# δD VARIATIONS IN OLIVINE-HOSTED MELT INCLUSIONS DUE TO POST-ENTRAPMENT PROCESSES: A CASE STUDY FROM BAFFIN ISLAND PICRITES

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Water concentrations and δD values obtained from olivine-hosted melt inclusions are routinely used to estimate the amount of $H_2O$ and the δD of the upper mantle. However, olivine-hosted melt inclusions do not necessarily retain a record of the original $H_2O$ conditions, due to post-entrapment processe such as diffusive loss or gain of $H^+$ (Gaetani et al., 2012, Bucholz et al., 2013). Recently, new analyses of melt inclusions from Baffin Island (Hallis et al., 2015) reported $H_2O$ contents ranging from 576 to 1964 ppm and light δD values between -97‰ and -218‰ , together with a negative $H_2O$-δD correlation. Such correlation was interpreted as an indication that the inclusions dehydrated before the eruption, either via $H^+$ migration from the melt to the olivine, or via degassing. The most depleated value (-218‰) was suggested to be the most indicative of the isotopic composition of H in the mantle, and interpreted as the indication of the presence of an heterogenous mantle tapping a deep, primitive, undegassed source. We analysed melt inclusions and their host olivines from two samples from the same locality as presented in Hallis et al. We report $H_2O$ content between 530 and 1243 ppm and δD values between -96 and -112‰ for the melt inclusions, and olivine $H_2O$ content between 1 to 17 ppm, consistent with analyses of olivines from MORBs-type basalts. Our data show no negative correlation between water content and δD, althought they are consistent with the majority of the non-depleted δD and low $H_2O$ contents reported in Hallis et al. We cannot confirm nor refute the extremly light δD value presented by Hallis et al., however we discuss the possibility, based on results from hydration experiments, that the light δD values and the negative $H_2O$-δD correlation observed by Hallis et al. could have been caused either by pre-eruptive hydration-induced $H^+$ diffusion, for example due to magma mixing; or by post-eruptive molecular water diffusion, due to hydration of the olivines by meteoric water.