Please ensure that your abstract fits into one column on one page and complies with the *Instructions to Authors* available from the Abstract Submission web page.

Water content of the oceanic lithosphere at Hawaii from FTIR analysis of peridotite xenoliths

ANNE H. PESLIER[1,2] AND MICHAEL BIZIMIS[3]

[1] Jacobs Technology, JETS, Houston, TX 77058, USA; anne.h.peslier@nasa.gov
[2] NASA Johnson Space Center, Houston, TX 77058, USA
[3] Earth and Ocean Sciences, University of South Carolina, Columbia, SC 29208, USA; mbizimis@geol.sc.edu

Although water in the mantle is mostly present as trace H dissolved in minerals, it has a large influence on its melting and rheological properties. The water content of the mantle lithosphere beneath continents is better constrained by abundant mantle xenolith data [1,2] than beneath oceans where it is mainly inferred from MORB glass analysis. Using Fourier transform infrared (FTIR) spectrometry, we determined the water content of olivine (Ol), clinopyroxene (Cpx) and orthopyroxene (Opx) in spinel peridotite xenoliths from Salt Lake Crater, Oahu, Hawaii, which are thought to represent fragments of the Pacific oceanic lithosphere that was refertilized by alkalic Hawaiian melts [3,4]. Only Ol exhibits H diffusion profiles, evidence of limited H loss during xenolith transport to the surface. Water concentrations (Ol: 9-28 ppm H_2O, Cpx: 246-566 ppm H_2O, Opx: 116-224 ppm H_2O) are within the range of those from continental settings [1,2] but higher than those from Gakkel ridge abyssal peridotites [6]. The Opx H_2O contents are similar to those of abyssal peridotites from Atlantic ridge Leg 153 (170-230 ppm) but higher than those from Leg 209 (10-14 ppm [5]).

The calculated bulk peridotite water contents (94 to 144 ppm H_2O) are in agreement with MORB mantle source water estimates [7] and lower than estimates for the source of Hawaiian rejuvenated volcanism (~540 ppm H_2O [8]) . The water content of Cpx and most Opx correlates negatively with spinel Cr#, and positively with pyroxene Al and HREE contents. This is qualitatively consistent with the partitioning of H into the melt during partial melting, but the water contents are too high for the degree of melting these peridotites experienced. Melts in equilibrium with xenolith minerals have H_2O/Ce ratios similar to those of OIB [9].

[1] Peslier (2010) *JVGR* **197**, 239-258. [2] Peslier *et al.* (2012) *GCA* **97**, 213-246. [3] Sen *et al.* (1993) *EPSL* **119**, 53-69. [4] Bizimis *et al.* (2007) *EPSL* **257**, 259-273. [5] Schmädicke *et al.* (2011) *Lithos* **125**, 308-320. [6] Peslier *et al.* (2007) *Goldschmidt*. [7] Dixon *et al.* (1988) *EPSL* **90**, 87-104. [8] Dixon *et al.* (1997) *JP* **38**, 911-939. [9] Dixon & Clague (2001) *JP* **42**, 627-634.