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Chemical Mineralogy, Geochemical Characterization and Petrography of the Cambumbia Stock, Northern Andes, South America, Colombia

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The Cambumbia Stock is located on the western flank of the Central Cordillera of the northern Andes, South America. The goals of this study were to characterize the mineral chemistry, the geochemical composition and the petrography of the Cambumbia igneous body and to establish its petrogenesis. We collected 41 samples, selected 28 for thin section petrographic analysis, 14 for whole rock elementary chemical determination by ICP-MS and 4 for chemical mineralogy by LA-ICP(JEOL JXA-8200). Petrographically the samples were classified as 30 % hornblende-gabbro, 30% pyroxene-gabbros, 10% diorites, 10% olivine-gabbro, 7% gabbronorites, 7% tonalities and 3% norite, 3% wehrlite, the rock varies from medium to coarse hipidiomorfic and holocristaline texture, with local microporfiritic texture. Spot elemental chemical analysis of the some minerals in 4 samples show the range of the major elemental composition is plagioclase (labradorite), clinopyroxene (augite), horblende (magnesiohornblende), olivine (fayalite())Chemical mineralogy shows the variety of minerals in this rock, essential minerals correspond to bytownite, augite, magnesio-honblende, fallaite and titanite.

We conclude base on the SiO_2 Vs Total Alkalis graph that the samples correspond to the sub-alkaline series with low K content, mainly in the calc-alkaline series. By using the SiO_2 vs TiO_2, Th/Yb vs Ta/Yb and Zr/117-Th-Nb/16 diagrams it was determined that these rocks were generated in two geotectonic environments: one type MOR (extension) and other island arc (subduction, compression).

Recently, a U/Pb age was obtained by the Universidad de Caldas in zircon in 2009 (not published data), yielded an age of 233.41 $\pm$ 3.4 Ma (Carnian - Upper Triassic). Petrographic geochemical and geochronology comparisons between the rocks of Cambumbia Stock and Diorite and Gabbro El Pueblito (located about 25 km to the north-west) and with U/Pb age 231 $\pm$ 8 may postulate a possible genetic link between them. These ages are consistent with the global event of the extension and fragmentation of Pangea supercontinent. In addition, the mantle nature of the source and the petrogenetic evolution of the magmatic system were established.
Keywords: Calc-alkaline, Chemical mineralogy, Geochemical characterization, Pangea, Petrography, Petrogenesis.