PETROLOGY AND GEOCHEMICAL ANALYSIS OF VOLCANIC DEPOSITS IN THE TENORIO VOLCANIC COMPLEX, BIJAGUA, NORTHWESTERN COSTA RICA

KITCHEN, Cortney H., NOBLETT, JEFF, AND SAK, Peter B., Geology Department, Colorado College, 14 E. Cache La Poudre, Colorado Springs, CO 80903, c_kitchen@coloradocollege.edu

Understudied volcanoes may provide valuable insight about tectonic setting, regional trends, and evolution of magma sources. Subduction along the Middle American trench offshore Costa Rica has produced numerous volcanoes, many of which, like the Tenorio volcanic complex, are unstudied. Recent fieldwork within the Tenorio complex in NW Costa Rica, has identified three distinct volcanoes, from south to north: Tenorio, Montezuma, and Carmela. In the field flows are distinguished by weathering intensity. The extent of weathering will be quantified using open system mass balance calculations, assuming Ti immobility. Field investigations suggest a northward migration of the volcanic center. Compositions shift from andesite in the south to basaltic andesite in the north. Andesite flows from Volcan Tenorio contain labradorite (An57-68), cpx, hpy, opaques, and rare olivine phenocrysts set in an andesitic groundmass, primarily andesine (An49) and display disequilibrium and trachtyic textures. Basaltic andesite flows from Cerro Montezuma contain calcic labradorite (An64), cpx, hpy, opaques, and rare olivine phenocrysts in a plagioclase rich groundmass and include glomerporphyritic clots of olivine and pyroxene. Basaltic andesite flows from Cerro Carmela contain labradorite (An54-68), cpx, hpy, opaques, and a trace of olivine phenocrysts. The total content of alkalis versus SiO2 (59.73% Tenorio, 53.04% Montezuma and 58.11% Carmela), and the ratio of Zr/TiO2 vs. Nb/Y classify Volcan Tenorio flows as an andesite and Cerro Montezuma and Cerro Carmela as basaltic andesites. On TiO2-MnO*10-P2O5*10 ternary diagram samples cluster as transitional between island arc tholeiitic and calc-alkaline basalt. However, on FeO+Fe2O3+TiO2-Al2O3-MgO and FeO*-Alk-MgO diagrams, samples fall into a calc-alkalic suite. The tectonic setting, arc-basalt, is shown on Zr/117-Th-Nb/16, Ti/100-Zr-Y*3, Hf/3-Th-Nb/16 and Nb*2-Zr/4- Y ternary diagrams. Spider diagrams plotted against NMORB show a trough at Nb, typical of subduction zones. Also found in the NMORB spider diagram is a Ba enrichment and a spike at the Pb, consistent with crustal contamination. REE spider plots show 100x enrichment in LREE and contain no EU anomaly. Analysis of the complex suggests and arc setting with a mantle source and crustal contamination.