

## **The geochemical composition of serpentinites in the Mesoarchaean Tartoq Group, SW Greenland: Harzburgitic cumulate or melt-modified mantle?**

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The Mesoarchaean Tartoq Group of SW Greenland host large slivers and enclaves (up to 100 x 2000 meters) of serpentinites, which form tectonic imbricates within the supracrustal rocks. We present new whole-rock major, trace and platinum-group element data, and preliminary Re-Os isotope data for these serpentinites. Additionally, we present in-situ major and trace element data for chromite and magnetite.

Based on these data we can rule out a magmatic (komatiitic/boninitic/picritic) or residual mantle (MOR/forearc) origin for the protoliths of the serpentinites. Fractionated platinum-group element patterns suggest a cumulate origin with some samples (high-Ir group) pointing towards derivation as early cumulates from large degree mantle melts. A melt-modified mantle origin cannot be rejected entirely, but appears unlikely given the high Fe content (FeO = 9.5-17.3 wt.%) and fractionated PGE patterns. Late resetting and overprinting is suggested by the altered in-situ oxide mineral compositions, which cannot be primary, as indicated by negligible Mg and Al contents.

Although our data do not provide unambiguous evidence for the petrogenesis of these Mesoarchaean serpentinites, we find many similarities with ultramafic rocks associated with the lower crustal cumulates from the Kohistan and Talkeetna arc sections (allowing for slight mobility of MgO and SiO<sub>2</sub> during alteration, serpentinisation and metamorphism).

Therefore, our preferred interpretation of the Tartoq Group serpentinites is an origin as ol+opx+chr cumulates, which crystallised from the magma that was parental to the Tartoq Group mafic sequence, consistent with the arc-affinity of the latter. The overall geological information from the Tartoq Group suggest that this assemblage of imbricated mafic to ultramafic rocks and minor sediments represents a dismembered Mesoarchaean arc-related ophiolite.