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**TEXTURAL STUDY OF PERMOCARBONIFEROUS LAVA FLOW AND
LAVA-LIKE IGNIMBRITE FROM BOLKÓW AREA
(KACZAWA MTS, POLAND)**

INTRODUCTION

Extremely welded lava-like ignimbrites are very often lithologically indistinguishable from lava flows. Several studies have examined textural variation and differences between lava flows and lava-like ignimbrites (Branney et al., 1992; Ekner, 1984). Even in Cenozoic volcanic zones, the distinction between different SiO₂-rich volcanic rocks type is not an easy task (Henry, Wolff, 1992; Manley, 1996). In ancient volcanic successions restricted outcrops and alteration increase these difficulties.

Knowledge on the emplacement type (lava flow, pyroclastic flow, subvolcanic intrusion) of SiO₂-rich volcanic rocks may help to reconstruct the volcanic, magmatic, paleogeographic environment and its evolution.

The North Sudetic Basin is the part of the European Variscides. SiO₂-rich, calc-alkaline volcanics formed in tectonically controlled basin in the late Autunian. Permocarboniferous sedimentary rocks and volcanic rocks like lava flows, subvolcanic intrusions, ignimbrites and tuffs occur at the metamorphic basement, which was also the alimentary area for the developing basin (Raczyński et al., 1998). The volcanic rocks occurring in SE part of the North Sudetic Basin near Bolków was named as *Quarzporphyr* by Zimmemann and Haack (1935) and interpreted as a lava flow. Skurzewski (1981) distinguished sequence of five lava flows.

RESULTS

The rhyolite cover very often forms hills in the local topography. The rocks crop out along the hills and are exposed in steep, 6-12 m high cliffs or as small, single rocks (2-5 m high) to the north and northeast of Świny Castle. The volcanic rocks overlie conglomerates and sandstones of alluvial fans, but the contact between volcanic suite and older sedimentary rocks is not observed. Field relations indicate the presence of not only lava flows but also welded ignimbrites (Pańczyk, 2002).

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Typically, the lava flows are flow-banded with autoclastic brecciated surfaces on the top. There were ascertained some contacts between lava flows within exposures, which presumably indicate presence of at least two lava flows. The upper part of lava flow contains vesicles typical for *carapace* lithofacies, what might suggest small volume of erupted lava.

The extremely welded fragments of pumices occurring within ignimbrite profile (*fiammae* - 1-2 cm in length) mimic flow-banded texture. For that reason, it is difficult to distinguish the *carapace* lithofacies of lava flow from ignimbrites in the outcrop.

In both cases (lava flows and ignimbrites), the groundmass commonly reveals micropoikilitic texture with relicts of recrystallized spherulites. However, the distribution of phenocrysts and microlites of ore minerals and feldspars is completely different. The lavas have flow-banded texture which is emphasized by parallel orientation of ore microlites, and concentration of phenocrysts in layers. In the upper level of the lava flow elongated vesicles occur which are filled by quartz, albite and phyllosilicate minerals. Otherwise, the ignimbrite groundmass is chaotic and irregular with lenses of ore minerals, without amygdales. The ignimbrites are welded with preserved *fiammae*. Such textures are not seen in lavas.

Both crystal-poor lavas (7-15 % of phenocrysts) and crystal-rich lava-like ignimbrites (15-25 % of phenocrysts) are characterized by the same mineral paragenesis. Nevertheless, the measurement of MPS (Maximum Particle Size) and microscopic observation of crystals and texture show differences in size, shape and distribution of phenocrysts. First of all, the lava flows are composed of smaller crystals than ignimbrites. In both cases, plagioclases are mostly clustered in aggregates (glomerocrysts), but only in the ignimbrite, plagioclase crystals, enclosed by K-feldspar are found.

CONCLUSION

A very detailed textural analysis of the SiO₂-rich volcanic rocks leads to distinction at least four units (Pańczyk, 2002). Using the criteria mentioned above and proposed for the lithofacies of Cenozoic acid volcanic rocks and also another very subtle features, it was possible to distinguish the following sequence of the Late Paleozoic volcanic rocks near Bolków (Pańczyk, 2002):

- Extremely welded ignimbrites (lava-like ignimbrites) at the basement, overlying conglomerates of the alluvial fan, outcropping near the Świny Castle
- Overlaying lava flows, which are exposed as the small, single rocks at the forest north of Świny Castle
- Welded ignimbrites near Śwarna Hill

- Overlaying lava flows, which preserved in the vent area (Popielowa Hill), to the north of both ignimbrites.

According to limited outcrops, erosion and alteration rate of the rocks, it is not possible to estimate number of eruptions. The presents of only carapace facies and signs of autobreccia at the surface of lava flows indicate small volume of eruption. However, the vent area is only known for lava flows from Popielowa Hill.

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