Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.28276

Geochemical characterization of the Vizcaíno ophiolitic sequence, Baja California Sur, Mexico: petrogenetic and tectonic implications

VANESSA COLÁS[1], MANUEL CONTRERAS-LÓPEZ, PHD[2], LUIS J. GUTIÉRREZ-TREJO[2] AND ELISA FITZ-DÍAZ[2]

[1]IUCA-Universidad de Zaragoza
[2]Instituto de Geología, Universidad Nacional Autónoma de México

The Vizcaíno ophiolitic sequence (Baja California Peninsula, NW Mexico) preserves one of the most well-exposed and extensive (ca. 32 km long) outcrop of a suprasubduction Mesozoic ophiolite in the country. It consists of three tectonically dismembered members, from base to top: serpentinized ultramafic rocks (dunites, harzburgites, lherzolites and chromitites), intrusive mafic units (gabbronorite, olivine gabbro, norite and plagiogranites with banded, phaneritic, cumulated, and pegmatitic textures), and an extrusive igneous complex.

Our whole-rock geochemical data indicate that both serpentinized ultramafic and intrusive mafic (gabbroic) rocks display an abyssal (intra-oceanic) to fore-arc signatures, following compositional trends consistent with the mantle fractionation: i) a decrease in Al_2O_3/SiO_2 as MgO/SiO_2 increases in serpentinized ultramafic rocks, and ii) a depletion in Nb_N as Th_N decreases in intrusive mafic (gabbroic) rocks. The difference in tectonic setting is also evident in the chondrite-normalized REE diagrams, where serpentinized ultramafic rocks show two different patterns: i) a U-shaped concave patterns, similar to fore-arc peridotites, and ii) a relatively flat pattern slightly depleted in the light REE, parallel to an average depleted MORB mantle (DMM). Latest REE signature is also evident in intrusive mafic (gabbroic) rocks, suggesting that they might be derived from DMM-like melts. Based on fractional crystallization models using the REE concentrations of the most primitive gabbro (Mg#= 73) from the igneous mafic units, we infer a comagmatic origin related to fractional crystallization. Our observations suggest that the ultramafic and mafic members of the Vizcaíno ophiolitic sequence were formed in a complex geotectonic context related to a supra-subduction zone where an arc developed in an oceanic plate and/or fore-arc zone was involved.