

2.

**APPLICATION FOR THE CONSENT TO CONDUCT MARINE SCIENTIFIC
RESEARCH IN AREAS UNDER NATIONAL JURISDICTION OF ICELAND**

Date:

1. General information

1.1 Cruise name and/or number:

1.2 Sponsoring institution:

Name: Marine Institute

Address: Rinville
Oranmore
Co. Galway
Ireland

Name of Chief Executive: Dr. Peter Heffernan

1.3 Scientist in charge of the project:

Name: Dr Sergei Lebedev

Address: Dublin Institute for Advanced Studies (DIAS), Geophysics Section, 5 Merrion Sq,
Dublin 2, Ireland

Telephone: +353-1-653-5147 x240

Telefax: +353-1-443-0575

1.4 Scientist(s) from ICELAND involved in the planning of the project

Name(s):

Address:

1.5 Submitting officer:

Name and address:

Rinville
Oranmore
Co. Galway

Country: Ireland

Telephone: 00 353 91 387200

Telefax: 00 353 91 387201

2. Description of project (Attach additional pages as necessary)

2.1 Nature of objectives of the project: Ireland's largest sedimentary basins and its largest natural hazards (offshore landslides) are in its vast offshore. The lack of broadband seismic

sensors offshore has hindered our understanding of the deep mechanisms of the lithospheric hyper-extension that formed the basins, mechanisms of the Paleogene uplift and volcanism in and around Ireland (probably related to the enigmatic Iceland Hotspot activity), regional-scale structure and evolution of the area's crust and lithosphere, and its current deformation and seismicity.

In this passive-seismology project, we will deploy 18 new, broadband, ocean-bottom seismometers (OBS) across and around Ireland's offshore, with the instruments provided by the newly established Insitu Marine Laboratory for Geosystems Research Centre. The deployment will start in September-October, 2018, and last ~18 months. Surface-wave and body-wave tomography will be performed using ambient-noise and natural earthquake sources. Waveform tomography of Ireland and NE Atlantic will be performed using 3D waveform sensitivity kernels and the new NAGTEC model of the NE-Atlantic crust. An offshore earthquake catalogue will be obtained. Lithosphere-scale thermal evolution of the basins will be modelled.

In order to enhance the seismic data coverage in the northwestern part of the region, so as to study the relationship of the lithospheric evolution of the Irish offshore with the Iceland Hotspot activity, we would like to deploy 3 of the stations in Iceland waters, to the south of Iceland.

2.2 Relevant previous or future research cruises: This will be the first OBS experiment at this scale between Ireland and Iceland.

2.3 Previously published research data relating to the project: This is a new project, deploying broadband OBS in the region for the first time, so that there are no publications on this specifically. The methods that will be applied to the data include regional and global seismic tomography techniques used, for example, in:

Endrun, B., S. Lebedev, T. Mejer, C. Tirel, W. Friederich. Complex layered deformation within the Aegean crust and mantle revealed by seismic anisotropy, *Nature Geoscience*, 4, 203–207, 2011.

Schaeffer, A. J., S. Lebedev. Global shear-speed structure of the upper mantle and transition zone. *Geophys. J. Int.*, 194, 417–449, 2013.

3. Methods and means to be used

3.1 Particulars of vessel

Name: Celtic Explorer
Nationality: Irish

Owner: Marine Institute

Overall length: 65.5m
Maximum draught: 5.7m
Net tonnage: 727
Propulsion: 2 x 1530 KW, 1000Rpm, 1 x 1020 KW, 1000 Rpm
Cruising speed: 10 Kts
Call sign: EI GB

Method and capability of communication –
 Vsat Satellite Broadband
 Imarsat –c
 HF
 VHF
 Mini –M

Name of master: Antony Hobin/Denis Rowan
 Number of crew:
 Number of scientists on board: 7

3.2 Aircraft or other craft to be used in the project: N

3.3 Particulars of methods and scientific instruments

Types of samples and data	Methods to be used	Instruments to be used
Continuous passive seismic recordings	Deployment of ocean-bottom seismometers for 18 months	Broadband ocean-bottom seismometers NAMMU, manufactured by K.U.M., Germany

3.4 Indicate whether harmful substances will be used: No

3.5 Indicate whether drilling will be carried out: No

3.6 Indicate whether explosives will be used No

4. Installations and equipment

Details of installations and equipment (dates of laying, servicing, recovery, exact locations and depth):

The seismometers will be deployed during the deployment cruise between 17 September and 6 October, 2018. Each seismometer is lowered to the water using the ship's A-frame and released. It then sinks to the ocean floor by itself.

The seismometers will then be recovered during the recovery cruise in the Spring, 2020. Their ascent to the surface will be triggered by an acoustic signal from the ship. Once at the surface, they will be captured and raised to the deck.

No servicing during the deployment will be performed.

5. Geographical areas

5.1 Indicate geographical areas in which the project is to be conducted (with reference in latitude and longitude):

The planned locations of the 3 stations in Iceland waters are:

61N, 17W

61.5N, 22W

59N, 24W

5.2 Attach chart(s) at an appropriate scale showing the geographical areas of the intended work and, as far as practicable, the positions of intended stations, the tracks of survey lines, and the locations of installations and equipment.

6. Dates

6.1 Expected dates of first entry into final departure from research area of the research vessel:

Deployment cruise between 17 September and 6 October, 2018; recovery cruise in the Spring, 2020.

6.2 Indicate if multiple entry is expected:

Two entries: deployment cruise between 17 September and 6 October, 2018; recovery cruise in the Spring, 2020.

7. Port calls

7.1 Dates and names of intended ports of calls in ICELAND:

None

7.2 Any special logistical at ports of call:

None

7.3 Names/ Address / Telephone of shipping agent (if available)

8. Participation

8.1 Extent to which ICELAND will be enable to participate to be represented in research project:

No concrete plans at this moment, but we are open to collaboration

8.2 Proposed dates and ports for embarkation / disembarkation:

The 2018 Cruise starts in Cork, Ireland and finishes in Galway, Ireland. The 2020 cruise will start and finish in Ireland as well.

9. Access to data, samples and research results

9.1 Expected dates of submission to ICELAND preliminary reports which should include the expected dates of submission of the final results:

6 MONTHS AFTER THE DEPLOYMENT

9.2 Proposed means for access by ICELAND to data and samples:

Electronic (download or USB disk)

9.3 Proposed means to provide ICELAND with assessment of data, samples and research results or provide assistance in their assessment or interpretation:

The data will be available to Iceland after the instrument retrieval

9.4 Proposed means of making research results internationally available:

The data will be open after the end of the project. The results will be published in international peer-reviewed journals

10. Scientific Equipment

COMPLETE THE FOLLOWING TABLE-
SEPARATE PAGE FOR EACH COSTAL STATE:

INDICATE YES OR NO

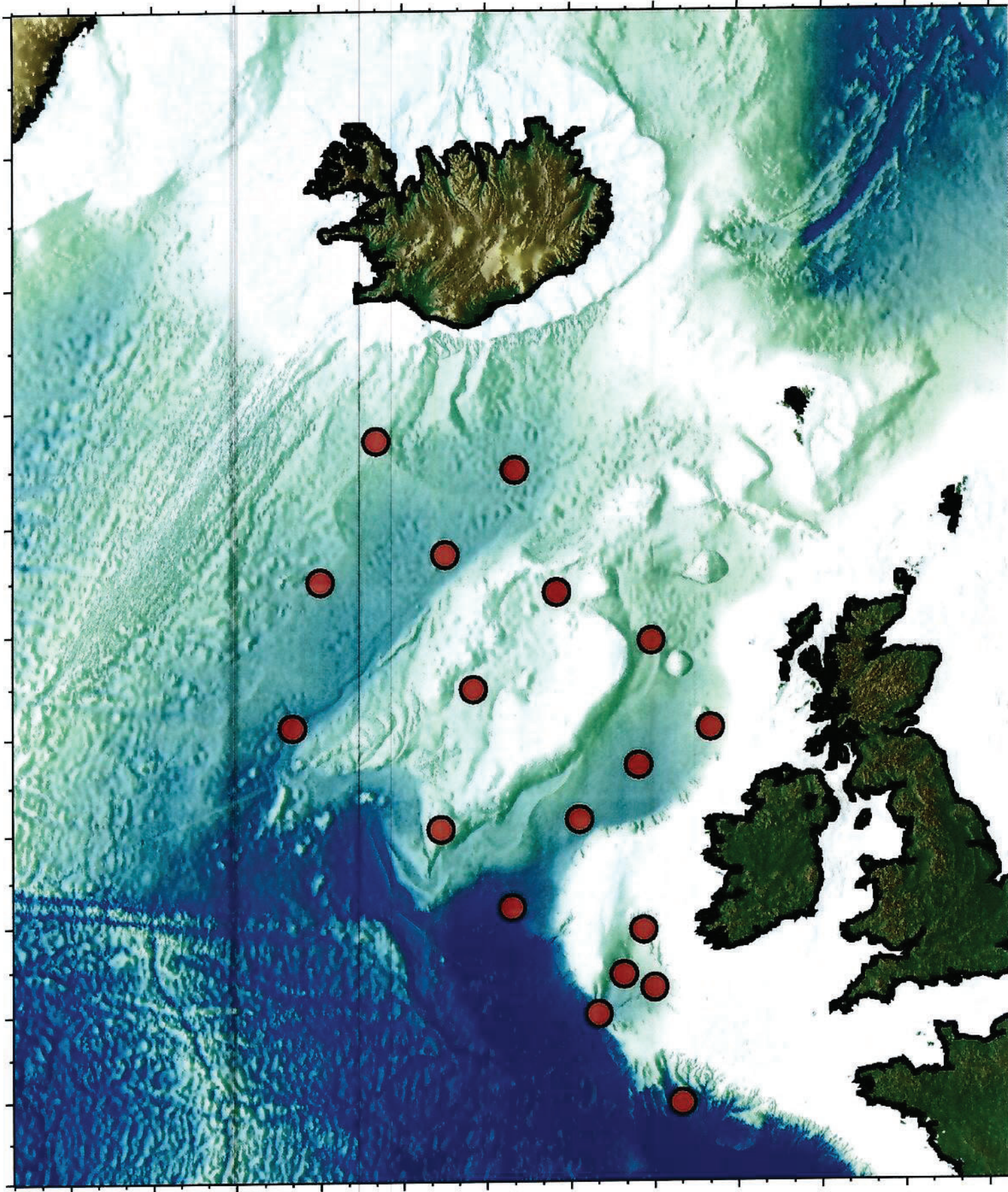
LIST SCIENTIFIC WORK BY FUNCTION Eg: MAGNETOMETRY: GRAVITY DIVING SEISMICS BATHYMETRY SEABED SAMPLING TRAWLING ECHO SOUNDING WATER SAMPLING U/W TV MOORED INSTRUMENTS TRAWLING ECHO SOUNDING WATER SAMPLING	Water column including sediment sampling of the Seabed	Fishes research within fishing limits	Research concerning the natural resources of the continental shelf or its physical characteristics	DISTANCE FROM COAST		
				Within 12nms	Between 12-200nms	(Continental shelf work only) Beyond 200nm but within the continental margin

WATER SAMPLING	n	n	n	n	n	<u>n</u>
PROFILING INSTRUMENTS	n	n	n	n	n	<u>n</u>
ABOVE WATER OPTICS AND PHOTOGRAPHY	n	n	n	n	n	<u>n</u>

-Sergei Lebedev-----
(On behalf of the Principle Scientist)

Dated ---23 April, 2018 -

-33° -30° -27° -24° -21° -18° -15° -12° -9° -6° -3° 0°



km, at 50°N
0 400 800
km. at 60°N