An investigation into the origins and composition of Jan Mayen Island and surrounding ridges

Due to inextensive research, the exact origins and composition of Jan Mayen Island are controversial, and ultimately unknown. Similarly, knowledge of the melt and convection processes of the mantle is limited. This study aims to address these problems by providing additional information about mid oceanic ridge basalts, the most uncontaminated representation of the mantle. Investigation of Jan Mayen Island and the surrounding ridges will also aid in the investigation of a larger geological interest: the dynamic processes of the mantle. Prior research has suggested a few hypotheses about how the island was formed: a magma plume, a locally emplaced part of the Icelandic plume, a small microplate of rifted Greenland lithospheric mantle material, or a trapped remnant of early Icelandic oceanic plateau. Our evidence supporting or discrediting such hypotheses will be obtained from previously collected samples as well as fresh samples collected during an expedition aboard the *RV Poseidon*, retrieving new samples of Jan Mayen Island ridges, the Kolbeinsey Ridge, and the Mohns Ridge. We plan on investigating the morphology of the region, specifically the Eggvin bank, which is the northernmost ridge segment along the adjacent Kolbeinsey Ridge, by means of bathymetric mapping using an Autonomous Underwater Vehicle. These mapping data will demonstrate structures, cones, and lava flows and reveal the morphology and shape of the ridge, which will help determine its origin. Other methods include using an Agilent Inductively-Coupled Mass Spectrometer to gather trace element data in combination with radiogenic isotope data collected by our colleagues at the University of Wyoming and l'Ecole Normale Supérieure de Lyon. Our isotope and rare element analysis will provide information about the composition and origins, and more broadly reveal insight into the convection and melt processes within the mantle, contributing to the understanding of the heterogeneity of the mantle.