Volatile and trace element abundances in HIMU melt inclusions

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Water distribution within the mantle influences magma chemistry and evolution, location and extent of melting, and volcanism over geological time. During subduction, oceanic crust has been suggested to transport significant quantities of water and other volatiles to post-arc depths [1]. Despite the important control water has over mantle characteristics and behavior, the amount of water that is retained within the descending slab is poorly constrained [2, 3].

One possible method for constraining the amount of surviving volatiles is to examine oceanic hotspot lavas that are thought to sample melts of subducted oceanic crust. It is hypothesized that subducted material can be returned to the shallow mantle in areas of mantle upwelling, where it is partially melted and erupted during hotspot volcanism. Lavas from Mangaia represent the HIMU (high-μ, or high $^{238}U/^{204}Pb$) mantle end member, which contains geochemical signatures associated with recycled oceanic crust.

Earlier work on olivine-hosted melt inclusions from Mangaia found the inclusions to host volatile-rich phases (e.g., amphibole, phlogopite, apatite, and carbonatite [4]), an observation that is consistent with Mangaian melt inclusions being volatile-rich. High volatile abundances, coupled with major- and trace-element compositions in melt inclusions that are consistent with HIMU source derivation, may indicate that subducted oceanic crust has retained a significant amount of water [1]. This would imply that dehydration during subduction of oceanic crust is not an efficient process.

Here, we will place new constraints on deep cycling of volatiles into the mantle through examination of olivine-hosted melt inclusions, and we will present the first ever volatiles data on HIMU end member glasses.

[1] Hacker (2008) *G3* **9**, doi:10.1029/2007GC001707. [2] Hilton *et al*. (2002) *Rev.Miner* **47**, 319-370. [3] Wallace (2005) *Volcan.Geotherm.Res*. **140**, 217-240. [4] Saal et. al. (1998) *Science* **282**, 1481-1484.

Mineralogy of stream sediments and soils of Santiago Island, Cape Verde

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Santiago Island covers an area of 991 km^2 and is characterized by a rough relief. (up to 1392 m) and valleys with almost vertical slopes and large flat areas in the coastal zones. The climate is semi-arid, with torrential rains. The lavas occupy most of the island, the pyroclasts are subordinated and the quaternary sedimentary cover occurs in small areas. The mineralogical composition of the 70 stream sediments and 70 soil samples, collected from all geological formations of the island, was studied in the < 2mm fraction. The samples are dominated by primary silicate minerals, such as feldspar (15.0 to 35.4 %), pyroxene (7.8 to 37.4 %) and olivine (0.0 to 9.0 %), reflecting the mineralogical signature of the igneous rocks that support the island. Quartz, phyllosilicates (smectite, kaolinite, mica/illite), calcite, hematite, leucite, apatite, nepheline, magnetite, titanomagnetite, ilmenite, chromite, garnet, zeolites, siderite, opal, barite, titanite, zircon, halite, aragonite, dolomite, brucite larnite and chlorite were also identified. Higher proportion of feldspar and pyroxene were detected on stream sediments (27.3 % and 25.6 %, respectively), than the soils (24.1 % and 17.0 %, respectively). The soils have higher relative proportion of quartz (24.5 %), phyllosilicates (16.1 %), calcite (2.8 %) and hematite (9.6 %) than stream sediments (12.2 %, 14.5 %, 0.8 % and 9.0 %, respectively). These differences are due to pedogenetic processes and wind-transported materials that affect the soils. Soil and stream sediments that cover formations affected by intense weathering are enriched in phyllosilicates and hematite and impoverished in pyroxene and olivine.