

Andesites and high-alumina basalts from the central-south Chile high Andes: Geochemical evidence bearing on their petrogenesis

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High-alumina basalts from seven High-Andean stratovolcanoes (37 °30'S to 41 °S) have major and trace element (including rare earth elements, REE) that are consistent with derivation by partial melting (typically 10-15%) of garnet-free peridotite followed by fractional crystallization of olivine and pyroxene. High-alumina basalts from two stratovolconoes require significantly lower degrees of melting (<5%) or melting of an incompatible, element-enriched source. However, a poorly understood feature of all of these basalts-and calc-alkaline rocks in general-is the mechanism for causing their low TiO₂ and heavy REE content relative to oceanic basalts. Further north in Chile (33 °-34 °S and 21 °-22 °S) amphibole-bearing andesites have REE abundances consistent with derivation from a garnet-bearing source such as incompatible, element-rich eclogite (e.g., Franciscan eclogites) or garnet peridotite. The marked petrological and geochemical changes along strike of the Andes are probably related