

Slab melting and slab melt metasomatism in the Northern Andean Volcanic Zone: adakites and high-Mg andesites from Pichincha volcano (Ecuador)

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Abstract

Situated in the fore-arc of the Northern Volcanic Zone (NVZ) of the Andes in Ecuador, Pichincha volcano is an active edifice where have been erupted unusual magmas as adakites and high-Mg andesites. The particular geodynamic setting of the ecuadorian margin (i.e. the flat subduction of the Carnegie Ridge) suggests that thermo-barometric conditions for the partial melting of the oceanic crust are accomplished beneath this volcano. Pichincha adakites possess all the geochemical and isotopic characteristics of slab melts described in various other arc settings. High-Mg andesites with geochemical characteristics close to those of adakites present strong enrichments in MgO that suggest that, once they were produced by ca. 10 % partial melting of the downgoing subducted slab, some adakites en route to the surface strongly interacted with the peridotitic mantle wedge. Adakitic magmas could then represent, as in many other arcs where slab melting occurs, the principal metasomatic agent of the mantle in the NVZ in Ecuador.

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