

Supplementary information for article ‘Fe-XANES analyses of Reykjanes Ridge basalts: Implications for oceanic crust’s role in the solid Earth oxygen cycle’

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Internal precision

We ran multiple repeats of the NMNH 117393 reference glasses and of natural and in-house experimental glasses throughout the analytical session to assess reproducibility. The results of these tests are summarised in Fig. 1.

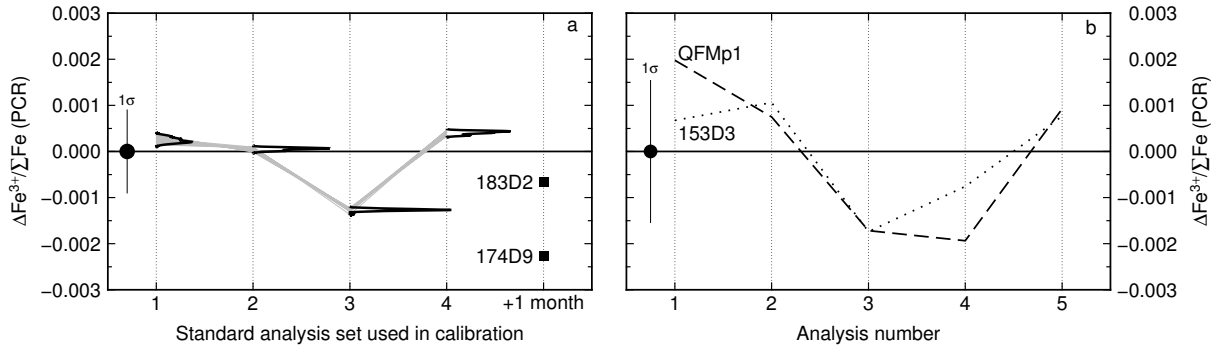


Fig. S1: Two tests of how drift across the session may have affected the $\text{Fe}^{3+}/\Sigma\text{Fe}$ calculated for the samples. (a) On four occasions during our four day run we analysed the entire suite of reference glasses in the NMNH 117393 reference block. This plot compares how the $\text{Fe}^{3+}/\Sigma\text{Fe}$ of the samples would differ if, rather than averaging the multiple spectra collected on each reference glass, we instead used a projection based on spectra collected in only one of the reference block runs. Misfit is presented as the deviation of the $\text{Fe}^{3+}/\Sigma\text{Fe}$ obtained for the samples projected using a single set of reference glass analyses to that obtained using an average of all the reference spectra. Grey lines connect samples between the different fits and for each fit a kernel density plot shows the distribution of misfit. A month after the first analytical session we returned to DLS and made repeat analyses of two glasses, 183D2 and 174D9, plotted as square points. (b) Each sample block contained in-house reference materials that were analysed repeatedly throughout the session. Here, the deviation of these in-house materials from their session mean composition is plotted using the single PCR calibration determined for the whole session. QFMp1 is a natural MORB glass equilibrated in a vertical CO-CO₂ gas mixing furnace at QFM+1 at 1375°C for 12 hours. 153D3 is a natural basalt from our study area, from which five fresh glassy chips from a single hand specimen were separated and embedded in each sample mount.