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Observations On The Origin Of Across-Strike Geochemical Variations In Quaternary Silicic Lava Flows From The Andean Central Volcanic Zone: Comparison Of Data From Individual Eruptive Centers

In an effort to better understand the origin of across-strike K₂O enrichments in silicic volcanic rocks from the Andean Central Volcanic Zone, we compare geochemical and isotopic compositions of Quaternary lava flows erupted at three well-characterized composite volcanoes situated along a narrow southeast striking transect between 21°S and 22°S. Trends observed include the following: at a given SiO₂ content lavas erupted with increasing distance from the arc front display systematically higher K₂O, Y, REE and HFSE contents; Rb/Sr ratios; and ⁸⁷Sr/⁸⁶Sr ratios (0.7055 - 0.7165). We suggest that silicic magmas erupted along the arc front reflect melting of relatively young, mafic composition amphibolitic source rocks with a garnet- (feldspar poor) rich residual mineralogy and that the lower crust becomes increasingly older with a more felsic bulk composition in which residual mineralogies are progressively more feldspar-rich, but garnet-poor. One implication of this interpretation is that large-scale regional trends in magma compositions at continental volcanic arcs may reflect a process wherein the continental crust becomes strongly hybridized beneath frontal arc localities due to protracted intrusion of subduction-derived basaltic magmas, with a diminishing effect behind the arc front because of smaller degrees of mantle partial melting and primary melt generation.