Geochemistry of Metabasic Dykes from the Northern Part of the Izera-Karkonosze Block, SW Poland

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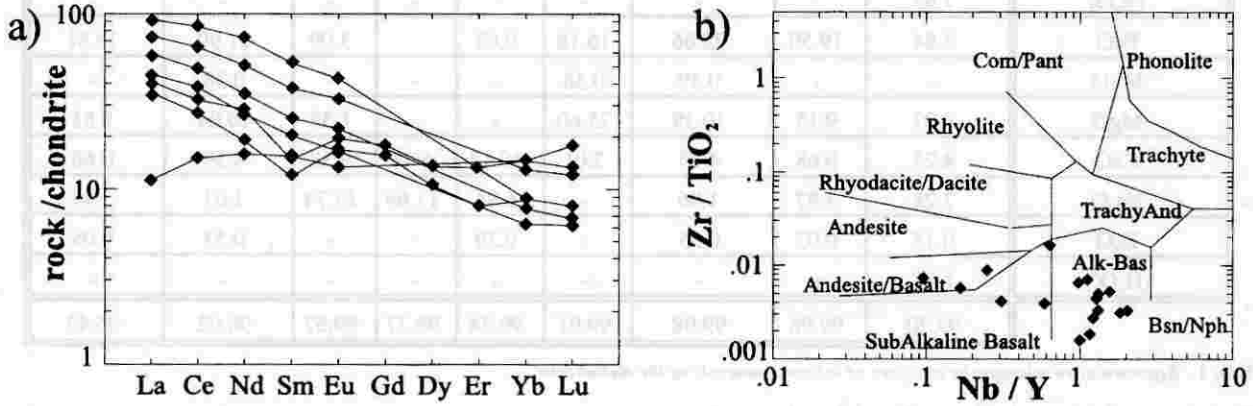

Fig. 1. a) REE concentrations in samples of the Izera metabasites, chondrite normalised (Nakamura 1974);
b) Nb/Y - Zr/TiO_2 classification diagram (Winchester and Floyd 1977).

Numerous small metabasic bodies in a form of dykes occur within various granites and ortho- and paragneisses in the northern part of the Izera-Karkonosze Block. These rocks were metamorphosed under amphibolite and greenschist facies conditions and underwent heterogeneous shear deformation of varying intensity along with the surrounding granite-gneisses. This metamorphism and deformation did not completely erase original igneous textures, thus there are common relicts of magmatic minerals - brown hornblende, clinopyroxene, less commonly olivine and ophitic structures, which indicate that the protoliths were microgabbros, massive basalts and dolerites.

The Izera metabasites are most commonly present in a form of steeply dipping dykes with a WNW-ESE strike, generally parallel to foliations of the surrounding gneisses. The emplacement of basic dykes in this area is connected with extension perpendicular to the mylonite foliation in the gneisses which allowed basic magma to intrude into the granites and gneisses, particularly parallel to mylonitic zones (Zelazniewicz 1996).

An isotopic age of the Izera metabasites is still unknown. Their origin can be linked to the Early Palaeozoic magmatism, however not older than the Ordovician, as the age of the Izera granites, into which the basic veins intruded, has been estimated at ca. 515-480 Ma (Korytowski et al. 1993, Philippe et al. 1995) by the U-Pb (zircon) method and at ca. 480-450 Ma (Borkowska, Hameurt and Vidal 1980) by the Rb-Sr (whole rock) isochron method.

Geochemical studies were mainly based on trace elements and REE which are considered to be rather stable during metamorphism (Floyd and Winchester 1978). A good straight line correlation between REE pairs and the slightly weaker correlation between HFSE pairs, along with rather comparable line arrangement in the REE diagrams permit assume that these elements are inherited from a premetamorphic magmatic rock (Fig. 1a).

The Izera metabasites can be divided into two groups based on their chemistry. The first group dominates in the studied area, and has an intraplate alkaline basalt chemistry (Fig. 1b), (Nowak 1996). The second group is made up of rocks of subalkaline basalt chemistry. Only few samples of such rocks were collected. They show an Nb/Y < 1.2 relationship at low TiO_2 < 1.5 wt. content, characteristic of this type of rock (Winchester and Floyd 1975). Except for one sample, the rocks of the second group have TiO_2/P_2O_5 and Nb/Th ratios typical of continental intraplate tholeiite basalts. The negative slope of the spidergram normalised to primary mantle and negative Nb anomaly also indicate an intraplate character of these rocks and their relationship to a continental crust environment (Holm 1985). One sample from the subalkaline basalt group differs from the others in having trace element and REE contents very similar to MORB (Nowak 1997).

The general line arrangement of the Izera metabasites in the diagrams indicates a similarity of these rocks to intraplate alkaline basalts and tholeiites connected with continental rift zones.

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Detrital Garnets and Chromites from the Ksiaz Formation, Świebodzice Depression: Implications for the Variscan Evolution of Sudetes

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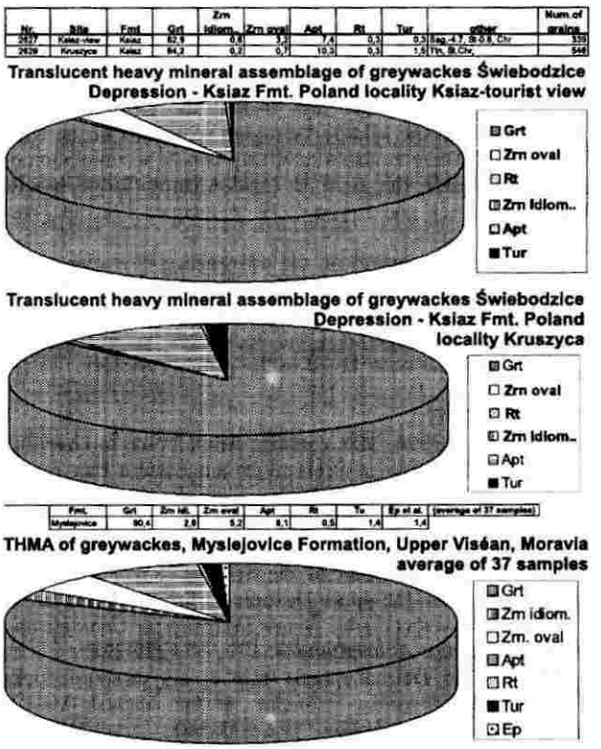

Fig. 1. Comparison of the translucent heavy mineral assemblages

The Świebodzice Depression (60 km ESE from Wroclaw) is a fault-bounded trough filled mainly with a folded clastic succession of a late Devonian - (?) early Tournaisian age. The thickness of sediments is estimated to 4000 m (Porebski 1990). The succession is subdivided into four lithostratigraphic units. The Upper Devonian, mostly flysch-like (mudstone, siltstone, sandstone with sandstone-conglomerate bodies) Pelcznica and Pogorzala Formations rest on the Precambrian gneisses of the Sowie Góry Mts. Both these formations gradually pass upwards into interfingering conglomeratic Chwaliszow (SW) and Ksiaz (NE) Formations which differ by their pebble assemblages. Conglomerates of the Chwaliszów Fmt are polymict, while those of the Ksiaz Fmt are predominantly gneiss-bearing.

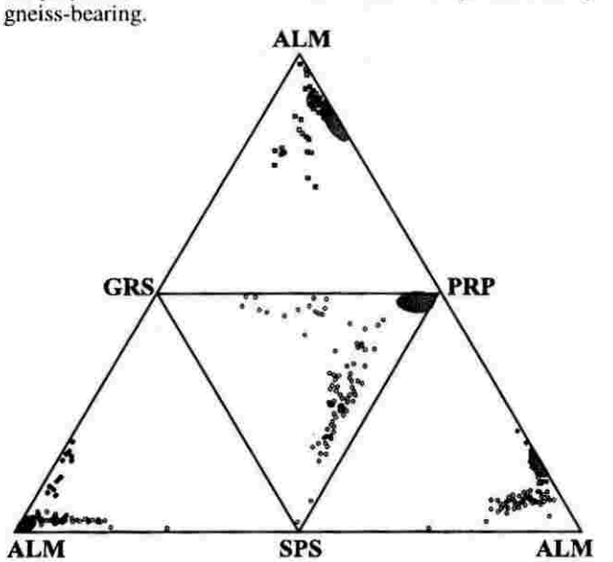

Fig. 2. Composition of detrital garnets from the Ksiaz Fmt, Upper Devonian of the Świebodzice Depression, Poland. Latticed field represents clastic garnets of the Myslejovice Fmt., Upper Viséan, Moravia.

Several samples of psammites from the Ksiaz Formation were picked to complete the detailed and valuable sedimentologic and petrologic studies of Nemec, Porebski and Steel (1980) in Porebski (1990) op.cit. Firstly, an assemblage of translucent heavy minerals was studied. Then over a hundred of microprobe analyses of clastic garnets and chromites from the locality Ksiaz-tourist view above the valley of the Pelcznica River were carried out and interpreted.

Discussion of results

Translucent heavy mineral assemblages (THMA) of grey-