High resolution volcanology and geochemistry of mid ocean ridge segments flanking the 9°40’S melt anomaly and the Ascension hot spot.

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Volcanism at mid-ocean ridges (MOR) plays a key role in the formation of oceanic crust and the depletion of the Earth’s upper mantle. During the past decades, MOR volcanism has attracted a wide scientific interest to understand melt generation and mantle processes on a global scale. Detailed, eruption-scale investigations, however, have been rare due to the immense logistical effort required. We aim to decipher the spatial and temporal evolution of selected volcanic segments in the ~8°S area of the mid-atlantic ridge using ROV-based mapping and sampling. This area is particularly suited to investigate the influences of different mantle source domains at high resolution, as fertile mantle (9°40’S melt anomaly) and hot spot volcanism (Ascension island) are both present together with typical depleted MORB segments. Based on detailed volcanological reconstructions of the seafloor eruptions (TOBI side scan images and ROV-based mapping) and investigations on Ascension Island (drill core logging and surface mapping) we will investigate eruption-scale heterogeneities and temporal trends with high precision geochemistry. These investigations will include trace element measurements by isotope dilution (HFSE, REE), high precision Pb and Hf-Nd isotope measurements. The dataset will contribute to the understanding of small scale mantle heterogeneities beneath slow spreading MOR.