Origine et évolution de deux plateaux océaniques Crétacés accrétés dans l'ouest Equateur (Amérique du Sud)

MAMBERTI Marc; April 4, 2001

Supervisor: Prof Jean Hernandez, Institut de Minéralogie et Géochimie

The geology of Ecuador is very different from that of the Cordillera Andes because of the presence of accreted oceanic terranes. These terranes consist of Early (123 Ma) and Late Cretaceous (90 Ma) crustal fragments of oceanic plateau affinity overlain by several island-arcs, the ages of which range between 100 to 40 Ma. In the Western Cordillera, the ages of accretion of the Early Cretaceous and Late Cretaceous crustal fragments (plateau and arcs) are 85-80 Ma and 70-65 Ma, respectively.

The Early Cretaceous oceanic plateau is composed of: (i) ultramafic to mafic cumulates (San Juan section), and (ii) pillow basalts and dolerites intruded by shallow level gabbroic plugs (Merced-Multitud section). The cumulates consist of a complete sequence, which range from dunites and wehrlites to clinopyroxene gabbros. Basalts, dolerites and gabbros display geochemical features of oceanic plateau basalts (OPB; MgO = 7 %, flat rare earth element (REE) patterns, negative Nb and Ta anomalies). The Nd and Pb isotopic compositions of the cumulates and basalts, dolerites and gabbros are similar and suggest that all these rocks were derived from a mildly enriched mantle source.

The Late Cretaceous lithologies include picrites (MgO = ~ 20 %), the MgO-rich (MgO ~ 9-10 %) basalts, and MgO-poor (MgO ~ 6-7 %) basalts associated with dolerites and shallow level gabbros, and represent accreted remnants of the Caribbean oceanic plateau. The picrites are Light (L)REE-depleted and characterized by low Pb isotopic ratios and high eNd (+8 to +10). The MgO-rich basalts are LREE-enriched. The Pb isotopic ratios of the MgO-rich and MgO-poor basalts are very high, suggesting that these volcanic rocks were derived from the melting of an enriched source with a HIMU component. These high Pb isotopic ratios are a common feature to all the basalts related to the Late Cretaceous magmatic event of the Caribbean oceanic plateau.