

EVOLUTION OF THE CRUCERO SUPERGROUP, PUNO, SE PERU: AN  
OLIGOCENE-MIOCENE "COLLISIONAL" MAGMATIC ASSEMBLAGE IN A  
NON-COLLISIONAL, ARC SETTING

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**Resumen:** El Superggrupo Crucero, un ensamblaje de rocas volcánicas diversas de edad Oligoceno-Mioceno, constituye el último período de magmatismo dentro de la sección Peruana del Arco Andino Interno. El supergrupo comprende la asociación típica de orogenias de choque, emplazado durante un episodio breve de extensión cortical en el Oligoceno tardío, seguido por un largo período de compresión oblicua diestra en el Mioceno.

**Key Words:** Crucero Supergroup, peraluminous, basalt, minette, extrusion tectonics, Bolivian Orocline.

The Crucero Supergroup is a continental assemblage comprising a wide range of crustally-derived peraluminous and mantle-derived mafic volcanic rocks. It is extensively exposed in the Cordillera de Carabaya range of southeastern Peru and represents the most recent magmatism within the Central Andean Inner Arc. The supergroup comprises the 21.2-25.0 Ma Picotani and the 6.5-16.9 Ma Quenamari Groups, each of which consists of numerous, aerially restricted formations. The Picotani Group is a complex assemblage of diverse rock-types, erupted over a brief interval, that show no time-transgressive relationships. The assemblage includes: olivine-plagioclase ± clinopyroxene ± orthopyroxene - phyric and -glomerophyric, high-K, basaltic-to-andesitic lavas of the spatially separate Suratira Formation (22.4-23.6 Ma), Pucalacaya Formation (ca. 21.9 Ma) and Cerro Queuta Formation (23.8-25.1 Ma); minette and mixed minette/rhyodacite lava flows of the Lago Perhuacarca Formation (ca. 23.9 Ma); biotite ± cordierite - phyric, dacitic-to-rhyodacitic lapilli-tuffs of the Cerro Huancahuancane (23.1-24.4 Ma) and Cerro Sumpiruni Formations (21.2-24.1 Ma); cordierite-biotite - phyric dacitic lavas of the Jama Jama Formation (ca. 23.8 Ma); cordierite-biotite - phyric dacitic agglomeratic tuffs of the Pachachaca Formation (23.6-24.4 Ma); and glassy, cordierite-biotite - phyric rhyolitic agglutinates of the Cerro Cancahuine Formation (ca. 22.2 Ma). In contrast, the Quenamari Group consists wholly of rhyolitic volcanoclastic rocks, forming a time-transgressive sequence from the muscovite-biotite ± sillimanite - phyric, crystal - lapilli tuffs comprising the Huacchane Formation (16.8-16.9), through the biotite-sillimanite ± muscovite - phyric, vitric - lapilli tuffs of the Quebrada Escalera Formation (16.2-16.4 Ma), to the muscovite-biotite ± andalusite - phyric ash-flow tuffs of the well known Macusani Formation (6.5-10.5 Ma). These two distinct magmatic pulses, constituting a magmatic association typical of collisional orogens, were emplaced in a late Oligocene episode of crustal extension, followed in the Miocene by a prolonged period of oblique, right-lateral compression coeval with antithetic subduction of the Brazilian Shield. We envisage a major petrogenetic role for "extrusion tectonics" during compressional shortening and accentuation of the Bolivian Orocline.