

## **Miocene to recent geological evolution of the Lazufre segment in the Andean volcanic arc and monitoring implications**

**José Naranjo, Víctor Villa, Cristián Ramírez**

<sup>1</sup>Departamento de Geología Regional, Servicio Nacional de Geología y Minería, Av. Santa María #0104, Providencia, Santiago, Chile.

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The Lazufre bulging zone in the southern part of the central Andes (25.26°S; 68.48°W) has been a major focus of study over the past decades. Since 1998, InSar interferometric analysis has shown that the structure has been deforming probably due to movements of magma and hydrothermal fluids. Updated geological maps at different scales may give a clue on the causes and probable consequences of this deformation. New mapping of regional structures or lineaments evidenced that Lazufre bulge is located upon the Pedernales-Arizaro hanging-wall, a major NE-SW trending Middle Miocene fault. After tectonism, the foot-wall, in turn, was affected by the major Los Colorados collapsing caldera at ~9 Ma, source of the homonymous 80 km<sup>3</sup> ignimbrite. Conjugated at ~30° to the Pedernales-Arizaro thrust, the Imilac-Salina del Fraile oblique slip constitutes a remarkable lineament in the area that favors the opening of tectonic spaces, parallel to the Los Colorados caldera-Lazufre bulge alignment. Notably, since Upper Pliocene, central volcanism has been concentrated in the Lazufre intumescence, and a total volume of ~120 km<sup>3</sup> has been extruded. The volcanic migration from the Los Colorados Caldera area to the Lazufre bulging zone could be consequence of local strain field variations which, in turn, promoted magmatic plumbing and pumping systems, induced by opening tectonic spaces. The random nature of focal mechanisms, the large number and the low magnitude of earthquakes, could be evidence of multiple shallow crust fracturing induced by the strain field beneath the areas up to 20 km around active monitored volcanoes in the southern Andes. The strain field at shallow crustal levels beneath these volcanoes would be analogous to the proposed interpretation model for Lazufre. The Plan Nacional de Geología (PNG, SERNAGEOMIN) and the PLUTONS Project (National Science Foundation) are acknowledged.