The PGE geochemistry of the on-craton kimberlites from Eastern Dharwar Craton, Southern India

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Although some platinum-group minerals (PGMs) have been found in kimberlites, studies on the geochemistry of gold and PGE in kimberlites are limited. The restricted nature of the database has prevented detailed modelling of the geochemical behaviour of PGE in Kimberlites. A detailed study on PGE geochemistry of 19 kimberlitic bodies from various regions within and around Anantapur area, which intruded in Eastern Dharwar Craton, has been taken up to understand their behaviour, abundances, fractionation trends as well as their genesis as they are derived from the deepest part of the earth. The PGE ratios of the kimberlites compared with other upper-mantle-derived rocks using a Pd/Ir vs. Ni/Cu plot are shown in Fig.1. HTPGE concentrations in kimberlites significantly exceeded those concentrations found in oceanic and continental basalts and overlap the range of concentrations found in komatiites and also mantle peridotites. Kimberlite PGE signature in Dharwar craton reflects a combination of process related to PGE retention in the source, possible loss of PGE during ascent, possible addition of some LTPGE during ascent, and incorporation of a primitive, HTPGE rich component. The likelihood of incorporation may be influenced by the thickness of the craton and lithosphere intruded by the kimberlite which had resulted in incorporation of more HTPGE component as a possibility of upwelling of asthenosphere bringing primitive as well as HTPGE signature in the source region of kimberlite magma.



Figure 1: Metal ratio diagram of Pd/Ir vs. Ni/Cu for kimberlites and other mantle-derived melts.

Cobalt uptake and resistance to trace metals in *Comamonas testosteroni* isolated from heavy-metal contaminated sites in the Zambian Copperbelt

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A biogeochemical study of a polluted wetland site in Kitwe, Zambia shows high concentration of trace metals, including cobalt, with many of them sequestered with the sediment organic phase. Depth profile in surface sediments suggest trace metal cycling between porewater and solid phases. Organic carbon degradation mediated by bacteria is a possible mechanism for the mobilization of trace metals. Although little is known of microbially mediated Co cycling, this study documents a bacterium that may be involved in the uptake, accumulation and possible cycling of Co in aquatic sediments. The dominant isolate was enriched from the microbial community and identified using 16S rRNA gene sequence analysis as a strain of Comamonas testosteroni (designated C. testosterone TDKW). Improved growth of C. testosteroni TDKW was seen with the addition of up to 200 µM of cobalt (optimal growth ca. 100 µM), whilst concentrations above 4 mM completely inhibited growth. C. testosteroni TDKW also exhibited resistance to high concentrations of iron and manganese, but showed limited resistance to copper or nickel. Further analysis revealed cellular cobalt accumulation and the presence of heavy-metal resistance genes, suggesting this organism could be contributing to in vivo biological cycling of cobalt in mineral contaminated aquatic systems.