

Neogene activity of the Barrancas Blancas Fault and its relationship with Hydrothermal and volcanic activity

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The chronology and nature of the Neogene-Cuaternary deformation in the Central Volcanic Zone (CVZ) in the north of Chile is partially unclear. Some authors have identified compression in isolated areas of the western slopes of the Altiplano-Puna Plateau between the 23,5 and 25°S, which deformed Miocene and Pliocene deposits (e.g. Gonzalez et al., 2009). In this context, Barrancas Blancas fault, located in the western limit of the Western Cordillera, outcrops in a scarp oriented NS and represents a record of the tectonic activity during the Miocene (Gardeweg et al., 1993). This fault affects to Pampa de Mulas gravels (23,6±1,6 Ma) and Rio Frio Ignimbrites (17,3± 1,7 Ma), and is covered by Miocene-to-Holocene alluvial deposits. In the eastern side of Punta Negra Salar was emplaced the Monogenetic Punta Negra volcano, located over the Barrancas Blanca-Fault scarp (10±0,8 Ma) and immediately to the south of Punta Negra volcano, travertine deposits are present in the footwall of Barrancas Blancas fault (10-2 Ma; Quade et al., 2017).

This work presents the preliminary results from geomorphologic and stratigraphic data, and structural analysis from Barrancas Blancas fault, and the sediment wedge related with the fault scarpment. These results were combined with geochronological data from magmatic and hydrothermal related rocks/minerals, with the objective to rebuild the activity of Barrancas Blancas fault and its relation with the magmatic activity during Miocene-Pliocene. Our results show that Barrancas Blancas fault has reverse displacement during Lower Miocene, which caused folding of the Rio Frio ignimbrite and Pampa de Mulas Formation. This period has a maximum age of 11,7 Ma and can be related to the local uplift of the Altiplano-Puna plateau. Using a cinematic analysis, we have identified a period with transtensional activity for Barrancas Blancas fault, which had been coeval with magmatic/hydrothermal activity, the last represented by monogenetic (Punta Negra volcano, ca. 10 Ma) and geothermal activity. The hydrothermal activity in the Barrancas Blancas fault would have lasted until to ca. 2 Ma, coeval with the deposition of alluvial fans related with the scarp backward movement. Our hypothesis suggests that transtensional activity of the Barrancas Blancas fault is related with the uplift and local collapse of the Altiplano.

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