



Late Paleozoic to Triassic magmatism in the north-central High Andes, Chile: New insights from SHRIMP U-Pb geochronology and O-Hf isotopic signatures in zircon

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The Chilean High Andes (28°- 31°S) comprises a vast number of late Paleozoic – Triassic granitoids which give information about the last stages of Gondwana assemblage. Particularly, previous studies determined two tectonic configurations during this time: subduction related compressional setting (late Carboniferous – Late Permian) and non-subduction post-collisional extensional setting (Late Permian – Triassic), as the last stage of Gondwana assemblage. However, new O-Hf isotopic data along new U-Pb SHRIMP ages in zircon have shown that this model should be modified and updated to the new analytical data available. $\delta^{18}\text{O}$ values indicate a strong change in the tectonic configuration approximately 270 Ma (earliest middle Permian) and thus, units can be divided into 2 mayor groups: late Carboniferous to earliest middle Permian and middle Permian to Triassic. The oldest group shows slightly low values of ϵHf_i (ca. +1 to -4) with high $\delta^{18}\text{O}$ (ca. >6.5 ‰), indicating an elevated supracrustal component and the addition of less radiogenic continental-like material, which along significant residence time (T_{DM2} : Mesoproterozoic) can be interpreted as magmas formed at depth in a subduction-related continental arc, and contaminated with supracrustal material and/or oceanic sediments transported through the subducted slab to the mantle-wedge. Subsequently, middle Permian – Triassic rocks show a wider range of ϵHf_i values (ca. +3 to -3) with relatively low, mantle-like $\delta^{18}\text{O}$ (ca. 4.5-6.5 ‰), indicating a source of magmas without the addition of supracrustal material for some plutons, whilst for others, a slight input. The higher positive values of ϵHf_i can be related to the influence of new juvenile material in the source of some magmas. This isotopic data can be interpreted as rocks formed as the result of melting of an old thinned mafic crust (with mantle-like $\delta^{18}\text{O}$ values characteristic of this type of rocks) with limited addition of supracrustal material; in agreement with regional models, which postulate an extensional setting during this time, and thus, during the last stages of Gondwana assemblage. Finally, the result for the late Carboniferous to earliest middle Permian group shows almost identical O-Hf signatures compared to those observed in the Chilean Coastal Batholith (33°-40°S) of mid Carboniferous – early Permian age. This suggests a comparable tectonic configuration for the entire magmatism, initiating from south-to-north, with magmatism starting from the south.