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# Selenium-tellurium systematics in variably metasomatized mantle xenoliths from the Deseado Massif, Southern Patagonia

**NATHALY SOLÍS**[1], MARIA I. VARAS-REUS[1], STEPHAN KÖNIG[2], MANUEL E SCHILLING[3], TIAGO LUIS REIS JALOWITZKI[4], MARTIN REICH[1] AND RONNY SCHOENBERG[5]

[1]University of Chile
[2]Instituto Andaluz de Ciencias de la Tierra (CSIC-IACT)
[3]Universidad Austral de Chile
[4]Universidade de Brasília (UnB)
[5]University of Tuebingen

The subcontinental lithospheric mantle (SCLM) beneath the Deseado Massif, southern Patagonia, records multiple episodes of partial melting and metasomatic processes that have modified its geochemical signature [e.g., 1-2]. Selenium (Se)-tellurium (Te) systematics constitute an innovative tool to investigate high-temperature melt/fluid interactions in the mantle [e.g., 3-6]. This study characterizes Se and Te concentrations in mantle xenoliths from the Deseado Massif to evaluate the impact of metasomatism on these chalcophile elements.

Previous work [2] identified four geochemical groups based on rare earth and trace element patterns and characterized the base metal sulphide (BMS) assemblages in each group. These groups range from strongly depleted mantle domains with scarce or absent BMS to strongly enriched peridotites preserving multiple sulfide generations.

Consistent with previous studies highlighting the sensitivity of Se-Te systematics to cryptic and modal metasomatism [e.g., 6], our results show that Se-Te systematics decouple from partial melting trends and instead reflect BMS distribution and reworking. In strongly depleted peridotites, Se variability is high; however, from slightly depleted to slightly enriched domains, Se abundances decrease as Se/Te ratios span a narrower range. In contrast, strongly enriched peridotites exhibit low Se abundances but a broader Se/Te dispersion. While Se broadly correlates with highly siderophile element (HSE) abundances, Te shows more variable behaviour, evidencing differential mobility during metasomatic events, similar to what has been reported in cratonic peridotites [6]. These results indicate that Se-Te systematics can track cryptic metasomatism even when mineralogical evidence is subtle at the whole-rock scale. This highlights Se-Te as a sensitive tracer of mantle metasomatism and a powerful complement to more traditional lithophile elements.

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