**Origin of refractory domains in the convective mantle: new insights from geochemical and Sr-Nd-Hf-Os isotope study of peridotites from modern oceanic basins.**

Chemical and modal depletion are generally provided as arguments in favour of a subduction-related origin for mantle peridotites. These signatures are thought to reflect high degrees of fluid-assisted melting or multi-stage melting histories. However, there is growing evidence that refractory domains with geochemical fingerprints similar to arc peridotites occur in a variety of geodynamic settings (Neumann and Simon, 2009; Urann et al., 2020). Remarkably, some of these peridotites were also proven to bear ancient depletion ages (~1-2 Ga, Harvey et al., 2006), suggesting that these residual characters cannot be straightforwardly linked to their recent geodynamic evolution.

This project will deal with a geochemical and isotope investigation of refractory peridotite samples from modern oceans drilled during various oceanic expeditions. The work will be focused on previously well-characterized peridotites and associated pyroxenite layers from the West Iberia margin (ODP Legs 149 and 173), Newfoundland (ODP Leg 210) and Izu-Bonin-Mariana region (ODP Legs 125 and 195). Combined isotope (Sr, Nd, Hf, Os) investigation will be carried out on whole rocks and, where possible, on mineral separates (clinopyroxene and sulfides). In addition, in situ Sr-Nd isotope ratios will be determined for pyroxenite samples.

This study is expected to provide an important contribution to our understanding of refractory mantle domains. In particular, these data will allow shedding light on the origin, evolution and fate of such refractory sections in the convecting mantle, and on their possible contribution to MORB origin. The combined application of Nd, Hf and Os isotopes will also allow gathering important time-constraints on the evolution of such domains.

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