

Petrographic features of Middle-Late Triassic volcanic rocks of the Transdanubian Range and their comparison to contemporaneous volcanic rocks of the Southern Alps

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During the early stage of the Alpine plate tectonic cycle, the Transdanubian Range Unit was located close to the area of the Southern Alps; they were situated at the western margin of the Neotethys. Ocean began opening in the Middle Triassic. Our aim is to present and evaluate the petrographic characteristics of the Middle to Late Triassic volcanic rocks of the Transdanubian Range formed in an extensional regime of the ocean margin and compare them to coeval volcanic formations of the Southern Alps formed in similar geodynamic settings.

Andesite (porphyric pilotaxitic texture, with plagioclase and hypersthene, subordinately augite and biotite phenocrysts) is the dominant volcanic rock type in the NE part of the Transdanubian Range (Eastern Bakony – Balatonfő and Buda Hills, which occur as dikes (Buda Hills) and lava flows (Szár Hill). Other volcanic rocks occur only as pebble populations in Eocene basal conglomerates in Buda Hills or Middle-Late Triassic volcanoclastites in the Eastern Bakony and Zsámbék basin. We defined the following rock types: amafitic andesite/microdiorite (consist of two populations of oriented plagioclase and only small abundant glassy groundmass); microdiorite (microphytic texture with large hypersthene, which has plagioclase inclusions in it); trachyte or latite (more primary K-feldspar and less plagioclase phenocrysts with microphenocrysts of augite and biotite); basalt (vesicular texture with pseudomorph after plagioclase, pyroxene and olivine phenocrysts); microdolerite (intergranular texture with pseudomorph after xenomorphic mafic minerals and plagioclase); aplite (microholocrystalline and micropoikilite texture with well-crystallized groundmass; quartz, K-feldspar and biotite crystals); rhyolite (dark and light flow banding and has poorly-developed micropoikilite texture with quartz, K-feldspar and biotite crystals); rhyolite tuff (ignimbrite texture with plagioclase, K-feldspar and biotite as well as lithic fragments - andesite, rhyolite, sandstone, siltstone - in a glassy groundmass); dacite/rhyolite tuff (juvenile glass shards and pumice as well as pseudomorphs after feldspar, subordinate quartz, pseudomorphs after pyroxene and biotite). The rocks are strongly altered by K-metasomatism. For this reason we can define in most cases andesite as K-trachyte, microdiorite as K-syenite.

We may compare the petrographic features of the volcanic rocks of the NE part of the Transdanubian Range to the volcanic complex of Predazzo and dyke rocks of Latemar, Western Dolomites. The most important similarity is the presence of basalt, andesite, trachyte, latite and rhyolite lava rocks, as well as dolerite/gabbro, diorite and aplite dyke rocks in both regions. However, the volcanic rocks in Predazzo and Latemar are more varied and extended than in the Transdanubian Range. Some rock types do not occur in the Transdanubian region, for example basanite, monzonite, pyroxenite, nefelin-sodalite-syenite, granite and pegmatite.

We can conclude that there is a definite similarity in the petrographic characteristics of the Middle to Late Triassic volcanic rocks of the two areas, but further comparative geochemical and geochronological studies are needed for a comprehensive evaluation of the similarities and differences and for better understanding the history of the volcanic activity.