

**CONTROL ID:** 1486485 **TITLE:** Across-arc geochemical variations in the Southern Volcanic Zone, Chile (34.5-38°S): Constraints on Mantle Wedge and Input Compositions  
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**ABSTRACT BODY:** In order to constrain the mantle source components of the Chilean Southern Volcanic Zone, we present a comprehensive geochemical data set (major and trace elements and O-Sr-Nd-Hf-Pb isotopes) from Holocene olivine-bearing volcanic rocks from an across arc profile between 34.5-38°S, extending 300 km into the backarc. We also present data from trench sediments outboard of this profile. All volcanic samples are characterized by typical subduction zone trace element patterns, having Pb, K enrichment and Ta, Nb depletion. Backarc samples have the least pronounced enrichment/depletion. We observe a systematic increase in Ce/Pb, Nb/U, Nb/Zr, and Ta/Hf, and decrease in Ba/Nb and Ba/La from the volcanic front into the backarc, consistent with lower amounts of a slab-derived component and lower degrees of mantle melting in the backarc. The mantle-like O isotopes in olivine and plagioclase phenocrysts (4.9‰-5.5‰, normalized to olivine) and lack of correlation between O isotopes and indices of differentiation and other isotopes, argue against significant crustal assimilation. Volcanic front and backarc samples overlap in Sr and Nd isotopic compositions. Double-spiked Pb isotope ratios are tightly correlated, precluding assimilation of older crustal material, but indicating mixing between a South Atlantic MORB source and a slab component derived from subducting sediment and altered oceanic crust. Hf-Nd isotopes define separate linear arrays for the volcanic front and backarc neither of which trend toward subducting sediment. Instead, they indicate a range in asthenospheric and sub-continental lithospheric mantle components beneath the volcanic front and backarc. Our quantitative mixing model (ABS3) suggests a mixed-source, slab-derived melt and a heterogeneous volcanic front mantle, which is consistent with local geodynamic parameters (P-T slab trajectory) if water-saturated conditions occur within the slab.

**KEYWORDS:** [1031] GEOCHEMISTRY / Subduction zone processes. (No Image Selected) (No Table Selected)

**Additional Details Previously Presented Material:**

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