

POS502 Science Report - week ending 24/07/2016

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A photo taken of the top of a pillow mound with the Deep Survey Cam system mounted on ROV PHOCA

It has been a very busy and very successful week scientifically, with 5 ROV dives, 30 Wax Corer stations, 2 dredges and a large area covered with the ship multibeam system. We have managed to sample all but one of our target flows with the Wax Corer (the final flow will be sampled tomorrow) and have had an extremely high sampling success rate, with glass being recovered in all but three deployments. Glasses recovered are, as expected, predominantly fresh and perfect for geochemical analysis back home. Both dredges on Eggvin Bank Volcano were successful, with several pieces of old material recovered from the volcano off axis and an entire dredge-full of young, glassy samples recovered from the crater.

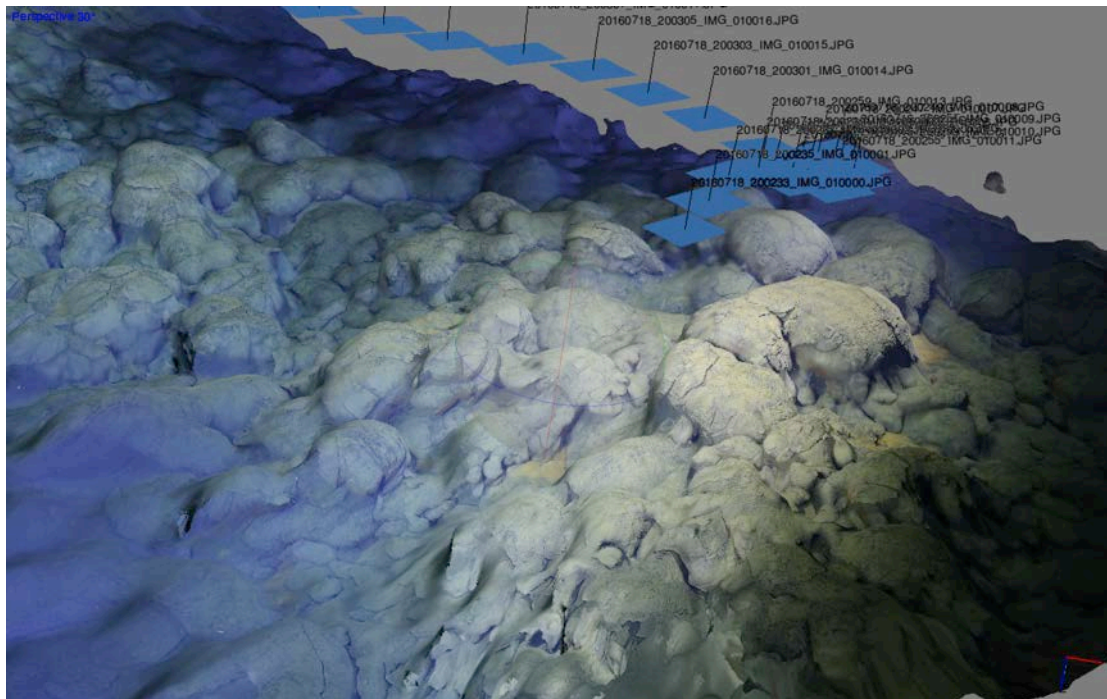
The bathymetry, so far covering 19600 km², has revealed a complex series of volcanically active valleys at the south of the segment, which appear to consist of a parallel valley at the southern end of the Northern Kolbeinsey Ridge that bends towards the volcanically active, overlapping northern end of the Middle Kolbeinsey Ridge. We also covered a large area to the east of the ridge axis, showing the easterly limit of Eggvin Bank Volcano and some interesting tectonic features.

The ROV dives have covered the entire spectrum of lava morphologies, from pillow mounds to ropy textured sheet flows, cut by deep fissures, than can be

many meters wide. The morphologies and sediment cover observed in the ROV footage and the early 3D photogrammetric reconstructions correspond well with the sidescan sonar imagery collected with the AUV Abyss in 2012, and support the theory that hydroacoustic information can be used to accurately predict seafloor morphology and sediment cover (a proxy for lava flow age), as predicted by GEOMAR scientists. Additionally, we have observed evidence for hydrothermal activity on the seafloor in at least 5 separate locations (corresponding to one site every two to three kilometers of seafloor covered). These sites were also often accompanied by a clear spike in the redox potential levels recorded by MAPR (Miniature Autonomous Plume Recorders) mounted on the ROV. Two such sites were observed within 400 m of each other during an ROV dive into the crater on top of the recently active Eggvin Bank Volcano.

All on board are well and enjoying the good weather and daily scientific discoveries. We are excited for the last few days, in which we hope to complete further ROV work on several more lava flow targets and complete our sampling program.

Bets wishes from the Arctic on behalf of everybody on board,
Isobel Yeo



An in progress 3D photogrammetric reconstruction of pillow lavas from the active rift zone