological samples.
- Nil Rodés, University of Barcelona - Rodés has worked as an expedition guide for three seasons (2022/2023, 2023/2024, 2024/2025) in the Antarctic Peninsula and the sub-Antarctic islands of South Georgia and the Falklands. He has completed a total of 10 trips to the Peninsula.
- Henriette Wilckens, University of Haifa - none
- Johann Voigtlander, MBARI - none
- Alessandra Savini, University of Milano-Bicocca - none
- Chong Sheng, GEOMAR - none

2. PROJECT DATA

Project Title

Fluid-seafloor interactions across the Antarctic seafloor under climate-driven change (FLAIR)

Indicate whether you are part of an International programme (name)

Not applicable

Number of Antarctic campaigns planned for the implementation of the project

One

¹ A complete list of all persons covered by this permit, indicating nationality and passport, will be sent to the TS of the Polar Committee before the start of the campaign

² It is recalled that all participants in the Spanish Antarctic campaign must have a certificate of medical fitness issued by the medical advice of the Spanish Polar Committee. For participants of other nationalities, a certificate of fitness issued by the competent authority of the relevant Antarctic Treaty Party shall be required.

³ All persons who participate for the 1st time in an Antarctic campaign are obliged to receive training on the Antarctic Treaty and the Madrid Protocol before the start of the Antarctic campaign

Area(s) where the project will be developed (indicate the southernmost latitude to be reached)

60.6–64.1° S, 53.6–61.5° W

Indicate if logistical support is needed at bases/vessels other than Spanish ones (name of the facility, country of belonging, geographical location)

Not applicable.

3. PRELIMINARY ENVIRONMENTAL ASSESSMENT

Activity details. Description and objectives of the proposed activity indicating the main characteristics that may have an impact on the environment

The FLAIR project aims to investigate fluid flow and its links to glacial history and seafloor processes in the Bransfield Strait and South Shetland Islands region. The work will provide new insights into how submarine fluid circulation influences slope stability, benthic ecosystems, and carbon cycling. The proposed field activities include:

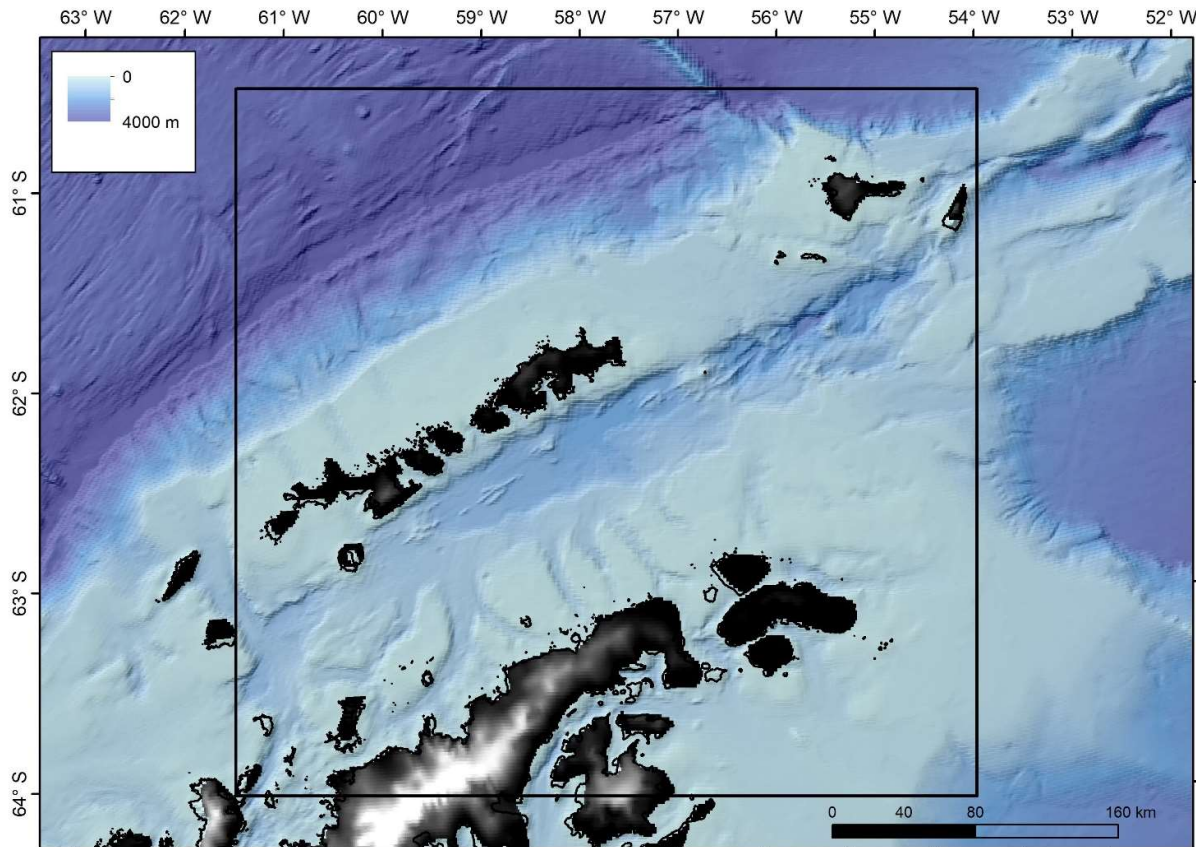
- Acoustic surveys using multibeam echosounder (MBES) and sub-bottom profiler (chirp) to map seafloor morphology and shallow stratigraphy.
- Conductivity-temperature-depth (CTD) or sound velocity profile (SVP) measurements to support MBES data processing
- Controlled-Source Electromagnetics (CSEM) with towed transmitter and receivers to investigate fluid pathways at depth.
- Remotely Operated Vehicle (ROV) dives to image seafloor seep sites and collect water samples.
- Sediment coring (gravity cores and mono-corer) to recover records of sediment and pore water for geochemical and stratigraphic analyses.

All activities will be conducted offshore, in open water, outside Antarctic Specially Protected Areas (ASPAs) and away from bird or seal colonies. A precautionary buffer of at least 1–2 km will be maintained from ASPA shorelines unless the official management plan confirms that the protected boundary does not extend into the adjacent marine area.

Location of activities. Indicate name, geographical coordinates of the locations, access routes and means of transport to the work areas, maps, frequency and duration of visits and whether they include protected areas

- Name and location of work areas: The proposed research will take place in the Bransfield Strait and adjacent offshore areas of the South Shetland Islands, Antarctica. The operational box is approximately 60.6–64.1° S, 53.6–61.5° W. Specific sampling stations will be selected within this area based on acoustic and geophysical survey results.

- Access routes and means of transport: Access will be by oceanographic research vessel Hesperides mobilized from Punta Arenas, Chile. All work will be conducted offshore, using hull-mounted systems or ship-based deployment of equipment (CSEM, ROV, CTD, coring systems). Some personnel may need to go ashore in King George Island to embark or disembark for flights.
- Map: A map of the study area showing the operational rectangle is attached.



- Frequency and duration of visits: The project involves a single research cruise of 7 days in 2026.
- Protected areas: No work will take place within Antarctic Specially Protected Areas (ASPAs). The only ASPA in the wider region with a marine component is ASPA 152 (Western Bransfield Strait); all stations will be positioned outside its boundaries. A precautionary buffer of at least 1–2 km from ASPA shorelines will be maintained for any near-island operations.

Expected dates for the development of the activities.

20th January to 1st February 2026

Will there be any **impact on ice, water or air quality**?

No

Will there be any **impact on ice-free areas, lakes or lake basins**?

No

Will there be any **impact on wildlife, mosses or lichens**?

No

Will there be any **impact on heritage or aesthetic values**?

No

Will diving activities be carried **out**? Indicate: 1) Number of people who make up the diving team; 2) Dive sites; 3) Logistical needs

It is recalled that any diving activity must comply with the provisions of the "Protocol for diving operations in Antarctica"

Not applicable.

Is the **introduction of hazardous substances planned**? Indicate the list of **chemical products**⁴, **radioactive material or stable isotopes** intended to be used. For each substance, indicate: 1) level of risk, 2) quantity, 3) justification of use, 4) destination of the waste generated. Explain how they will be used

No

Activities with UAV/RPAS.⁵⁶ Indicate: 1) Weight and dimensions of the appliance; 2) Power supply; 3) Flight autonomy; 4) Height at which the flight will be carried out and range in km; 5) Area where the flight will take place and estimated dates

It is recalled that any operation with RPAS must comply with the provisions of the "Protocol of the Spanish Polar Committee for the operation of remotely piloted

⁴ Absolutely all the chemical products to be displaced are declared, even in the case of small quantities.

⁵ RPAS: Remotely Piloted Aircraft Systems

⁶ All RPAS activities will follow Resolution 4 (2018) "Environmental Guidelines for the Operation of Remotely Controlled Aircraft Systems (RPAS) in Antarctica"

aircraft (RPAS) in Antarctica" and may formalize, before the campaign, the "Request for the provision of service for the performance of flights with remotely piloted aircraft (RPAS) in Antarctica" if you want to use this service.

- 1) Weight and dimensions of the appliance: DJI Mavic 3 Pro, 958 g; dimensions when unfolded are 347.5 x 290.8 x 107.7 mm (L×W×H).
- 2) Power supply: 5000 mAh LiPo
- 3) Flight autonomy: Approximately 40 minutes per battery (depends on the flight mode).
- 4) Height at which the flight will be carried out and range in km: We operate within the EASA A1/A3 regulations, which are restricted to a maximum altitude of 120 m above ground and a flight range within visual line of sight. However, the UAV can fly much higher and has a transmission range of up to 8 km.
- 5) Area where the flight will take place and estimated dates: The UAV will be used throughout the expedition (20 January – 1 February 2026) to acquire video footage for outreach purposes across the entire study area.

Identification of environmental impacts. Direct and indirect impacts that the activity will produce (emissions, physical disturbance, waste (including human waste), noise, light, etc.

Activity	Duration/intensity	Possible impact	Mitigation measures
Multibeam echosounder (MBES) and chirp sub-bottom profiler	7 days; MBES and chirp typically 200 dB.	Acoustic signals outside or at the upper end of the hearing range of most Antarctic marine mammals; low risk of disturbance, especially compared to seismic airguns. Potential effects limited to short-term avoidance behaviour in nearby animals, with no risk of injury or long-term disturbance.	Maintain watch for marine mammals; pause or adjust operations if large animals observed close to the vessel; restrict use to offshore sites away from bird and seal colonies.
CTD or SVP profiles	7 days; maximum one deployment per day	No impact envisaged. CTD or SVP profiles are proposed because XBTs cannot be used in Antarctica.	
Controlled-Source Electromagnetics (CSEM)	4 days; low-intensity, short-duration electric and magnetic fields generated by surface-towed transmitter at 30 A.	Fields may in principle be perceived by electro- or magnetosensitive organisms, but these are substantially weaker than natural sources (e.g. lightning, Earth's magnetic field). No evidence of significant harm, considered a low-impact technique. Effects, if any, expected to be negligible and transitory.	Limit survey duration; maintain appropriate tow depths; monitor for presence of marine mammals; avoid sensitive nearshore habitats.
Sediment coring	Localized deployment of gravity and mono-corer; maximum 40 stations.	Small-scale, localized seabed disturbance at coring sites; negligible effect on benthic habitats given limited number of cores.	Restrict number of cores to scientific minimum; avoid coring in sensitive habitats; all samples and waste retained onboard.

4. FAUNA AND FLORA

Describe the different activities with terrestrial, marine or freshwater fauna and flora that involve: collection, capture, immobilization, marking and release. Indicate: 1) affected species; 2) number of specimens affected; 3) percentage of the total population; 4) area where the activity will be carried out; 5) Period in which the activity will be carried out

The taking of samples, any harmful interference with Antarctic fauna and flora, the introduction of species (animal or vegetable) that are not native to the Antarctic Treaty Area and/or the collection of geological samples is prohibited, unless there is an authorization issued by the competent authority. An application for a permit for sampling, harmful intrusion, introduction of species and/or collection of geological samples for this purpose (TMU Application) must be attached once the project has been approved and before the start of the campaign.

Not applicable

Is there any provision for the **deliberate introduction of non-native species**⁷? Indicate: 1) Species and number; 2) Objective; 3) Place of introduction; 4) Precautions to avoid their dispersion and contact with native fauna and flora; 5) Disposal Process

Not applicable

Bioprospecting activities⁸. Describe the different activities indicating in detail: Collection, capture, immobilization, marking, release, affected species, number of affected specimens, percentage of the total population, area where the activity is carried out, period in which the activity is carried out.

Not applicable

5. ROCKS AND MINERALS

Describe the activities that involve **the collection or removal of fossils, rocks, soil, marine and lake sediments, minerals, meteorites, etc.** Indicate: 1) Type of material; 2) Collection area; 3) Total quantity (number or weight); 4) Final destination of the collected material and availability (outside the Antarctic Treaty area)

⁷ Terrestrial or marine animals, plants, seeds, microorganisms or non-sterile soil not native to the Antarctic Treaty area.

⁸ "Any search, identification, description, collection, study, observation, cultivation, replication or any other scientific research process carried out on indigenous biological species and carried out within the Antarctic Treaty area, with the initial intention of considering possible products or applications of industrial or commercial derivation, especially through the development of patentable materials or processes"

An application for a permit for sampling, harmful intrusion, introduction of species and/or collection of geological samples for this purpose (TMU Application) must be attached once the project has been approved and before the start of the campaign.

The proposed activity involves the collection of marine sediments by means of coring. Two types of cores will be taken: up to 20 gravity cores (each up to 5 m in length) to obtain longer stratigraphic records, and up to 20 mono-cores (each up to 1 m in length) to recover undisturbed surface sediments and pore waters. Sampling will be conducted offshore in the Bransfield Strait and around the South Shetland Islands (60.6–64.1° S, 53.6–61.5° W), at stations outside any Antarctic Specially Protected Areas (ASPAs).

All cores will be transported to the University of Barcelona (Spain) for analysis and curation. Subsamples will also be distributed to partner institutions (MBARI, University of Milano-Bicocca, GEOMAR) for specialised analyses. All samples and resulting data will remain available outside the Antarctic Treaty area, with residual material archived according to institutional curation protocols. No disposal of sediment material will occur in Antarctica.

6. SUBSTANCE RELEASE

The amount of waste produced⁹ or disposed of in the Antarctic Treaty area shall be reduced as far as possible. In the event that they occur, indicate:

1) Type of substance or product; 2) Composition and/or components; 3) Quantity (grams, liters, etc.); 4) Frequency of evacuation; 5) Place of evacuation; 6) Evacuation route

1) Type of substance/product: Laboratory consumables (plastic tubes, gloves, filters, etc.) used for sample handling.

2) Composition/components: Lab consumables: inert plastics and nitrile.

3) Quantity: Lab consumables: estimated <5 kg for the entire cruise.

4) Frequency of evacuation: Continuous collection onboard during the cruise; final evacuation at the end of the expedition.

5) Place of evacuation: All waste retained onboard and removed at the port of demobilization (Punta Arenas, Chile). No disposal in the Antarctic Treaty area.

⁹ The management and removal of waste generated during the development of the research project is the responsibility of the project.

6) Evacuation route: Waste collected onboard in designated containers → stored according to vessel protocols → offloaded at port → transferred to licensed waste management facilities for treatment/disposal according to national regulations.

7. PROTECTED AREAS

Describe the activity that involves access to these areas, indicating: 1) Total duration of the visits; 2) Periodicity of the visit; 3) Duration of each visit; 4) Number of people during the visit (including logistical support staff)

It is strictly forbidden to access an Antarctic Specially Protected Area unless you have a permit issued by the competent authority. A permit application for access to the ASPAs (ASPA Application) must be attached once the project has been approved and before the start of the campaign.

Not applicable.

8. ACTIONS ON LAND AND SEA

Describe all those actions that involve the **installation of structures**, indicating: 1) Type of structure; 2). Building material; 3) Anchors to the ground or sea; 4) Place of installation; 5) Time of permanence; 6) Destination of the structure after its use; 7) Logistics for assembly and disassembly

Not applicable.

Describe all those actions that involve the **installation of camps**, indicating: 1) Installation area; 2) Description of the camp; 3) Number of occupants; 4) Period of occupation (days, weeks); 5) Assembly, sourcing and dismantling logistics; 6) Quantity and destination of the waste generated

Not applicable.

Describe all those actions that involve the **installation of equipment**¹⁰ (data loggers, markers, etc.) indicating: 1) Description of the equipment; 2) Location; 3) Transportation to the area; 4) Frequency and duration of visits for installation and maintenance; 4) Withdrawal

Not applicable.

¹⁰ All equipment that is left installed must be correctly identified with the name of the IP, contact, project and date of installation

Describe the activities that involve **throwing into the sea any type of probe, instrument**, etc., indicating: 1) Type and description of the equipment; 2) Means of deployment 3) Duration and depth; 4) Technical and logistical needs for your use

1) Type and description of equipment

- Controlled-Source Electromagnetics (CSEM): surface-towed electric dipole transmitter and up to 2 seafloor receivers. Total length of 700 m.
- Remotely Operated Vehicle (ROV): small ROV (Pivot Deep Trekker) equipped with video and sampling arms.
- Coring systems: gravity corer (up to 5 m length) and mono-corer (1 m length).
- CTD: CTD rosette or sound-velocity probe.

2) Means of deployment

- CSEM transmitter and receivers deployed and recovered over the stern on a tow rope using a winch.
- ROV deployed and recovered from the stern, ideally using a winch. A zodiac may be needed for recovery.
- Corers and CTD lowered vertically to the seabed by winch and wire.

3) Duration and depth

- CSEM: survey lines of up to 12 hours.
- ROV: dives of up to 3 hours to depths up to 300 m.
- Corers: penetration up to 5 m below seabed in depths up to 2500 m. Duration of up to 3 hours per deployment.
- CTD: deployments of up to 3 hours in water depths of up to 2500 m.

4) Technical and logistical needs

- A-frame, and winches suitable for coring, ROV, CTD and CSEM operations.
- Shipboard laboratory space for handling cores and maintaining instruments.
- Support from deck crew for safe deployment and recovery.
- Temperature-controlled cold storage room for the preservation of core and water samples.

Describe any other activity that involves: 1) Heavy use of an area (trampling); 2) Continued use of existing or new trails

Not applicable.

Are the planned activities expected to cause cumulative **impacts**¹¹?

No.

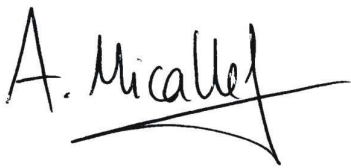
9. OTHER

Describe any other equipment, activity or action not previously listed and that you consider may have an impact on the Antarctic environment.

Not applicable.

10. DECLARATION

Date and signature of the person responsible for the activity

A handwritten signature in black ink, appearing to read 'A. Micallef', with a long horizontal flourish extending to the right.

Aaron Micallef

11th September 2025

¹¹ Combined impact of past, present, or reasonably foreseeable activities. These activities can overlap in time and/or space.

For questions and queries contact:

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