Melt inclusions in basalts of the Menez Gwen active seafloor hydrothermal system: An LA-ICP-MS study

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Active seafloor hydrothermal systems, located south of the Azores between 40°N and 36°N, are under plume-influence as evidenced by the enriched nature of host basalts and vent fluid chemistry. Melt inclusions, found in volcanic rocks that host these systems, provide valuable clues regarding the contribution of magmatic ore-metals into the hydrothermal system. Large plagioclase phenocrysts in highly plagioclase phyric basalts (HPPB) from the active Menez Gwen hydrothemal system (37°50'N) contain abundant well-preserved melt inclusions. There are two groups of HPPB based on their REE and incompatible trace element abundances in bulk-rock analyses: group I are highly enriched basalts whereas group II basalts are of a less enriched character. When normalized to primitive mantle (PM), HPPB lay between the fields of E-MORB (group II) and OIB (group I).

Bulk compositions of many melt inclusions, hosted in plagioclase and olivine phenocrysts, were determined using LA-ICP-MS. Preliminary results indicates that the incompatible trace element composition of the melt inclusions is relatively constant in all HPPB of the Menez Gwen, depicting a less enriched character similar to group II bulk-rock results. In other words, melt inclusions do not reflect the extreme enriched character observed in bulk-rock compositions of group I HPPB. REE abundances in melt inclusions are slightly lower than bulk-rock, whereas the $(La/Sm)_N \sim 2.4$ lies between bulk-rock values of group I and group II HPPB. A slight chemical zonation between core and rims is visible in a few phenocrysts. On the contrary, abundances of transition metals (normalized to PM) of bulk rocks and bulk melt inclusions are similar with negative Cr and Ni and Cu contents that are enriched compared to PM. Occasional Cu-Ni spikes were produced in the LA-ICP-MS spectra from Cu-Ni sulfide precipitates present in vapor bubbles inside melt inclusions that had been observed previously by SEM.

Cosmogenic ^{36}Cl surface exposure age calculator

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As part of the NSF-funded CRONUS-Earth initiative, a new online ^{36}chlorine exposure age calculator has been developed based on the equations presented in Gosse & Phillips [1]. The calculator provides a uniform platform for comparing results and allowing for the recalculation of previously published results in this consistent format. Another advantage is the ability to use the calculator to conduct sensitivity studies quickly and consistently. The calculator implements features such as time-dependent scaling schemes, uncertainty calculations, and a variety of input options to accommodate as many users as possible. Production is based on the typical production pathways, spallation of K, spallation of Ca, absorption of a thermal neutron by a ^{35}Cl nucleus, and muon production in K and Ca, as well as the minor production pathways of spallation of Ti and Fe. The Matlab code used in the calculator is available for download on the website for more experienced users who wish to work beyond the scope of the calculator. The most recent version of the calculator is available at:

http://www.cronuscalculators.nmt.edu/cl-36/.

[1] Gosse and Phillips (2001), *Quaternary Science Reviews* **20** 1475-1560.