Chromite and PGE mineralisation in ophiolitic complexes

OHNENSTETTER, M., CNRS-CRPG, 15, rue Notre-Dame Des Pauvres, B.P. 20, 54501 Vandoeuvre-les-Nancy Cédex, France

Supra-subduction zone ophiolites have a high metallogenic potential compared to those formed at Mid-Oceanic Ridges.

In the former, the distribution of chromite deposits varies according to mantle stratigraphy and structure whereas their composition is related to that of the overlying cumulate sequence and lavas. The preservation of diapiric structure at the top of the mantle may be used to define areas of high chromite potential. Fractionation or successive partial melting of a progressively depleted mantle may explain the presence of Al_2O_3- and Cr_2O_3-rich chromite deposits, the latter being predominant in the ophiolitic complexes.

PGE mineralisation is associated with chromitites and with low-sulphide bearing rocks, usually dunites. Os-Ru-Ir mineralisation is by far the most common, but Pt- and Pd-mineralisation has been described from several ophiolitic complexes: Albania, Leka, New Caledonia, Quebec and Shetland. It is possible to distinguish: 1) Pd- mineralisation in pentlandite-bearing dunite; Pt- and Pd- mineralisation in Cr- to Al- rich chromitites; 3) Pt- mineralisation, with Pt-Fe alloys in Cr- and Fe^{3+}- rich chromitites.

Most of the deposits are considered to be magmatic, and the influence of deuteric fluids is evident to trigger PGE deposition. The platinum-group mineral assemblages and the PGE patterns of the distinct types of mineralisation result from PGE fractionation due to local fluctuation of sulfur, oxygen and/or arsenic fugacities related to the existence of silicate magmas of distinct composition.