Geophysical Research Abstracts
Vol. 15, EGU2013-7134, 2013
EGU General Assembly 2013

Pleistocene Volcanic Fields in the Anahim Volcanic Belt: What, why, how? - Chilcotin Highland, West-Central British Columbia, Canada

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A large number of volcanic features, including stratovolcanoes, cinder cones, domes, flows and erosional remnants of these exist in the eastern part of the Anahim Volcanic Belt (AVB) around Satah Mountain and Baldface Mountain. These two fields (abbreviated SMVF and BMVF below) are located south and east of the Itcha Ranges in the Chilcotin Highland of west-central British Columbia. Petrographic, geochemical and geochronological studies are hoped to clarify the volcano-tectonic association of these fields and if/how they relate to the nearby AVB. The studies might also provide corroboration of the hot-spot that has been proposed as the source of magmatism in the area, ranging from mid-Miocene ages in the western part of the AVB to Holocene ages at its eastern end at Nazko Cone. During two field campaigns, 20 centres in the SMVF aligned on a NNW-SSE trending topographic high and seven centres in the BMVF were studied with a focus on geochemistry and ages of the erupted lavas. With the exception of Satah Mountain, the most prominent and best-preserved edifice, individual centres are generally small in elevation (200-300 m) and volume. At almost all edifices, there is evidence for glacial modification, which likely removed most of the once-existing (?) pyroclastic material; water-magma interaction could be observed at one centre as well. Extensive coverage by glacial till limits outcrops to cliffs on the edifices' flanks or to local "windows" in the Quaternary deposits. This makes stratigraphic relationships, both within the fields and the surrounding volcanic rocks of the AVB and Chilcotin Flood Basalts (CFB), unclear. Preliminary XRF results indicate a high variability of the lavas, even between centres close to each other. Erupted lavas range from undersaturated basanites (44 wt% SiO_2), trachybasalts and trachytes to high-alkali phonolites (14 wt% Na2O+K2O). In general, larger structures in the SMVF appear to have erupted more evolved rocks whereas smaller centres, often just remnants of plugs and necks, and centres in the more easterly BMVF, erupted more primitive rocks. In addition, all new whole-rock ages were determined using the Ar-Ar method for eleven SMVF centres and seven in the BMVF, with clusters around 1.85 Ma for the former and 2.22 Ma for the latter. These ages coincide with existing K-Ar ages for the nearby Itcha Ranges (3.5^{-1}.1 Ma) and would fit well with the hot-spot hypothesis for the AVB. The prevalence of evolved rocks in the SMVF and BMVF might further indicate a relationship to the high-alkaline rocks of the AVB. Further studies will focus (1) on the geochemistry and ages of additional centres, including the yet-unstudied southern part of the Rainbow Range shield volcano in the AVB; (2) the isotopic composition of the lavas to identify possible source regions of the erupted magmas; (3) potential mechanisms and tectonic controls leading to magma ascent along the apparent W-E trend of the AVB, which heretofore has been explained by a mantle plume.