Origin of compositional variation in basalts from Mount Glooscap Map at 36°35'N: successful use of a submersible drill

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Mount Glooscap, a large peak in the crestal mountains of the Mid-Atlantic Ridge at 36°25'N, south of the FAMOUS area and about 16km west of the AMAR rift valley, was sampled with the submersible electric rock core drill developed by BIO. Twenty-eight basalt samples from seven drilling stations have been analyzed for major and trace elements. Many of the samples come from flows lying under a cover of carbonate rocks and therefore could not have been sampled by a submersible or a dredge.

The ca. 2 Ma old Mount Glooscap basalts are similar to AMAR basalts but quite distinct from "0-age FAMOUS area basalts: they are pyroxene-phyric instead of olivine-phyric, have lower contents of MgO, higher Al_2O_3 and CaO and lower contents of TiO_2 and Zr than many FAMOUS basalts at equivalent MgO values and are LREE-enriched. Most of the in- and between-hole compositional variation can be accounted for by low-T alteration, accumulation of phenocrysts, and low-P relatively low-T fractional crystallization. A comparison is made with Mont de Venus, the largest active volcano in the FAMOUS area. If Mount Glooscap can be interpreted as a single volcano, it may be that lavas become progressively more differentiated with time at mid-ocean ridge volcanoes as they commonly do at subduction zone volcanoes.

The density of sampling and the type of data sought during this study begin to approach the scale and requirements of the submarine fieldwork that may be needed in the reconnaissance study of polymetallic sulphide deposits on the ocean floor.