

The Peltetec ophiolitic belt (Ecuador): evidence for early Cretaceous suprasubduction oceanic crust in the northern Andes

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The Peltetec ophiolitic belt is discontinuously exposed along about 310 km in the western margin of the Cordillera Real (Ecuador). It has been interpreted as a mélangé of a dismembered ophiolite (Litherland et al., 1994 and references therein) formed at a minimum age of ~134 Ma (Spikings et al., 2015). We present here new field, petrologic and geochemical data in order to characterize the nature and tectonic setting of formation of the protoliths, the geochemical evolution of this geologic unit, and to establish relationships with other units in the Northern Andes.

To the west, the Peltetec ophiolite and the Jurassic Guasuntos Unit are separated by the Peltetec fault, although occasional are present small slivers of older granitic rock bodies, correlated with Triassic Units. The eastern limit corresponds to the Maguazo Unit, however, in some place fragments similar to Guasuntos Unit are observed. The Peltetec ophiolite is composed by slivers of serpentinite, metagabbro, olivine metagabbro, metabasalts, metabasaltic dykes, and metasediments. Mineral assemblages of the more intensely metamorphosed rocks indicate greenschist facies conditions.

The basaltic rocks are classified into three geochemical groups: two groups show a tholeiitic affinity and N-MORB-like signature, while the third group is distinctly enriched in LREE and Th and is interpreted as arc affinity. The samples show a variable influence of subduction zone fluids, indicated by enrichment in Th, negative anomaly of Nb and increasing depletion in HFSEs (e.g. Ti, Zr, Y, Yb). These characteristics allow interpreting the Peltetec ophiolite as an oceanic lithospheric section generated in a suprasubduction setting, as a consequence of early Cretaceous extension in the continental lithosphere. In the regional context, Peltetec has a structural position equivalent to that of the Raspas Complex in the south of Ecuador and the Arquía Complex in Colombia. However, contrary to Peltetec these complexes have been interpreted as subduction unrelated ophiolites. On the other hand, rocks formed during the late magmatic stages of Peltetec may represent the initial stages of formation of a volcanic arc equivalent to the Quebradagrande arc in Colombia.

Litherland, M., Aspden, J., Jemielita, R. (1994). The metamorphic belts of Ecuador. Overseas Memoir of the British Geological Survey, (Nottingham, England), 11, 147 pp.

Spikings, R., Cochrane, R., Villagomez, D., Van der Lelij, R., Vallejo, C., Winkler, W. and Beate, B. (2015). The geological history of northwestern South America: from Pangea collision of the Caribbean Large Igneous Province (290 – 75 Ma). Gondwana Research, GR-01278, 45, <http://dx.doi.org/10.1016/j.gr.2014.06.004>.