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**PETROLOGY OF DIORITIC/SYENITIC ROCKS OF THE NIEMCZA ZONE (FORE-SUDETIC BLOCK, SW POLAND)**

The Niemcza Zone (Fig. 1) is located at the eastern margin of the Góry Sowie Gneissic Block (NE Bohemian Massif). The Zone originated due to a late Variscan sinistral shearing along the eastern margin of the Góry Sowie Block, which produced the few kilometers wide N-S trending zone of low- to medium grade mylonites (Mazur and Puziewicz 1995). The mylonites are intruded by (1) the syn-tectonic medium-grained granodiorites and (2) the suite of fine-grained, dioritic to syenitic rocks relatively rich in dark minerals (30 – 50 vol. %). In this paper the latter are discussed, basing on the detailed petrological study undertaken in the last few years. The data presented are based on vast amount of petrographical and mineral-chemical data, the latter collected by CAMECA SX50 and SX100 microprobes in various laboratories.

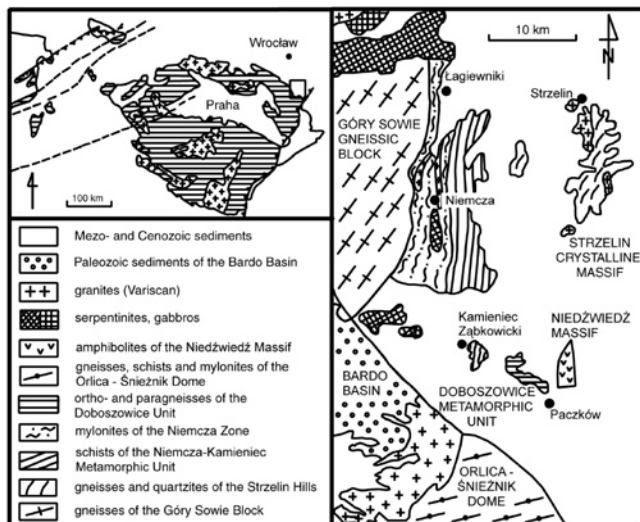


Fig. 1. Geological units east of the Góry Sowie Gneissic Block (modified after Puziewicz et al. 1999).

The rocks of the dioritic suite occur as small intrusives whose size ranges from tens of centimeters to hundreds of meters. Some of them are undeformed, whereas

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the other exhibit metamorphic deformational structures and related changes in mineral composition. The primary mineral assemblage of the dioritic rocks consists of clinopyroxene, biotite, plagioclase and hornblende. Quartz occurs in small amounts, but is present in all rocks of the suite. The amount of potassium feldspar varies from negligible to significant, which leads to variation in the rock systematic position (IUGS classification scheme) from dioritic/quartz dioritic through monzodioritic to syenitic. Part of the K-feldspar occurring in the deformed varieties may be of secondary (i. e. metamorphic) origin.

The undeformed rocks occur in the Koźmice quarry (monzodiorite; Puziewicz 1988, 1992), in quarries of the Kłóśnik Hill (quartz diorite) and in the Przedborowa quarry (quartz monzodiorite; Dziedzicowa 1963). The exposure of quartz syenite in Piława Górna (Puziewicz 1987) became unaccessible due to industrial constructions. The deformed rocks form small (tens of centimeters) occurrences in Brodziszów (diorite) and Sienice (no data on systematic position) and larger ones (tens of metres) in Wilków Wielki (syenite) and Niemcza (quartz diorite).

Diopside + biotite are the primary magmatic ferromagnesian minerals. Typically diopside is followed by biotite. The latter has the  $Fe/(Fe+Mg)$  ratio between 0.20 and 0.40. The pyroxene is rimmed by hornblende, or hornblende crystals contain relics of diopside in their central parts. The composition of hornblende as well as its relationship to diopside indicate that both the minerals crystallized at the magmatic stage. Locally, the pyroxene-bearing parts of the rocks are intermingled with the amphibole-bearing ones (Koźmice), or even the amphibole-bearing varieties are dominating (Przedborowa). Large part of the quartz monzodiorite occurring in Przedborowa contains magmatic hornblende with no relics of diopside.

Plagioclase typically forms normally zoned crystals, containing from 54 - 64 % of anorthite in cores and 21 - 24 % in the rims.

Magmatic mineral assemblages are preserved to a different degree in deformed varieties of the diorites/syenites. The hornblende is, however, commonly converted to actinolite, the plagioclase is usually oligoclase, and albite replaces large part of plagioclase. The syenite from Wilków Wielki is the most interesting in this group, since it is highly magnesian and contains unusually high concentration of phosphorus (1.56 wt % in the whole-rock).

Variations in the proportions of diopside to hornblende and of plagioclase to potassium feldspar are the prominent features of the described rock suite. Thus, they crystallized from melts of various water activity (determining the hornblende/diopside ratio) and of various potassium content (determining the amount of potassium feldspar). Relatively anorthite-rich plagioclase composition and presence of diopside indicate the presence of basic component in the parental melts of the dioritic/syenitic suite. Variations in water activity and potassium content are best explained by adding various amounts of water and potassium to the primary basic melt. This is supposedly due to interaction of basic magma with crustal melts. The interaction (mixing?) was of local character, and the crustal melts may have been

of variable composition, which led to the compositional variability observed in the dioritic/syenitic suite. This model follows the early idea of Puziewicz (1987), who basing on the comparison of the Piława Górna quartz syenite and the Przedborowa monzodiorite suggested that they originated from basic magma contaminated by crustal partial melts of various potassium contents.

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