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Major and trace element composition of the Hvítserkur ignimbrite E-Iceland: preliminary results

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Generation of silicic magmas in Iceland have long been debated and are generally explained by partially melting of hydrothermal alterated basaltic crust, fractional crystallisation of mantle derived basalts or as a combination of the two. U-Pb ages on zircons separated from the Hvítserkur ignimbrite however reveals Mesozoic ages (Paquette et al., 2006) implying that old continental crust could exist beneath parts of Iceland and therefore might be an important component in the magma genesis. This contribution documents the major and trace element composition of the Hvítserkur ignimbrite. The ignimbrite classifies as a non-welded lithic-rich and crystal poor pyroclastic fall deposit with a high SiO_2 rhyolitic composition (slightly peralumious comendite). The ignimbrite is compositional zoned with 76.2 wt% SiO_2 in the lower part and 81.7 wt% SiO_2in the upper part. The SiO_2 increases towards the top in contrast to decreasing concentrations of most major and trace elements with the exception of Pb, REE and Y. The REE pattern is relatively flat $(La/Yb)_n$ = 1.2-1.4 and sub-parallel for the lower and upper units with a small negative Eu anomaly. This distinguish Hvítserkur from other Icelandic high-SiO_2 rhyolitic rocks ($>$ 75 wt% SiO_2) that typical have $(La/Yb)_n$ $>$ 8. The samples display a relatively flat and parallel trace element pattern for the most incompatible elements (Rb, Ba, Th, U, Nb and Ta) and are enriched 2.5-5 times relative to the REE. The Hvítserkur also differ from other Icelandic high SiO_2 rhyolitic rocks in that they have a more pronounced negative Zr anomaly than previously reported and are also characterized by having low Pb and Hf concentration. Since the trace element patterns are parallel it is suggested that they must be related through a similar process. Fractional crystallisation of plagioclase + Fe-Ti oxides and zircon might explain small differences in Sr, Zr and some transition elements, but cannot

account for the enrichment in REE. It is instead proposed that fractional crystallisation combined with differential incorporation of accessory minerals rich in REE from wall rock lithics could explain the enhanced REE concentration, while the high SiO_2 content is explained by the addition of Si during post-eruptive silicification.

Paquette, J., Sigmarsson, O and Tiepolo, M, 2006, Continental basement under Iceland revealed by old zircons. *Eos Trans. AGU, 87*(52), Fall Meet. Suppl., Abstract V33A-0642