

clays. The flysch sandstones with pebbles of quartz, dark chertstone, and quartzite are a predominant lithology, while the limestone pebbles, the Upper Cretaceous conglomerates and granitoids are of scarce occurrence. The size of pebbles is variable. Although the majority of them have the diameter ranging from 5 to 10 cm, those found in the coarse grained beds may be up to 30 cm across. Thin beds of variegated, green, yellow-brown and red-mottled clays are also present.

Limy clay/claystone is a predominant lithotype of the Holíč Formation. Its color is grey, it is sandy and contains lenses of sand. Apart from pelites, the basal part of the formation may also contain sands and/or friable sandstones, or sands alternating with clays. Compressive and pull-apart structures (in which the sand beds became subject to desintegration) and syndimentary slump structures have been observed at places, where sands alternate with clays.

The Sarmatian sediments have been deposited within a deltaic, pro-deltaic or basinal realm.

Pannonian

As a result of progressive freshening of the Paleotethys, the Vienna Basin has been transformed into a semi-brackish bay of the Pannonian Basin. The Pannonian sediments are exposed west of the Kovalov fault. They fill-in the Kópčany trough and their occurrences have been found northwards and northwestwards, as far as the Hradište trench, however, their outcrops have only been found in the surroundings of Štefanov, Smolinské and between Gbely and Petrova Ves villages. Their thickness is greatest within the Kúty trench (some 600 m).

Fossilized fauna finds indicate that the lowermost part of the Pannonian sediments represents the A zone, composed predominantly of riverine deltaic sands, or of limy clays in case that they were deposited under basinal facies conditions. Limy clays predominate in the B zone. The C zone is represented by clays and sands, whereas the D zone is chiefly pelitic, with green clays and silts with sandy intercalations.

The E zone (Upper Pannonian), referred to as the Záhorská Formation, is composed of grey clays, with an unevenly distributed sandy admixture. Alternations of fine-grained sands and clays are characteristic in the upper parts of the formation.

Pontian

The process of degradation of the Vienna Basin during the Pontian stage has resulted in a turnover to lacustrine-fluvial sedimentation, an indication that the drying out of the basin have drawn to its close. Most of the sedimentation has taken place in the Kúty trough. The Pontian sediments are recently assigned to the Čáry Formation, with the maximum thickness of 190 m. They crop out in the upthrown block, along the Moravský Ján fault, north of Čáry and west of Smolinské villages.

Basal part of the formation is composed of the Sekule beds, which include grey clays, sandy clays with coalified vegetal vestiges and fine-grained to aleuritic sands with lignite seams in the underlier.

The middle part of the formation is made of Dubňany coal-bearing beds. They are composed of alternating lignite seams with clayey and sandy intercalations.

Upper part of the Čáry Formation is represented by the Moravský Ján beds. These are composed, from the base upwards, of fine-grained muscovitic sands, grey clays and sandy clays with coalified vegetal vestiges.

Dacian

Most of the Vienna Basin area has been a dry land during the Dacian stage and the sedimentation has taken place only in the areas with declining subsidence and under lacustrine and/or fluvial conditions. The Dacian sediments, preserved in the Kúty trough (with a thickness of some 100 m), have been assigned to the Gbely Formation. They crop out in the surroundings of the Kúty township and are composed of variegated, green, brown and mottled clays with lenses of yellow and greenish sands. Basal parts contain darker clays with a faint coaly pigmentation.

Rumanian

It is represented by the sediments assigned to the Brodské Formation. They occur in the western portion of the Kúty trough, west of the Kúty fault, but do not crop out at the surface. They are limited to the north by the Farské fault. These sediments are represented by gravels, sands and clays and include irregular lignite lenses. The area of the map sheet has a continuous Quaternary cover, composed predominantly of proluvial and aeolian sediments.

Lower Pleistocene

Beginning of the Lower Pleistocene stage was marked by an intense weathering, followed by piling up of thick deposits of eluvial-deluvial cover. It is during this time that the Kúty depression became filled with gravels and sands, transported in

by local streams. However, no Morava River sediments of Lower Pleistocene age have been observed in the Kúty depression.

Middle Pleistocene

Periglacial character of the area during the Middle Pleistocene times has played an important role for both, the formation and the development of proluviums. Proluvial sediments are found in various forms and positions, the most common being the relics of original, vast, taper-shaped accumulations and smaller fan-like alluvial cones.

Morava River was the main supplier of the fluvial sediments, whereas the Teplica, Myjava and Chvojnicca Rivers provided but subordinate volumes. The Morava River sediments first appeared in the mapped area during the Middle Pleistocene (Mindelian), following an incursion of the Morava River through the Napajedla Gate during the Drahanská neo-tectonic phase (ZEMAN 1973). This conclusion has been drawn on the basis of petrographic researches, focused mostly on the heavy minerals. According to the analytical results garnet prevails over staurolite in most Southern Moravian and Western Slovakian alluviums. However, the ratio of the two minerals is in Mindelian sediments approximately equal, or has a reverse relation (MINARIKOVÁ 1991). This agrees with the main geologic-tectonic and paleogeographic changes along the whole Morava River course, which have taken place during Quaternary times. Fluvial sediments have been preserved in terraces as well as in the Kúty trough.

Traces of the Middle Pleistocene aeolian sedimentation, represented by accumulations of loess and aeolian sands, have also been observed.

Upper Pleistocene

As a result of an intense aeolian activity, masses of loess and sand, which cover vast areas of the map sheet, have accumulated during the Upper Pleistocene times. In granulometric terms, the loess is composed predominantly (75 to 95 %) of particles measuring less than 0.06 mm in diameter. The amount of finer, silty fraction ranges from 50 to 70 %. The clayey fraction occurs in the amounts ranging from 15 to 28 %, whereas the sandy fraction, amounting from 15 to 25 %, occurs in but subordinate amounts, when compared to the former two fractions.

The occurrence of loess, rich in Molluscan fauna, is indicative of predominantly open and tree-less country environment, while the steppe and medium moist biotope has been less widespread. The faunistic community in the loess is characteristic for the latest glaciation (Wurmian stadial 3). The loess has accumulated under cold climatic conditions, possibly with few warmer episodes. Findings of borealpine assemblages, such as *Pupilla loessicata* LZK. and *Pupilla muscorum densigrata* (KERNÁTSOVÁ 1991) also indicate cold climatic conditions.

Blown out from the Morava River fluvial sediments, the aeolian sands blanketed western and southern parts of the area mapped. Their aeolian origin has been assessed on the basis of internal sorting coefficient (0.57) and internal skewness coefficient (-0.01). The grains of sandy component are semioval, subangular and semiangular, indicating a short aeolian transport.

The fluvial activity, marked by a deposition of sands and gravels, has taken place mainly in the Morava, Chvojnicca, Teplica and Myjava rivers/creeks. Intense proluvial - fluvial activity has been followed by a formation of fan-shaped cones in the lower course of the Chvojnicca and Sudoměřický potok creeks. Meanwhile, the intensity of proluvial processes has slowed down.

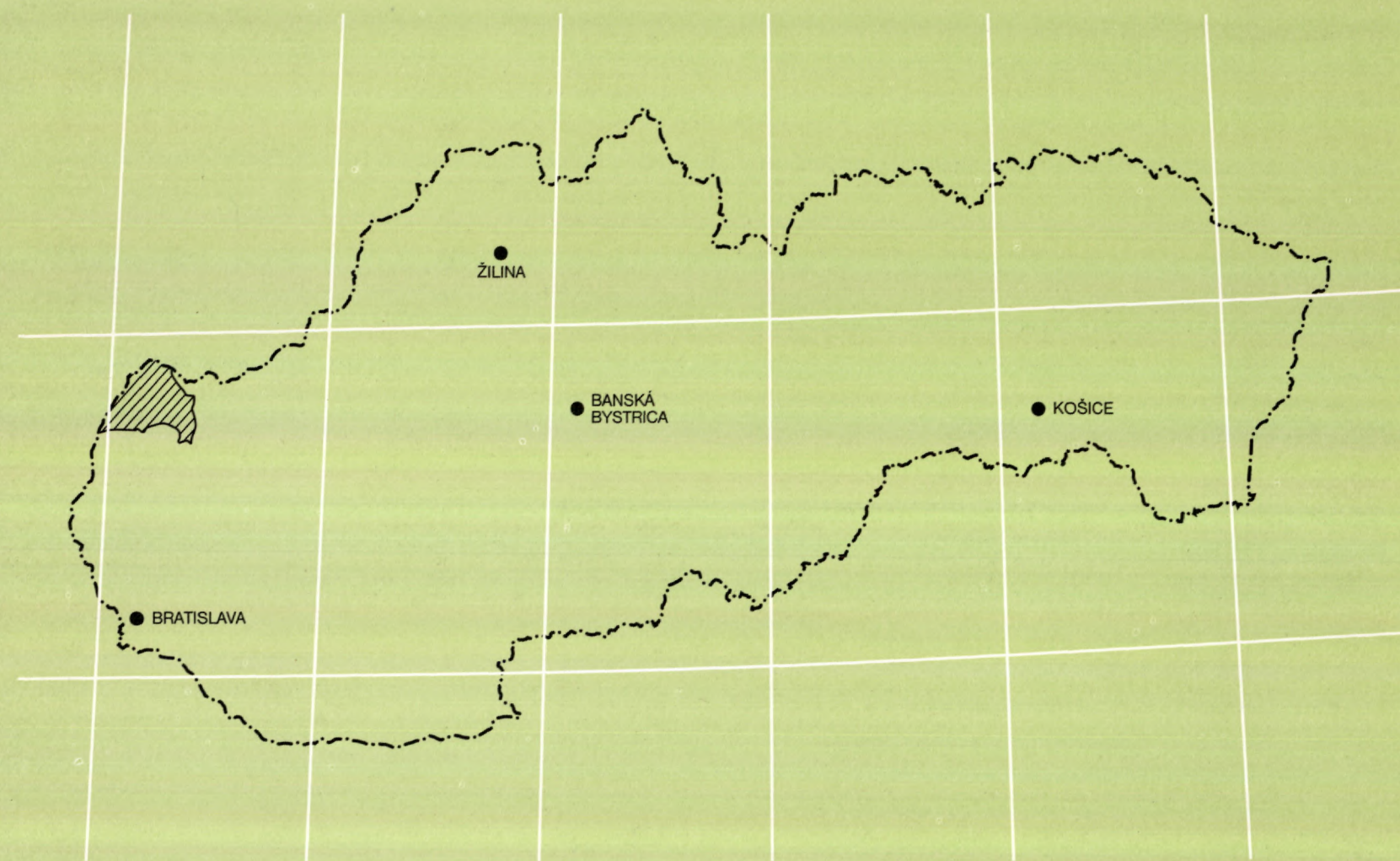
Postglacial

The development of alluvial plains with loamy, sandy and clayey-loamy fillings and the youngest inundation slimes has continued during the Holocene epoch. The deposition of aeolian sands has died out during the Lower Holocene.

TECTONICS

The basement of Neogene molasse sediments is characterized by an Alpine nappe structure, with unit being thrust over each other.

The area is disturbed by faults, initiated during the Upper Pliocene and propagated during the Pleistocene through to Holocene stages. Some of those faults, immobilized during Pre-Quaternary times, have been revived during Quaternary. The positive movements, best developed in the Hrebeň-Šibenica, Veterník, Zámčisko structures, have been active during Quaternary, while the negative ones are developed in the Kúty and Skalica-Vradište depressions.



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REGIONÁLNE GEOLOGICKÉ MAPY SLOVENSKA

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VLADIMÍR BAŇACKÝ - 1996

GEOLOGICKÁ MAPA CHVOJNICKEJ PAHORKATINY A SEVERNEJ ČASTI BORSKEJ NÍŽINY

GEOLOGICAL MAP OF THE CHVOJNICKÁ
PAHORKATINA UPLAND AND NORTHERN
PART OF THE BORSKÁ NÍŽINA LOWLAND

GEOLOGICKÁ SLUŽBA SLOVENSKEJ REPUBLIKY - BRATISLAVA

