

## Comparability of major, trace element, and PGE data of ultramafic rock certified reference materials

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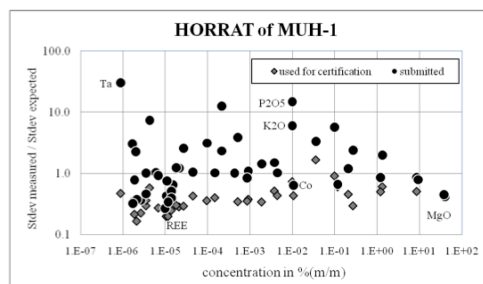
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Comparability and traceability are terms increasingly recognized by the geoanalysts, particularly when trying to compile data bases from literature-published values. The use of certified reference materials (CRM), which by definition ought to be traceable to a common reference, is essential for the development of analytical procedures and to ensure comparable results.

Serious problems occur at the low end of the concentration range. In particular, the determination of TiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Na<sub>2</sub>O, K<sub>2</sub>O, P<sub>2</sub>O<sub>5</sub>, REE, and most HFSE in melt-depleted ultramafic rocks are a challenge for many geoanalysts. The abilities of most labs are probably overestimated, as demonstrated by the data sets obtained during the recent certifications of three new ultramafic reference materials (OKUM, MUH-1, and GAS). Using the Horwitz function (*Ha*) as a measure of the expected between-lab standard deviation (*s*) and calculating the ratio of the expected and actual values of *s* (HORRAT, see figure), it was possible to identify serious deviations. While the MgO, SiO<sub>2</sub>, Co and REE are analyzed better than expected, the precision of compounds such as P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, Na<sub>2</sub>O, and TiO<sub>2</sub> (most commonly analyzed by XRF) and elements such as Ta and the PGE (analysed by ICP-MS, at ≤ 10 ng/g) were considerably worse than predicted by *Ha*.



Through the use of the three new CRM an improvement in the performance and comparability should be expected. The CRM will be distributed through the International Association of Geoanalysts (IAGeo Limited <http://geoanalyst.org>).

## Traces of melting in mantle spinel peridotite xenolith from Khorog volcano (northern Mongolia)

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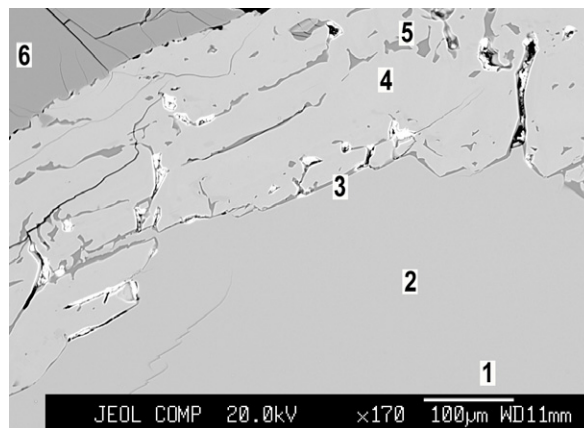
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Partial melting phenomena in peridotite xenoliths are not unusual. Glass films and melt pockets have been reported for peridotite xenoliths from different localities [1-3].

This study concerns small-scale partial melting in peridotite xenoliths from the Khorog volcano located in the Tarian Depression (northern Mongolia). All of the xenoliths include in our study are four-phase spinel lherzolites (ol + opx + cpx + sp). Main mineral composition are typical of many published analyses [2].



**Figure 1:** Back-scattered-electron photomicrographs of peridotite xenoliths. 1-4 – clinopyroxene: Na<sub>2</sub>O contents are 1.9 wt.% (1-3) and 0.6 wt.% (4), 5 – glass, 6 – olivine.

The glass are characterized (wt.%): SiO<sub>2</sub> – 59.3-54.9, Al<sub>2</sub>O<sub>3</sub> – 22.5-16.8, FeO – 2.3-3.8, MgO – 1.6-4.1, Na<sub>2</sub>O – 6.5-4.8, K<sub>2</sub>O – 2.3-3.9.

Petrographic and chemical evidence shows that the melts derived locally from the main peridotite minerals.

[1] Schiano & Clivichatti (1994) *Nature* **368**, 621-624. [2] Ionov *et al.* (1994) *J. Petrol.* **35** (3) 753-785. [3] Luhr & Aranda-Gomez (1997) *J. Petrol.* **38** (8) 1075-1112.