

**THE DUNITE COMPLEX OF THE GULI MASSIF, NORTHERN SIBERIA, RUSSIA:  
A MULTIDISCIPLINARY STUDY**

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The Guli Dunite Clinopyroxenite Massif is located at the north eastern rim of the Siberian Craton, Taimyr Province, Russia and represents the largest complex of this type in the world. The Guli Massif is known to host economic placer deposits of platinum group elements (PGE) and gold (Au) in addition to deposits of rare earth elements (REE) and phlogopite. However, it does not conform to the standard of Alaskan type complexes, which are usually much smaller, approximately 12 – 40km<sup>2</sup> and concentrically zoned. The Guli complex covers an area of approximately 1500-1600km<sup>2</sup> placing it far outside the parameters of “normal” Alaskan type complexes, and it is a laccolithic body without the concentric zoning typical of other complexes.

Geophysical data indicate the true size of the complex with more than <sup>2</sup>/<sub>3</sub> of the complex covered by Quaternary sediments of the Khatanga Trough. The exposed areas consist of ~63 % dunite and peridotites and within this body are a number of magnetite pyroxenite bodies which occur as veins and stock-like masses. The remainder of the complex consists of alkaline to highly alkaline volcanic sequences and two carbonatite intrusions. (FEDORENKO & CZAMANSKE, 1997)

A problem that is often associated with studying ultramafic complexes is a high degree of surficial weathering and alteration. This is overcome at the Guli complex, with an extensive collection of drill cores. Two of these form the basis of this study as they represent the longest and contain the freshest dunite samples of the complex. Field and microscopic studies of both drill cores show serpentinisation to a depth of ~500m, the remaining core is remarkably fresh. The unserpentinised dunite shows minor variation in grain size, colour and percentage of accessory minerals, such as spinel, calcite, phlogopite, perovskite, clinopyroxene and very rarely apatite. Geochemical results show remarkable consistency over more than 600 m of unserpentinised core, with respect to bulk MgO, CaO, Cr, Ni, in addition the composition of olivine is also consistent over the same interval. The rare earth element patterns show a significant enrichment in the light rare earth elements, which suggests that metasomatism, has affected portions of this complex. Normalised PGE patterns show a pronounced positive Ru anomaly and significant depletion of PPGE (0.1 – 0.01 chondrite). Whole rock Os data indicate an age of 329±57 Ma.

These results indicate that the Guli dunite complex possibly represents a giant portion of mantle restite, which has been significantly metasomatised.

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**References:**

FEDORENKO, V. & CZAMANSKE, G. (1997). *International Geology Review* 39: 479-531.