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Volcanic Evolution of the Eastern Sector of the Cordillera de San Buenaventura: Geodynamic Implications for the Southern Puna

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At the South of the Central Volcanic Zone of the Andes, in the Puna Plateau, the Cordillera de San Buenaventura (located at 27°S) marks the boundary between the normal subduction zone to the north and the flat subduction zone to the south. Volcanism in this area took place since 9 Ma to recent and can be stratigraphically summarized in four supersynthem, each one limited by first order unconformities, which respond to changes in the geodynamics of the area. San Buenaventura Supersynthem (9-7 Ma) groups rhyolitic ignimbritic units of calco-alkaline affinity emplaced on top of a metamorphic basement. The interaction of mantle and derived arc magmas with felsic lower crustal rocks produce crustal melts that erupted forming these rhyolitic ignimbrites. Then, the magmatic system changed, with the emplacement of arc related calco-alkaline products, forming stratovolcanoes complexes. This change of composition and eruptive style, from rhyolitic caldera-forming explosive activity to andesitic-dacitic effusive and explosive central volcanism, is marked by an angular unconformity at the base of the Lower La Hoyada Supersynthem (7.04 - <4.63 Ma). The stratovolcanoes enclosed in the Lower La Hoyada Supersynthem are eroded and with pervasive tectonic deformation. This deformation can be related to an increase in the subduction convergence rate at 5-4 Ma. At the top of this supersynthem, an angular unconformity corresponding to an erosion period, with the emplacement of conglomeratic deposits, marks the base of the Upper La Hoyada Supersynthem (4.63-1.38 Ma), showing no pervasive tectonic deformation. This synthem unit groups andesitic-dacitic products derived from preserved stratovolcano edifices. Finally, at the base of the Purulla Supersynthem (<1.38 Ma) an unconformity is marked by a change in the volcanic products, with the emplacement of basaltic-andesitic and rhyolitic monogenetic volcanoes and calderas. The younger volcanism is related to lithospheric delamination, where the continental lithosphere is convectively removed from the subducting plate.