

Basic features of the Cerová vrchovina Upland geology

Since 1989, the major part of the Cerová vrchovina Upland has got a status of a protected landscape area (The PLA Cerová vrchovina). Especially the young volcanic landscape (relief) gives the Cerová vrchovina Upland its special character.

The Cerová vrchovina Upland is built up by sandstones, its hill peaks and elongated ridges are formed by volcanic rocks especially basalts, in surrounding of Šiatorská Bukovinka also by andesites.

Occurrence of marine sediments indicates that at the end of Paleogene and at the beginning of Neogene (Kiscelian, Egerian), southern Slovakia was covered by the sea. The oldest marine sediments - limy siltstones of the Číž and Lučenec Formations, were formed in the Buda marine basin, which encroached upon actual northern margin of the Lučenec and Rimavská kotlina Depressions from Northern Hungary. Later on, during early stages of the Miocene (Eggenburgian), sea regressed to give way to a new transgression, which enabled formation of the Filákov/Péteřvására Basin. However, only littoral sediments of the Filákov Formation have been spared from erosion.

Having had a shape of a bay opened towards the north and northeast, the basin was accessed by tidal waves, which progressed along the western side of the basin, causing sedimentation of the Lipovany Sandstone with abundant thick-walled lamellibranch shells and scarce occurrence of the ripple cross-lamination. The ebb currents, strongly amplified due to growing tidal intensity and proceeding along the eastern margin off the bay, had been able to form coarse sand dunes high as much as several meters. By this way the Jalová Sandstone, with impressive series of coarse cross-bedding and with broad bed washouts at their bases, was formed. Meanwhile, in deeper parts of the bay and out of an immediate influence of tidal currents, the Tachty Sandstone was formed. It differs from the Jalová Sandstone by finer sandstone and by the absence of high-energy cross-bedding. In the Jalová Sandstone as well as in the Tachty Sandstone only scarce shells of marine molluscs can be found. This could be caused by a strong current activity in the former case and probably by a salinity fluctuation eliminating life of molluscs in the later case. At a greater distance from the shore, in deeper waters, the Čakanovce Member was formed. It is composed of silt and silty clay with abundant thin-walled shells of marine molluscs, indicating more deep- sea and calm environment with the normal marine salinity.

Still during the Eggenburgian stage, the Cerová vrchovina Upland and its broader surroundings (i.e. the whole present Pannonian Basin) began to rise. The Filákov/Péteřvására Basin disappeared and its sediments appeared on land exposed to erosion. River courses dissected the area and deposited their alluvial sediments in numerous places of the Cerová vrchovina Upland. They include gravels, sands and variegated clays of the Bukovinka Formation (the Late Eggenburgian). Later on, during the Ottnangian, when the area was extensively peneplained, the rivers deposited only sandy sediments. Swamp and bogs evolved in the alluvial plains and temporary coal sedimentation took place. Consequently two or locally three coal seams, found amidst sands of the Pôtor Member, were formed. Fluvial sedimentation was replaced by the sedimentation in a calm lake, where the monotonous Plachtince Clay deposited. The Pôtor Member and the Plachtince Clay are gathered in the Šalgôtarjân Formation of the Ottnangian age. The proximity of transgressing sea was demonstrated by local marine incursions into swamps and later into the lake what is proved by intercalations, containing marine fauna, which suddenly appear in otherwise fossil- free sand and clay of the Šalgôtarjân Formation. The sea most

likely entered an area of the Cerová vrchovina Upland at the end of Early Miocene, during the Karpatian stage, but later a long lasting uplift of this area caused an erosional denudation and marine sediments were removed.

During the Middle Miocene Badenian stage, i.e. some 16 Ma ago, the andesite magma intruded sandstones of the Fiľakovo Formation, giving the way to formation of laccolith bodies and veins of the andesite with garnet. As magma cooled down below the surface, its thermal effect altered surrounding sandstones. Having been more resistant to the erosion, andesites now built the highest peaks of the Cerová vrchovina Upland - the Šiator and the Karanč Hills.

During the process of its formation, drainage system respected the andesitic outliers and streams carving the valleys, avoided them. The basaltic volcanic activity, which started in the Cerová vrchovina Upland during the Pliocene stage, produced a variety of volcanic forms (the Cerová Basalt Formation). On surface the explosive forms as the scoria cones and maars were formed. At the foot of scoria cones, large lava covers (plateaus) originated, formed by numerous lava flows. Some of the lava flows moved farther from the scoria cones, following paleovalleys of drainage system. Processes forming maars and some of the scoria cones had a character of freatic explosions (water vapour explosions) during the initial period, later they were replaced by the freato-magmatic eruptions (lapilli tuffs eruption). During the final period of this development, volcanic bomb eruptions (the Strombolian type) frequently prevailed; alternatively also the Hawaiian eruption type in form of lava fountains occurred. After the end of volcanic activity, the subsurface feeding channels were preserved in form of erosional remnants like lava necks, dikes and diatremes. Petrographic type of the basalt volcanism products comprises basanites (basalt without foids, but often with phenocrysts of yellow-green olivine). In the course of this volcanic activity a vault uplift of the Cerová vrchovina Upland took place. Selective erosion gave a way to the relief inversion; the basalt lava flows, which originally filled paleovalleys, now form tops of elongated ridges of the Cerová vrchovina Upland. Basaltic volcanism of the Cerová vrchovina Upland lasted from the beginning of Pliocene (approx. 5 Ma) till the Early Pleistocene (approx. 1.2 Ma).