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# Remnants of the Cretaceous Colombian Oceanic Plateau in Ecuador: Evidenced by the Petrology and the Geochemistry of Picrites and Mg-Rich Basalts

**Marc Mamberti**[1], **Henriette Lapierre**[1], **Delphine Bosch**[2], **Stephen Eggins**[3], **Etienne Jaillard**[4], **Jean Hernandez**[5] & **Mireille Polvé**[6]

[1] LGCA, Maison des geosciences, 1381 Rue de la piscine BP 53, 38041 Grenoble Cedex 9, France
[2] ISTEM, Univ. Montpellier II, 34095 Montpellier, France
[3] Department of Geology, A.N.U., ACT 0200 Canberra, Australia
[4] IRD, CSS1, 209-213 rue lafayete, 75840 Cedex 10, France
[5] IMP, Universite de Lausanne, 1015 Lausanne, Switzerland
[6] UMR 5563-CNRS, Universite Paul Sabatier, 31400 Toulouse, France

Coastal Ecuador is composed of Cretaceous oceanic rocks with oceanic plateau affinity. Recently, hyaloclastites associated with pillow basalts and dolerites have been discovered near Pedernales. The dolerites exhibit ophitic texture with plagioclase and clinopyroxene phenocrysts. The hyaloclastites consist of glass partially replaced by palagonite which contains centimeter sized rounded fragments with basaltic and picritic compositions. The basalts contain plagioclase and cpx microcrysts. The picrites contain 20-25% of mm-sized olivine phenocrysts (Fo92-89) in a preserved glass matrix which includes quenched dendritic olivine microphenocrysts and microlites. They also contain magnesio-chromite (Cr# 0.64 - 0.57) which is in inclusion in the olivine phenocrysts as well as in the glassy matrix.

By comparison of the shape of these olivine crystals with experimental olivine crystal shapes it's possible to deduce the approximate degree of supercooling at which the olivine crystal nucleated and grew in the rock. For the picrite, the dendritic and skeletal shapes of some of these olivine crystals provide evidence of extremely rapid cooling between 7 and 1450 degrees per hour, probably under shallow level water. Olivine phenocrysts contain abundant rounded and elongated melt inclusions (5 to 40 microns). These inclusions and the glassy matrix have similar major element compositions, i.e. MgO = 11.3%, FeO = 10.2%, $Al_2O_3$ = 15%. The glassy matrix is exceptionally depleted in incompatible trace elements [(La/Yb)n = 0.06 ; Nb = 0.1 ppm ; Zr = 9 ppm). Basalts and dolerites show rather flat REE patterns [0.74 < (La/Yb)N < 1.23] normalized to chondritic values and are similar to oceanic plateau basalts like Ontong Java and Nauru.

Preliminary isotopic data show that the picrite have higher Pb and Nd ratios compared to the other Oceanic Plateau Basalts [($^{206}Pb/^{204}Pb$)i = 19.18 for the picrite and 18.34 < ($^{206}Pb/^{204}Pb$)$_i$ < 19.01 for hyaloclastites and dolerites].

Late Cretaceous mafic volcanic rocks occur in Western Colombia and in the southern Caribbean. A comparison between these rocks and the Ecuador rocks shows strait similarities. The CCOP high Mg lavas show a wide range of trace element compositions, from moderately enriched basalts [(La/Yb) = 1.5] to extremely depleted ultramafic picrites [(La/Yb)n = 0.2]. Similar rock types are exposed near Pedernales but the trace element compositions of the basalts exhibit a relatively narrow range.

The petrological and geochemical similarities of the Ecuador rocks with the other rocks from the CCOP suggest their probable link with the same plume. The occurrence of ultra depleted lavas associated with relatively enriched basaltic hyaloclastites attest to the complexity of their genetic processus.