

Geochemistry and Geochronology from Palaeogene Conglomerate Rocks from the San Jacinto Fold Belt: Insights to the Tectonic Evolution of the Colombian Caribbean Region

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Abstract

Geological studies carried out on the Palaeogene San Cayetano, Maco and San Jacinto clastic sedimentary formations, which crop out in different sectors of the San Jacinto Fold Belt (Caribbean Colombian Region), show a variety of igneous clasts belonging to the basaltic andesites-andesites-dacites and basaltic trachianandesites-trachianandesites-trachidacites suites (tholeiitic and calc-alkaline series). The wide composition variety of these clasts evidences the significant heterogeneity of their sources. Igneous clasts from the San Cayetano Formation with zircon U-Pb ages of about 239 Ma suggest that the Lower Magdalena Valley (LMV) and Central cordillera range basements acted as the sediment source during deposition of this unit. Other igneous clasts with zircon U-Pb ages from 88 – 73 Ma (lacking inherited zircons from South America continental rocks basement), indicate another source of clasts, represented by an intra-oceanic magmatic arc, developed over the Caribbean Large Igneous Province (CLIP), as has been proposed in previous studies.

The presence of sedimentary clasts in the Maco and San Jacinto Formations, having similar composition than their corresponding underlying sedimentary lithologies, shows that these Paleogene units must have been deposited simultaneously with the locally progressive uplift and erosion of previously deposited sedimentary units.

The occurrence of igneous rocks in the LMV basement with zircon U-Pb ages of about 84.5 Ma, along with the aforementioned data, suggests that the oblique accretion of the CLIP against south America continental crust (during the Late Cretaceous time) was accompanied by the collision of before-mentioned magmatic arcs (intra-oceanic and continental arcs). The subsequent erosion of these both magmatic arcs and their host rocks explains the great compositional heterogeneity of clasts observed in the studied sedimentary Paleogene units.