ARCHAEAN MANTLE FRAGMENTS IN PROTEROZOIC CRUST, WESTERN GNEISS REGION, NORWAY: IN SITU AND WHOLE-ROCK Re-Os EVIDENCE

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Orogenic peridotites occur in Proterozoic gneisses at several localities in the Western Gneiss Region (WGR) of western Norway. The recent development of high-precision in situ laser-ablation techniques enables rapid acquisition of Re-Os isotopic data from single sulfide grains in such peridotites (Pearson et al. 2002 *Geochimica et Cosmochimica Acta*). Re-Os model ages were determined for twenty-nine sulfides from garnet-bearing peridotites at Almklovdalen in the southern WGR. Whole-rock Re-Os data were collected for sulfide-free dunites from the same locality.

Re-Os model ages for Almklovdalen sulfides define a series of peaks on a cumulative probability plot, some of which can be matched with known crustal events in the region. The Proterozoic peak has a maximum at ~1.7 Ga which falls within the age range for the Gothian orogeny (1.60-1.75 Ga) and is close to calculated Sm-Nd mineral ages (ca. 1.6 Ga) for WGR garnet peridotites. Peaks at 2.8 and 3.2 Ga do not correspond with any known event in the WGR crust and suggest that the peridotites experienced an Archaean partial melting event. This was unexpected as the garnet peridotites thus record a much older history than that suggested by previous Sm-Nd studies. Further evidence for an Archaean event in the WGR comes from whole-rock Re-Os model ages of ca. 2.9 Ga for the dunites at Almklovdalen.

Archaean crustal rocks are unknown in this part of the Baltic Shield, suggesting that the peridotites reflect a mantle depletion that predates crustal growth; this would imply a decoupling between the crust and the lithospheric mantle. Alternatively, the Archaean crust corresponding to this melting event may exist at structural levels below those presently exposed in the WGR, or it may have been thoroughly reworked in Proterozoic time, to the point of being unrecognisable.

Despite the lack of crustal evidence for an Archaean event, it appears that mantle material that underwent depletion in Archaean time has survived in relatively shallow parts of the lithospheric mantle. The preservation of Archaean ages in the WGR peridotites is further evidence that at least some mantle material that has previously been identified as Proterozoic lithospheric mantle may in fact be refertilised Archaean lithospheric mantle (Griffin et al. 2002 *Geochemistry Geophysics Geosystems*).