Strontium isotopes in silicate-melt inclusions: A case study from the Faroe and Azores islands

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The Faroe and the Azores islands in the North Atlantic are produced by melting of anomalously hot/wet and geochemically distinct mantle of the Icelandic [1] and Azores [2] plumes, respectively. Numerous studies have investigated the chemical composition of basalts from both localities to infer mantle source compositions and to place constraints on the dynamic emplacement of both oceanic plateaus. The emergence of the Faroe islands is related to North Atlantic rifting 55-56 Ma ago, whereas the Azores islands are less than 10 Ma old, but initial volcanism may already have started 39 Ma ago [3].

Melt inclusions represent mantle melts that are trapped in phenocrysts, which usually formed over a large range of pressures and temperatures during melt ascent and evolution in the shallow mantle and crust. Their chemical composition often exceeds the isotopic variability observed in their host lavas [4] and therefore offers insights into magmatic processes that are not apparent from the aggregated, erupted lavas.

We will present new major (EMP) and trace element (LA-ICPMS) data along with Sr isotope ratios (MC-ICPMS) from melt inclusions in forsteritic olivines ($Fo_{>88}$) from primitive basalts (MgO > 8 wt.%). The major (and trace element compositions) from the melt inclusions are corrected for post-entrapment modification via crystallisation and re-equilibration with their host crystals during cooling. This allows direct comparison of melt inclusion and host lava compositions. Strontium strongly partitions into the melt, and thus $^{87}Sr/^{86}Sr$ of the melt inclusions are little affected by post-entrapment processes and reliably reflect the isotopic composition of their parental melts. The involvement of the depleted and enriched components in both settings will be (re-) evaluated with the aim to further constrain mantle melting and magma mixing processes, as well as the extent of source heterogeneity and the nature of possible mantle components.

[1] Holbrook et al. (2001), *EPSL,* **190** (3-4). [2] Saki et al. (2015), *EPSL,* **409**. [3] Beier et al. (2015), *GSA Special Paper*, **511**. [4] Maclennan (2008), *GCA*, **72** (16).