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The oldest chromitite on Earth – a potential archive of the Hadean

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The Nuuk region of SW Greenland hosts the most extensive exposure of Eoarchean crust anywhere on Earth. It is dominated by tonalitic continental crust, but also includes fragments of mafic to ultramafic rocks, such as the >3.7 Ga Isua Supracrustal Belt, and the >3.8 Ga Ujaragssuit Nunât Intrusion [1]. The occurrence of stratiform chromitites rules out a mantle protolith for the peridotites of the Ujaragssuit Nunât Intrusion. Instead, such peridotite enclaves either represent dismembered layered intrusions that formed within a mafic proto-crust, or they represent the magma conduits which fed such mafic proto-crust that existed prior to the formation of the regional tonalitic continental crust. The Ujaragssuit Nunât Intrusion, is of particular interest because it hosts the oldest chromitites known on Earth. These chromitites occur as up to 2 x 3 m large lenses or pods, as well as in the form of repeated stratiform layers enclosed within peridotites. Previous studies of the siderophile isotope compositions of the Ujaragssuit chromitites indicate a Hadean age [2]. Furthermore, a Ru-isotope anomaly supports a pre-late veneer component in these rocks [3]. Therefore, this key locality in Greenland can potentially contribute with significant new insights on the geochemical starting composition of our planet prior to the formation of the continental crust and differentiation of the mantle. We present field observations and a new map the Ujaragssuit Nunât Intrusion, and summarize preliminary geochemical findings.

References

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