

## Chemical stratigraphy of UG2, Bushveld Complex, SA: Comparison of analytical methods

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The aim of the detailed investigation was to develop and to validate the EDXRF method as a fast tool to outline zones of interest regarding PGE, Ni and Cu mineralization by using these and other pathfinder elements.

Several methods were applied to obtain geochemical, mineralogical and textural information from UG2-chromitite horizons.

The fastest information was obtained by profiles along half cores using the EDXRF-geoscanner with 250µm steps at 1 to 30 sec/point for major and trace elements. Elemental maps were collected by EDXRF-microscopy in 100µm steps, at 0.5 sec/step for selected areas. Polished thin sections were optically scanned, and investigated by SEM for PGE distribution. Besides these fast methods sub-samples (0.5 to 5 cm) with a more representative sample volume were analyzed by XRF for major and trace elements. The XRF glass beads were digested and analyzed by ICP-MS for REE. Another set of glass beads was produced in graphite containers, embedded in araldite, polished and analyzed for PGE by LA-ICP-MS. For control, the rest of the glass beads was digested in nitric acid and PGE were collected by the telluride precipitation method (Evans *et al.*, 2003). Since our observation with SEM confirmed that most of the PGE minerals occur in the interstices of the chromite, selective leaching of the PGE and silicates by nitric acid in the microwave was performed.

### Conclusions

A comparison of the methods shows that EDXRF-scanning is a fast and accurate tool to highlight areas of unusual Ni, Cu, PGE pattern. EDXRF mapping provides textural patterns for hand specimen scale and reduces the amount of polished sections needed. Ni, Cu anomalies could easily be verified by other methods (e.g. SEM). PGE distribution patterns have to be treated carefully, since nugget effects might occur or diffraction peaks obliterate the distribution pattern.

### Reference

Evans, N.J., Davis, J.D., Byrne, J.P., French, D. (2003): Contamination-free preparation of geological samples for ultra-trace gold and platinum-group element analysis. *Journal of Geochemical Exploration* **80**: 19-24

## Lithochemistry of parautochthonous Variscan metasediments (Northern Portugal). Implications of metamorphism and metassomatism

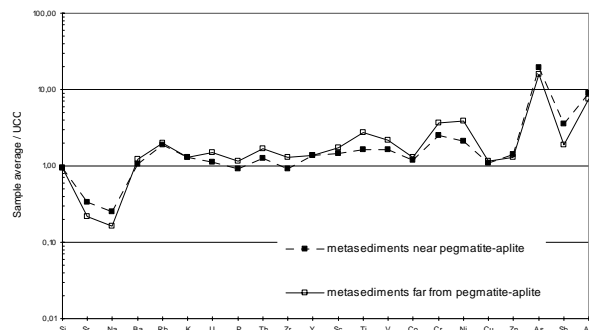
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The studied metasedimentary rocks, belonging to different lithostratigraphic units, are inserted in the lower Parautochthonous of Galiza Trás-os-Montes Zone (ZGTM), in Northern Portugal Variscan belt. The studied area involve two geographic sectors separated by the Regua-Verin fault. In the western block of the fault the metasedimentary rocks are intruded by abundant pegmatite-aplite bodies and quartz veins and show higher metamorphic conditions: staurolite to biotite zone. In the western block the metamorphic conditions are biotite to chlorite zone.

The metasedimentary lithologies are mainly phyllite and quartz-phyllite rocks in an imbricate structure. Lithochemical studies revealed a slow sedimentary sorting and high geochemical maturity in both sectors. The Th/Sc versus Zr ratios indicates, for the two sectors, a geotectonic environment ranging from an Active Continental Margin (ACM) to a Continental Insular Arc (CIA).

The normalization to upper continental crust (UCC) diagrams showed that similar lithologies present geochemical variations according to their proximity to the pegmatite-aplite veins. Next to the veins a deficit in mobile elements in fluid phases are evident, namely in, Rb, U, Th.



**Figure 1:** Crustal normalization of samples near and far from pegmatite-aplite veins.

So, the lithologies next to the aplite-pegmatites had been affected by fluid circulation (metassomatic effects) in a high temperature and low pressure (HT-LP) metamorphic conditions, while the lithologies in the both sectors, far from these intrusive bodies, present a isochemical metamorphism.