

Granitic intrusive rocks in southern Colombia: missing link of the north Andean Jurassic magmatic belt

M. Restrepo¹, C. Bustamante¹, L. Chavarría¹, A. Cardona²

¹Departamento de Ciencias de la Tierra, Universidad EAFIT, Carrera 49 N° 7 Sur-50, Medellín, Colombia

²Departamento de Procesos y Energía, Facultad de Minas, Universidad Nacional, Carrera 80 # 65-223, Medellín, Colombia

Field work recently carried out in southern Colombia (Putumayo and Nariño departments), led us to recognize a series of granitoids (granites, quartz monzonites, granodiorites, and diorites) not described until now in the geological maps which may be related with the Jurassic magmatic belt of the Northern Andes. These rocks have been included within the La Cocha-Río Tellez Migmatitic Complex, a metamorphic unit with an assigned Precambrian age that crops out in southwestern Colombia, which is composed of migmatites, schists, gneisses, and amphibolites, and has been correlated with Proterozoic rock of the Central Cordillera of Colombia, which, are also considered as part of the Grenville-age basement of the Colombian Andes.

Petrographic observations indicate that these granitoids are fine-medium inequigranular, composed of quartz, plagioclase, microcline, biotite, hornblende. Accessory minerals include epidote, opaque minerals, titanite, apatite, and zircon; and present solid-state flow microstructures like undulose extinction in quartz, microcline twinning, and myrmekite. Whole-rock geochemical analyses show that these plutonic rocks are metaluminous with a medium- to high-K calc-alkaline trend; present LILE and LREE enrichment; negative Nb, Ti, and Eu anomalies; and positive Pb, Ba, and K anomalies; suggesting that they originated in a continental magmatic arc tectonic setting. U-Pb geochronological analysis yielded a crystallization age of ca. 152 Ma, indicating a Late Jurassic magmatic event.

These results are consistent with data obtained in the eastern flank and northern part of the Central Cordillera, and the Colombian Massif. In those areas, a similar deformational pattern is observed in rocks with coeval ages. Additionally, this age is contemporaneous with the metamorphism of the Cajamarca Complex, a medium to low-grade belt of schists in faulted contact to the west with the Jurassic magmatic belt.

Furthermore, similar U-Pb crystallization ages have been reported in the north of the Ibagué, which suggest that the youngest magmatic events are also registered in southern Colombia; likewise, these data confirm a lack any migration pattern of the magmatic arc. The new geochemical and U-Pb age constraints suggest a long-lasting magmatic arc (ca. 189 to 129 Ma) intruding a Permo-Triassic basement along the Northern Andes.