

Contrasting old and young volcanism in Irruputuncu volcano, Central Andean Volcanic Zone, Chile

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Irruputuncu (20°45' S; 68°34' W) is an active stratovolcano (middle Pleistocene – Holocene) located in the Central Andean Volcanic Zone at the Chile-Bolivia border. Irruputuncu was constructed during two separate stages: Irruputuncu-1 (I-1; middle Pleistocene) and Irruputuncu-2 (I-2; middle Pleistocene – Holocene) [1]. In order to evaluate the magmatic evolution of Irruputuncu volcano, we combine published whole-rock major element data [1] and new Sr and Nd isotope data from lava samples representative of both volcanic stages.

Irruputuncu lavas are characterized by SiO₂ = 59.7 to 63.0 % m/m; MgO = 1.8 to 3.0 % m/m = K₂O = 2.3 to 3.1 % m/m; ⁸⁷Sr/⁸⁶Sr = 0.70539 to 0.70548; ¹⁴³Nd/¹⁴⁴Nd = 0.51244 to 0.51248. Eruptive products are mainly andesitic to trachyandesitic in composition, associated with high-K calc-alkaline series. Nd isotope ratios have a negative linear correlation with increasing ⁸⁷Sr/⁸⁶Sr ratios, with a number of samples showing scattered ¹⁴³Nd/¹⁴⁴Nd ratios with respect to Sr isotope ratios at ~0.70545.

All lavas show similar compositional ranges in major element concentrations and in Nd isotope ratios. In contrast, our samples representative of the I-1 and I-2 stages differ among each other in terms of their ⁸⁷Sr/⁸⁶Sr ratios. The I-1 lavas show a larger variability in Sr isotopes (⁸⁷Sr/⁸⁶Sr = 0.70539 to 0.70548) compared to the more restricted range revealed for the I-2 samples (⁸⁷Sr/⁸⁶Sr = 0.70544 to 0.70546). Indeed, the Sr isotope ratios for the I-2 lavas values remain nearly constant with increasing ¹⁴³Nd/¹⁴⁴Nd values. Considering these preliminary results based on Sr-Nd isotope compositions, a temporal change in the differentiation regime of Irruputuncu volcano is proposed. The I-1 samples show a high degree of isotopic variability with respect to the younger I-2 eruptions, and thus the parental magmas of the I-1 lavas would be affected by higher degrees of crustal assimilation and contamination.

[1] Rodríguez et al., 2015. *Journal of South American Earth Sciences* 63, 385-389.