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Age and petrogenesis of the EM I magma source beneath Ö

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It is known that Öraefajökull has several geochemical signatures that are characteristic of EM I-type mantle, such as enriched Sr and Pb ratios that are not yet recognized elsewhere in Iceland. This has been attributed to an enriched end member of the Iceland mantle plume (1, 2).

An enriched mantle plume end member is not essential in producing the EM source, however it can explain it. EM magmas can also be produced by re-melting older trapped continental crust within Icelandic crust (3) or by melting decoupled continental lithospheric mantle beneath Öraefajökull, SE Iceland.

The seismological crust is 30 km thick under eastern Iceland and \sim 34 km to the MOHO with 26-30 km to base of lower crust beneath Öraefajökull. Thus, Icelandic lower crust probably displays amphibolite to granulite metamorphic facies (4). Melts generated here may interact with the trapped continental crust to produce EM magmas.

We will constrain the age of the EM source using a traverse east from Öraefajökull by sampling two extinct volcanic centers and exposed plutons, 30 and 80 km east of Öraefajökull respectfully. Due to Iceland having a, generally, E-W rifting direction these centers would have been central volcanoes in SE Iceland during their activity and may demonstrate an Öraefajökull-like EM signature. We are able to date some of the rocks from these centers using fresh biotite phenocrysts, to make the age constraint more accurate. The extinct centre 80 km from Öraefajökull contains several silicic units, both eruptives and plutons, which will allow constraints to be placed on crustal interaction. This work uses detailed, high quality Sr-Nd-Pb-O isotope data all acquired at Royal Holloway, University of London, as well as numerical trace element modeling and physical modeling to test the enriched plume model verses a lithospheric source

model in producing the EM I signature observed at Öraefajökull, SE Iceland.

- 1. Prestvik et al., 2004. EPSL, 190, 211-220
- 2. Manning et al., Unpublished
- 3. Foulger et al., 2006. Geophys. J.Int. 165, 672–676
- 4. Foulger et al., 2003. Geophys. J. Int. 155, 567–590