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To: Heiðrún Ýrr Júlíusdóttir, Secretary
Directorate for Security and Defence
Ministry for Foreign Affairs
Iceland

7th May, 2025

Re: Request for a permit to deploy 23 Ocean Bottom Seismometers along the Reykjanes Ridge, southwest Iceland.

Dear Heiðrún,

I am writing this letter in order to seek permission from the Directorate for Security and Defence to deploy 23 Ocean Bottom Seismometers (OBSs) along the Reykjanes Ridge. Of these 23 instruments, 13 lie within Iceland's Exclusive Economic Zone (EEZ), and the remaining 10 lie to the south in international waters. This is part of a collaborative experiment between the University of Cambridge (myself), University of Iceland (Elias Rafn Heimisson), the Institute of Geology and Geophysics, Chinese Academy of Sciences (Prof. Liang Zhao), also known as IGGCAS, University College London (Prof. Ana Ferreira) and the Australian National University (Prof. Hrvoje Tkalčić), that seeks to use recordings of earthquake activity in order to better understand plume-ridge interaction and its role in crustal growth.

In 2021, we deployed a pilot OBS array offshore of the Reykjanes Peninsula using the Iceland Coastguard vessel ICGV Thor, which involved 6 instruments. A research permit was obtained from the Directorate for Security and Defence, Ministry for Foreign Affairs, Iceland for this experiment. Its primary goal was to test the efficacy of the instruments in the challenging and potentially noisy conditions of the North Atlantic. Overall, the pilot experiment was a success, and provided crucial data that allowed us to significantly improve the OBSs for the upcoming experiment.

I have been in discussions with Ásgrímur Ásgrímsson and Auðunn Kristinsson from the Icelandic Coast Guard, and they have agreed to facilitate the deployment of the OBS units with their vessel the ICGV Thor. The deployment will take approximately six days, and is scheduled to begin on 17th September 2025. The OBSs will be in place for a maximum period of 12 months, and will be retrieved by the ICGV Thor or another vessel provided by the Icelandic Coast Guard. I have included a separate document called "Iceland_OBS_cruise_plan_2025.pdf" that provides maps and coordinates of the proposed OBS locations, details about the OBSs, including size and weight and how they operate, and deployment procedure. In summary, OBSs are seismometers contained in pressure-resistant housing that weigh ~100 kg each and have a footprint of ~1m². A metal ballast is

attached to the bottom, and they are lowered into the water by a winch or crane. They then descend autonomously to the bottom, where they record 3-component ground motion due to earthquakes. A pressure sensor for detecting hydroacoustic signal is also included. The data is recorded to disk, and when the instruments are ready to be collected, an acoustic modem is used to send a release signal to the OBS, which then ascends to the surface and leaves the metal ballast behind (it is designed to disappear over time due to corrosion). Once it reaches the surface, it emits a radio signal, and will be collected by the vessel on the surface.

The University of Cambridge Volcano Seismology group (UCVSG) has been undertaking research in Iceland for several decades, and the OBS experiment outlined here is an extension of our current activities. In particular, for the past ~5 years we have had an array of seismometers operating on the Reykjanes Peninsula that is recording earthquakes and volcanic tremor generated by the unprecedented sequence of 11 eruptions since 2021. The additional data from the offshore region will contribute to our efforts in trying to understand the nature and origin of the ongoing activity in the broader context of plume-ridge interaction.

If you require any more information about this experiment, please don't hesitate to let me know.

Yours sincerely,



Prof. Nicholas Rawlinson
BP Foundation McKenzie Professor of Earth Sciences &
Fellow of Downing College