

## NERC Research Experience Placement Scheme (2)

### Project:

### Mapping volcanoes in the Tofua Arc

**Supervisors:** Dr Isobel Yeo, Dr James Hunt, Dr Mike Clare, Philipp Brandll (GEOMAR, Germany) and the British Oceanographic Scientific Core Facility (BOSCORF)

### Summary:

More than 70% of the earth's volcanic activity occurs underwater, much of it at plate boundaries. The Tofua Arc, in the Kingdom of Tonga, is one of the most active volcanic Arcs in the world, and has produced four known eruptions in the last 5 years, including the volcanic explosivity index (VEI) 5 eruption of Hunga Volcano (also referred to as Hunga Tonga – Hunga Ha'apai) in January 2022, the most explosive eruption in the last 150 years, which generated tsunamis in multiple oceans and disconnected the Kingdom of Tonga from the world wide web. Despite its potential to produce large, dangerous volcanic eruptions, surprisingly little is known about the volcanoes of the Tofua Arc, or their states of activity, though recent studies have suggested there are several other volcanoes in the region which show evidence of magmatic recharge.

This project will use bathymetry of the Tofua Arc, alongside newly acquired data related to the Hunga Volcano Eruption and associated ongoing work, to produce detailed geological maps of the volcanoes of the Tofua Arc, including volcanic products, bedforms, and tectonic and structural features using ArcGIS to produce an evaluation of the frequency of major events and risk posed by Tofua Volcanoes.

This project will be supervised by Dr Isobel Yeo, Dr James Hunt and Dr Mike Clare, and conducted in partnership with Philipp Brandll (GEOMAR, Germany) and the British Oceanographic Scientific Core Facility (BOSCORF). The researcher will be incorporated into ongoing research on Hunga Volcano and Volcanic and other Marine Geohazards within the Marine Geosystems group at NOC.

Skills developed will include GIS, processing and interpretation of bathymetric data, and core logging and geochemical interpretation (of cores collected from Hunga Volcano).

### Timescale:

Week 1: Project introduction, data gathering and formatting

Week 2: Multibeam processing, core logging and data interpretation

Weeks 3-5: Mapping

Week 6: Risk assessment and report writing