Platinum-group Elements in Rocks from the Voikar-Syninsky Ophiolite Complex, Polar Urals, U.S.S.R.

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Analyses of platinum-group elements (PGE) in rocks collected from the Voikar-Syninsky ophiolite in the Polar Urals suggest that the distribution and geochemistry of PGE in this Paleozoic ophiolite are similar to those in Mesozoic ophiolites from elsewhere. Chondrite-normalized PGE patterns for chromitite, the tectonite unit, and ultramafic and mafic cumulate unit have negative slopes. These results are similar to those found for chromitites from other ophiolites; stratiform chromitites show positive slopes. If the magmas that form both types of chromitite originate from similar mantle source material with respect to PGE content, the processes involved must be quite different. However, the distinct chondrite-normalized PGE patterns may reflect differing source materials.

INTRODUCTION

The Voikar-Syninsky ophiolite complex, which lies west of the city of Salekhard in the Polar Urals, U.S.S.R., is an exceptionally well exposed and well preserved ophiolite complex of Paleozoic age. The complex is about 300 km long and 50 to 80 km wide (Fig. 1); it is only moderately serpentinized, is extensively glaciated, and is largely free of vegetation. The area was examined in 10 traverses by participants in an ophiolite conference sponsored by Project 39 of the International Geological Correlation Program in August 1978 (Bogdanov, Morgan, and Page, 1979), during which time samples were collected from the ultramafic tectonite, ultramafic and mafic cumulates, gabbros, and dike rocks in order to investigate the distribution of PGE (platinum-group elements) in the complex. The purposes of this investigation were (1) to document the abundances of PGE in the different parts of an ophiolite, (2) to define the distribution of the PGE with...
respect to minor and trace elements, and (3) to compare the PGE geochemistry of a Paleozoic ophiolite with that of Mesozoic ophiolites from various parts of the world.

GEOLOGIC SETTING AND SAMPLE LOCATION

The generalized geology of the Voikar-Syninsky massif consists of thrust slices. From the northwest to southeast they consist of Ordovician to Devonian flyschoid and pelagic sediments, the ophiolite complex, tonalite and diorite, and Silurian and Devonian island-arc sequences, thrust northwestward over an Eocambrian to Paleozoic platform sequence (Fig. 1). The flyschoid and pelagic sediments occur in an imbricate thrust zone in which there are some sedimentary rocks of Upper Mississippian age that contain ophiolite detritus (Bogdanov, Morgan, and Page, 1979). At the eastern margin of the massif, gabbro and diabase dike complexes are intruded and hornfelsed by tonalite that is older than Middle Devonian (K-Ar ages of 375 m.y.; Bogdanov, Morgan, and Page, 1979). Knipper (1979) reported K-Ar ages of 400, 410, 420, and 470 m.y. for gabbroic rocks of the ophiolite. Reviews of the geology, petrology, mineralogy, and structure of the Voikar-Syninsky massif are contained in Efimov and others (1978) and in Sobolev and Dobretsov (1977). More directly focused on the Voikar-Syninsky ophiolite complex are reports by Savel'yev and Savel'yeva (1977) and