



The magmatism linked to the transversal structures in Central Andes: the Tastil-Las Burras complex (24°19' S, 65°50'E), SW Argentina

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The central Andes between 22° and 27° S are affected by transversal transcurrent fault systems with NW-SE strike, extending from Pacific coast inland for 600/700 km. Since Miocene time widespread volcanism mainly with a calcalkaline signature, emplaced along these structures. The Tastil-Las Burras magmatic complex, is set on the extreme eastern sector of the Calama-Olocapato-El Toro (COT) fault system, one of the most extensive of these transversal lineaments at around 24 °S. The study of Tastil-Las Burras magmatism is of crucial importance because of its geological position on the western margin of the Eastern Cordillera where a compressive tectonic regime is dominant and for its distance from the Pacific trench (about 500 km).

The magmatic complex consists of a laccolith-like intrusion (Las Burras) and volcanic rocks (Tastil volcanics) mainly made up of lava domes and flows: Intrusive rocks range in composition from monzogabbro to monzogranite through quartz-monzonite with an U/Pb age on zircon of 14.4 Ma. The ubiquitous stability of amphibole in these intrusive rocks, suggests magma storage at least at 200 MPa. The volcanic products have K/Ar ages ranging between 6 and 7 Ma. The lavas were erupted by monogenetic centres scattered in an area of about 40 km around the intrusive body. These products show a calcalkaline affinity and range in composition from high-K andesites to dacites/rhyolites. The Sr isotopic ratios of Tastil volcanics (0.70760-0.70923) are among the highest of the almost coeval products erupted along the COT, and the Nd

ratios are rather low (0.51227-0.51241). On the contrary, the Sr isotopic ratios of Las Burras intrusives (0.70454-0.70531) are remarkably lower than all the products along the COT, and the Nd ratios are relatively high (0.51259-0.51268).

The tectonic structures of the area are mainly dominated by N-S dextral faults, possibly controlling the rise of the intrusive body along localized areas of extension, and NW-SE sinistral faults, sub-parallel to the COT. Both structures, possibly active during the emplacement of the pluton, have been reactivated with extensional motions afterwards.

The whole of the geochemical data suggest that Las Burras intrusion could be generated by melting of a lithospheric mantle source with relatively low Sr and high Nd isotopic ratios and possibly contaminated by low radiogenic crustal rocks. The volcanic products were erupted 7-8 Ma after the emplacement of the pluton, when the underthrusting of Brazilian shield was acting following the Quechua tectonic phase (about 10 Ma ago). These volcanics could be the result of a mixing process between Las Burras intrusion-type magmas and crustal melts deriving by partial melting of a more radiogenic Brazilian crust. The magma generating processes could be linked to an increase of isotherms due to the upflow of asthenosphere after the Quechua compressive phase and/or to a depressuring process due to the transtensional movements of the COT. In this case the COT played an important role either for the ascent of magmas and for their generation.