

Structures, textures and classification of the Devonian metavolcanics – southern part of the Vrbno group (Silesicum, Jeseník Mts., Czech Republic)

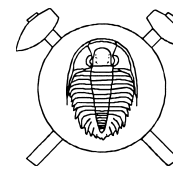
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The Vrbno Group forms a N-S trending belt in the eastern part of the Silesicum composed of Devonian sediments and volcanites deformed and metamorphosed during the Variscan orogeny. Its southern part is exposed between Úsov village in the southwest and Malá Morávka village in the northeast. It is separated into two parts by a block of the pre-Devonian basement near Oskava. The rocks of the Vrbno Group have been metamorphosed under greenschists facies conditions. The metavolcanics with local well preserved volcanic structures are common (except of basal metaclastics) in the whole lithostratigraphic sequence (Pragian? – Famennian).

Pillow lavas, agglomerate tuffs, ignimbrites, dolerites and acid subvolcanic dykes were structurally distinguished within the metamorphosed volcanosedimentary sequence in the southern part of the Vrbno Group. Volcanosedimentary rocks and rocks with strongly developed schistosity are not referred to because of their ambiguous interpretation.

Pillow lavas are exposed near Třemešek village (NW of Oskava) and Václavov brook valley near Václavov village to the west of Oskava (Přichystal 2001). The pillows are ellipsoidal in transverse sections – longer axis is max. 50 cm long, oblong sections are max. 4 m long. They are composed of fine-grained basalt to trachybasalt, showing vesicular structure with circular but mostly ellipsoidal pores in section, 0.X to X cm in size. They are sporadically filled by secondary minerals (small vesicles) – minerals of the Czo-Ep group, and/or carbonates and Fe-oxides and hydroxides. The rocks have porphyritic texture with pilotaxitic texture of the groundmass. Their mineral assemblage is composed by Ab + Ep + Act + Chl ± Ttn ± Cal ± Py. It is possible either to classify them as transitional (sub-alkaline to slightly alkaline) basalts to trachyandesites – by TAS classification (LeMaitre 1989) or as subalkaline basalts to andesites – by Winchester – Floyd (1977).

Agglomerate metatuffs have been documented, for example, at localities close to Nová Ves near Rýmařov and at Police N of Úsov. The rocks are greenish-gray in color. In layered and schistose groundmass they contain fragments, bombs and blocks of massive, porphyritic and/or amygdaloidal volcanites with porphyritic to ophitic texture. More basic rocks are composed of Ab + Chl + Ep ± Py ± Cal mineral association, acid metatuffs of Qtz + Ab + Ms + Ep ± Chl ± Cal ± Py one. The whole rock chemistry varies from slightly alkaline trachybasalts to

trachyandesites to sub-alkaline dacites to rhyolite. According to the classification of Winchester – Floyd (1977) basic rocks are alkaline basalts to trachyandesites, acid rocks lie in the fields of rhyolites and comendites-pantelerites.

Metamorphosed ignimbrites are mainly exposed in a belt between the Rešov waterfalls and Horní Město village and are scattered between Václavov village and Třemešek village. They are usually well foliated. Both markedly elongated fiammé and oval fragments of fine porphyritic rhyolites lie in fine-grained matrix. Their mineral assemblage is composed of Qtz + Ab + Ms + Chl + Kfs ± Rt ± Py. Chemically they correspond to dacites, rhyolites and/or comendites-pantelerites.

Metadolerites are common and structurally very characteristic volcanic rocks. They form sills and dykes in the Devonian volcanosedimentary sequence as well as in metagranitoids of the pre-Devonian basement. They are massive to slightly schistose, fine- to medium-grained. Ophitic texture is often preserved. The original mineral assemblages are completely overprinted by metamorphism. Main rock forming minerals are Ab + Act + Ep + Chl, accessories are represented by Ttn ± Py ± Cal. The studied metadolerites have mostly the composition of sub-alkaline basalts, sporadically basaltic andesites and basaltic trachyandesites according to TAS classification, or sub-alkaline basalts and andesites, according to Winchester – Floyd (1977).

Acid metamorphosed sub-volcanics form dykes exposed in the pre-Devonian metagranites of the Oskava block (i.e. Stančín Hill, in the valley of the Mladoňov Brook, the top of the Mravenečník Hill (W of Oskava) and near Tvrdkov village (NE of Oskava). The rocks are massive, locally strongly foliated, especially near contacts with host metagranites. Small feldspar phenocryst are rare in fine grained matrix (Stančín Hill area). The rock-forming constituents are Qtz + Kfs + Ab + Ms + Py and accessories are Zrn ± Cal ± Bt ± Aln(La-Ce). Most of the rocks belong in composition to rhyolites (TAS) or comendites-pantelerites (Winchester – Floyd 1977). The metavolcanic rock from the Mravenečník Hill is dark grey, slightly foliated rock with preserved relict trachytic texture and Ab + Kfs + Bt mineral assemblage, subordinately Ms ± Py ± Ap ± Zrn are present. The chemical composition of the rock refers to trachydacite to andesite in composition. Taking into consideration the different geochemical features compared to other metarhyolites

and relationships with host metagranites it is possible to assume at least for some acid sub-volcanites their pre-Devonian age and at least two different magmatic sources. We can conclude that the Devonian volcanic activity in the southern part of the Vrbno Group east of the Oskava block is more characteristic by pyroclastics. On the other hand, pillow lavas indicating the presence of submarine volcanism are more characteristic for western part of the studied area. These pieces of knowledge connected to preliminary interpretations of geochemical features of the rocks indicate at least two different volcanic centres in this part of the Vrbno Group.

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References

- Le Maitre, R. W.* (1989): *A Classification of Igneous Rocks and Glossary of Terms*. – Blackwell, 193, Oxford.
- Přichystal, A.* (2001): Devonian pillow lavas from the southern part of the Vrbno Group (Silesicum). – *Geol. výzk. Mor. Slez. v r. 2000*, 50–51, Brno. (In Czech with English abstract.)
- Winchester, J. A. – Floyd, P. A.* (1977): Geochemical discrimination of different magma series and their differentiation products using immobile elements. – *Chem. Geol.*, 20, 325–343, Amsterdam.