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EARLY PALEOGENE MAGMATISM FROM THE NORTHERN ANDES: A RECORD OF SLAB MELTING AND INTRAPLATE MAGMATISM IN COLOMBIA?

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The Northern Andes has been related to complex processes of subduction-collision associate with the Caribbean Plate since the end of the Mesozoic, this scenario made possible the formation of a late Cretaceous-Paleogene magmatic arc along the Colombian Andes. Contemporary Late Paleocene-Early Eocene sedimentary sequences from Eastern Colombia record the presence of detrital and volcanic zircon populations with Paleogene ages, suggesting intraplate volcanic activity at 400 km from the collisional margin.

New U-Pb zircon ages from representative Paleogene plutonic rocks (tonalites and granodiorites) of the Western and Central Cordilleras of the Colombian Andes and from sedimentary successions of eastern Colombia shows that the entire magmatism was active from ~65 to 50 Ma.

Whole rock geochemistry of the intrusive rocks is typical of a volcanic arc setting with Nb and Ti negative anomalies and a high LREE/HREE ratio. Eu anomalies are absent, and the parameters used to identify adakites are present such as: Sr/Y >40, K_2O/Na_2O ~0.4, SiO_2 >56%, Al_2O_3 >15%, MgO <3%, Na_2O >3.5% and mg# ~50.

Initial Hf signatures from the plutonic rocks range from +1 to +7, whereas those from the Late Paleocene-Early Eocene sediments show two contrasting signatures: one is similar to the Paleogene plutons from the Central Cordillera (εHf_i= +1.5 to +8), which suggests an input from western sources to the distal foreland basin by that time (Paleo-Eastern Cordillera). The second population records a highly negative Hf signature (εHf_i= -0.6 to -14) which contrasts with the previous one, suggesting the presence of a new and *in- situ* intraplate magmatic focus possibly eroded and deposited within of the foreland basin, which was in a distal position of the continental margin.

Magmatism of this period is related to the flat subduction of an oceanic plateau-like crust under NW South America, which can cause partial melting of the downgoing oceanic slab due to an unusual high heat flow. Further interaction of these melts with peridotite during their ascent through the mantle wedge will form the adakite magmatism.

Intraplate magmatism is associated to adiabatic melting due to lithospheric extension or to a mantle plume, but none of these scenarios have been recognized during the Paleogene in eastern Colombia. Alternatively, we suggest that this intraplate magmatism is related to a distortion of the mantle isotherms due to a lithosphere folding. Melts produced by this process will be mingled with the lower crust as indicated by the crustal signature reflected in the Hf isotopes. The rise to the surface of these magmas and further emplacement could be throughout faults reactivated during the Cenozoic.