

Understanding the Morphology of the Eggvin Bank with Mapping, Isotope, and Trace Element Data

Located north of Iceland, the Eggvin Bank is an abnormally shallow segment of the Kolbeinsey Ridge. There are multiple hypotheses for its morphology. The presence of a mantle plume, similar to that thought to underlie Iceland, could cause anomalous melting in the mantle underlying this region. By analyzing the samples collected at sea and on Jan Mayen Island for U-series isotopes, the timing of mantle melting can be better understood. Timing of melting could show that there is a rapidly upwelling plume in this region. Additionally, radiogenic isotope data can aid in determining the composition of the source of the melt. Variations in source can determine the mantle composition and its origin. Another hypothesis for the region's morphology is that there is continental crust, or perhaps mantle lithosphere from under ancient continental crust, trapped in this area, which melts more easily. This could be confirmed with trace element data, which can be used to understand mantle composition and the process of the melting.

Immediate goals are to prepare Mohns Ridge and Jan Mayen Island samples for trace element and isotopic analysis, and to begin trace element analysis using the Agilent Inductively-Coupled Plasma Mass Spectrometer (ICP-MS). In addition, we will be dredging more samples of mid-ocean ridge basalts from the Eggvin Bank aboard the *RV Poseidon*. While aboard the vessel, we will use an autonomous underwater vehicle (AUV) to map the Eggvin Bank to better understand its bathymetry. From our fieldwork, we expect to have a high-resolution map of the Eggvin Bank. These data will aid in understanding the morphology in this region, but more importantly, it will help explain why the Eggvin Bank is shallow with uneven bathymetry compared to the surrounding ocean floor, by determining the nature of volcanic output along and adjacent to the ridge axis.