

He and Ne isotopic ratios along the Terceira Rift: implications for the Azores mantle source

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Noble gas data (He and Ne) on olivine phenocrysts obtained from Azores' lavas sampled along the Terceira Rift will be presented in this work. The Terceira Rift is considered as one of the slowest spreading system in the world (Vogt & Jung, 2004) and new compiled multibeam swath bathymetry on this structure will be also shown. Lava samples were collected inland at S. Miguel, Terceira, Graciosa, Pico and Faial Islands as well at sea at D. João de Castro Bank and south Hirondelle basin, the latter being sampled by the ROV Luso in 2008 and 2009 during the EMEPC oceanographic cruises. Noble gas data were analyzed in the Noblesse mass spectrometer housed at the IPGP. The most primitive He isotopic ratios were obtained from Pico, Terceira and Hirondelle olivines although presenting values below 10 R/Ra. Most Ne isotopic ratios are similar to the present-day atmosphere, but distinct $^{20}\text{Ne}/^{22}\text{Ne}$ ratios were found for the majority of submarine samples and also Pico and Faial Islands, defining mixing lines with the atmospheric end-member with slopes greater than that defined from MORB lavas. The He-Ne systematics shows that most of the new noble gas data fit in a mixing model between a dominant MORB-type mantle source and a relatively primitive mantle source related with the regional Azores component. However, data from the D. João de Castro Bank argue for the presence of a radiogenic He end-member distinct from MORB that also coincides with the particular Pb-Sr-Nd isotopic signature recently presented by Beier et al. (2008) for this site.

References:

- Vogt, P. & Jung W. (2004). *Earth Planet. Sci. Lett.*, 218: 77-90.
Beier et al. (2008). *G3*, 9(12), Q12013, doi:10.1029/2008GC002112.