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ABSTRACT BOOK

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Dipartimento
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S6.

Integrating multidisciplinary observations to track mantle dynamics from ocean domains to arc systems

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Noble gases isotope signature in the source of Polynesian hotspot volcanism: Evidence from fluid inclusions in Society and Cook-Austral Islands xenoliths

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Mafic rocks and ultramafic xenoliths from Ocean Island Basalt (OIB) systems constitute important geological windows into Earth's mantle processes, as they enable to characterize the origin, abundance and isotopic signature of volatile species in deep mantle reservoirs. Polynesian OIB localities (e.g., Society, Samoa and Cook-Austral Islands) are especially suitable for investigating mantle composition since radiogenic isotopes (Sr-Nd-Pb) have revealed the existence of different geochemical reservoirs (EMI-EMII-HIMU). Building on this geochemical framework, the present study uses noble gases and carbon isotopes to further explore the behavior of volatiles and their relationship with mantle heterogeneity. We investigate the noble gas and carbon isotope signatures of fluid inclusions hosted in ultramafic xenoliths from Tahiti, Rarotonga and Aitutaki islands to better constrain the composition of metasomatic fluids that infiltrate and modify the composition of the Polynesian lithospheric mantle. As part of this study, we report new He, Ne and Ar isotopic data from 5 ultramafic xenoliths from Tahiti (Society islands). Preliminary results indicate that Tahitian samples show radiogenic Rc/Ra values ($^3\text{He}/^4\text{He}$ ratios corrected for atmospheric contamination) from 5.52 to 6.98, lower than the typical MORB range (8 ± 1). This confirms the variability of He isotopic signature in EM-type mantle sources, which ranges from 5 Ra (Lanzarote, Canary Islands; Sandoval-Velasquez et al., 2022) to 24 Ra (Western Samoa and American Samoa; Workman et al., 2004; Jackson et al., 2016). Moreover, $^{40}\text{Ar}/^{36}\text{Ar}$ (629.3 to 2857.1), $^{20}\text{Ne}/^{22}\text{Ne}$ (10.05 to 10.96) and $^{21}\text{Ne}/^{22}\text{Ne}$ ratios (0.03 to 0.04) indicate the presence of atmospheric-derived component in the local mantle likely recycled by subducted relict materials. To better constrain these observations, future work will focus on the analysis of CO_2 isotopic composition ($\delta^{13}\text{C}$) to evaluate the role of recycled crustal materials in the local mantle. Integrating these data within a multi-analytical framework, including petrographic and geochemical characterization (mineral chemistry), will provide insights on the nature and evolution of the Polynesian mantle.

Jackson M.G. et al. (2016) - Peridotite xenoliths from the Polynesian Austral and Samoa hotspots: Implications for the destruction of ancient ^{187}Os and ^{142}Nd isotopic domains and the preservation of Hadean ^{129}Xe in the modern convecting mantle. *Geochim. Cosmochim. Acta*, 185, 21-43, <https://doi.org/10.1016/j.gca.2016.02.011>.

Sandoval-Velasquez A. et al. (2022) - The radiogenic nature of the lithospheric mantle beneath Lanzarote (Canary Islands). Abstract Book Congresso SGI-SIMP, <https://doi.org/10.3301/ABSGI2022.02>.

Workman R.K. et al. (2004) - Recycled metasomatized lithosphere as the origin of the Enriched Mantle II (EM2) end-member: Evidence from the Samoan Volcanic Chain. *Geochem. Geophys. Geosyst.*, 5(4), Q04008, <https://doi.org/10.1029/2003GC000623>.