Uppermost Miocene to Quaternary accumulation history at the Danube Basin eastern flanks (preliminary results)

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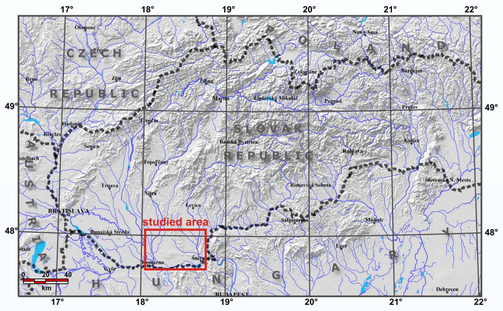
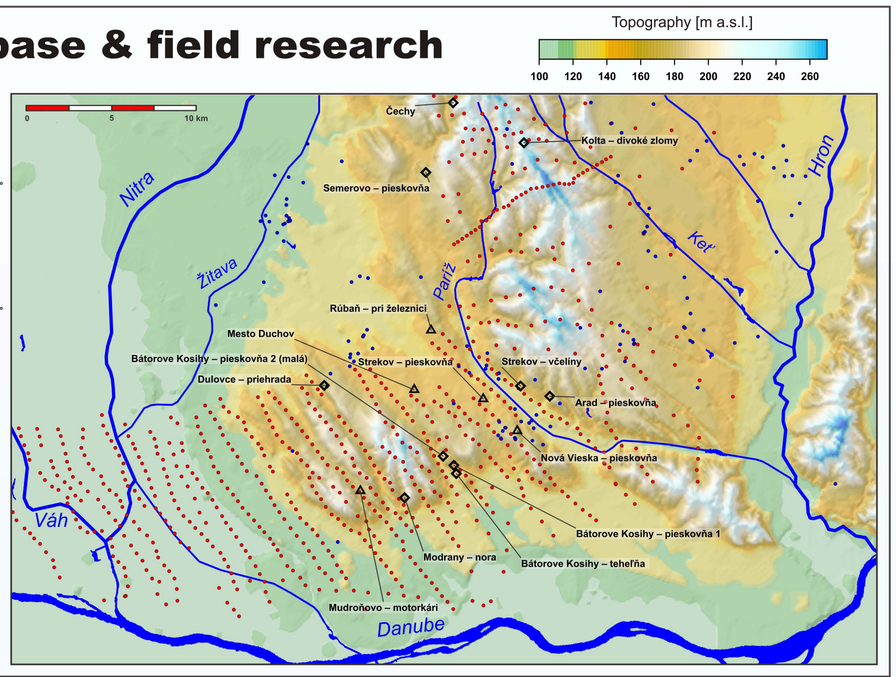
1. Studied area - database & field research



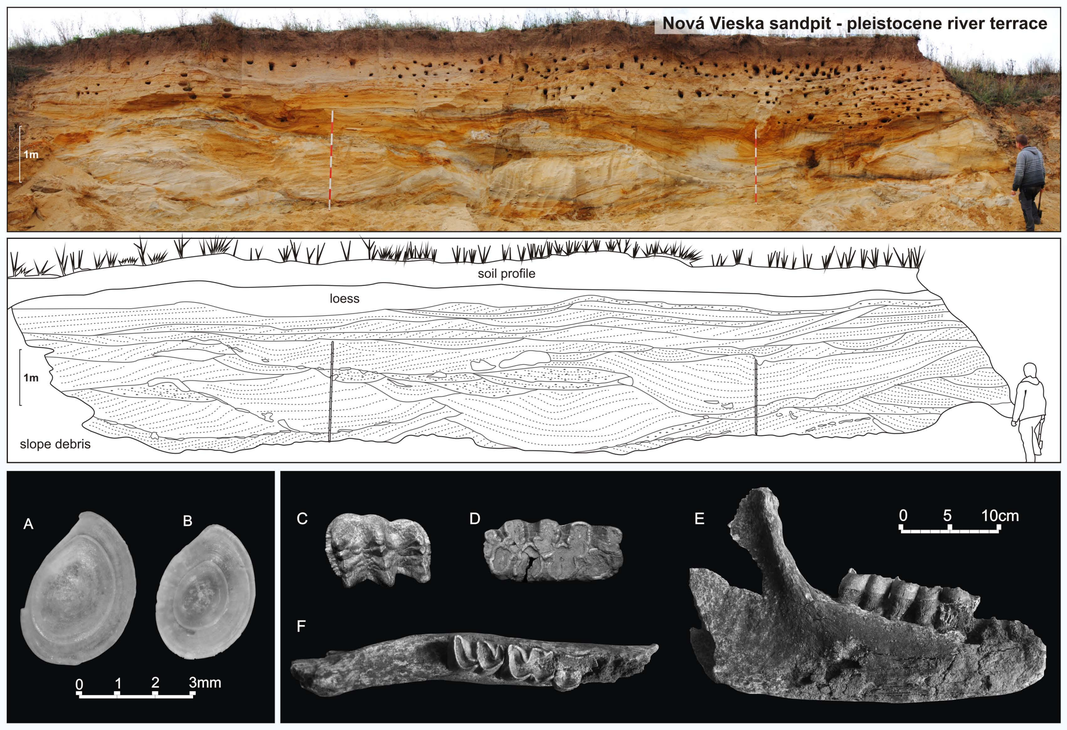


Localities of the field research

- outcrop with occurence of the Volkovce Fm. (Upper Pannonian - Pliocene)
- outcrop with occurence of Pleistocene river channel sediments.

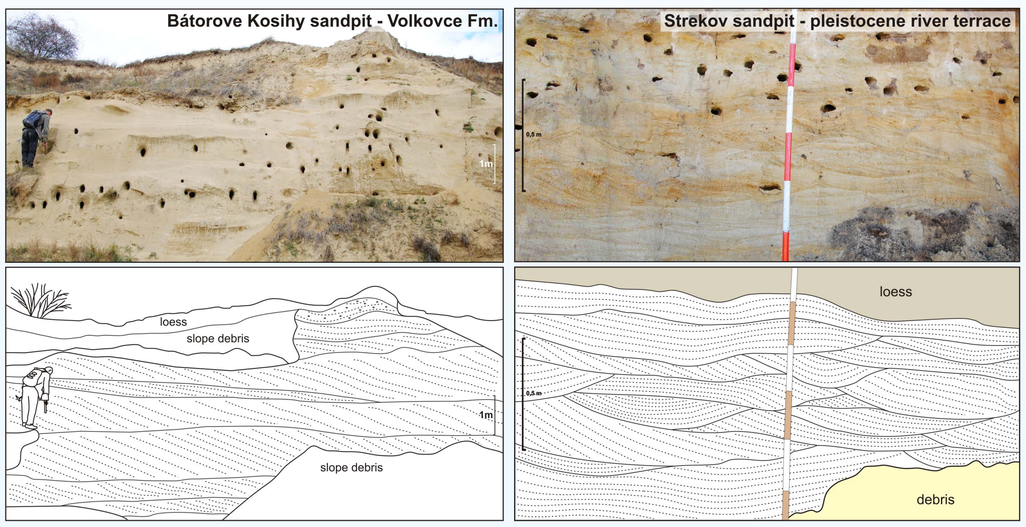
Boreholes used by lithological correlation

- counter-flush borehole with total depth around 300 m (777 boreholes)
- hydrogeological or engineering-geological borehole with total depth from 15 to 200 m (141 boreholes)



A,B: *Bithynia tentaculata* (operculum), locality Strekov - včelíny; C: *"Mammut" borsoni* m1 sin., locality Nová Vieska;
D: *Anancus arvernensis* m2 dext., locality Nová Vieska; E,F: *Stephanorhinus jeanvireti* dext., mandibula.; locality Nová Vieska.

2. Sedimentology & biostratigraphy

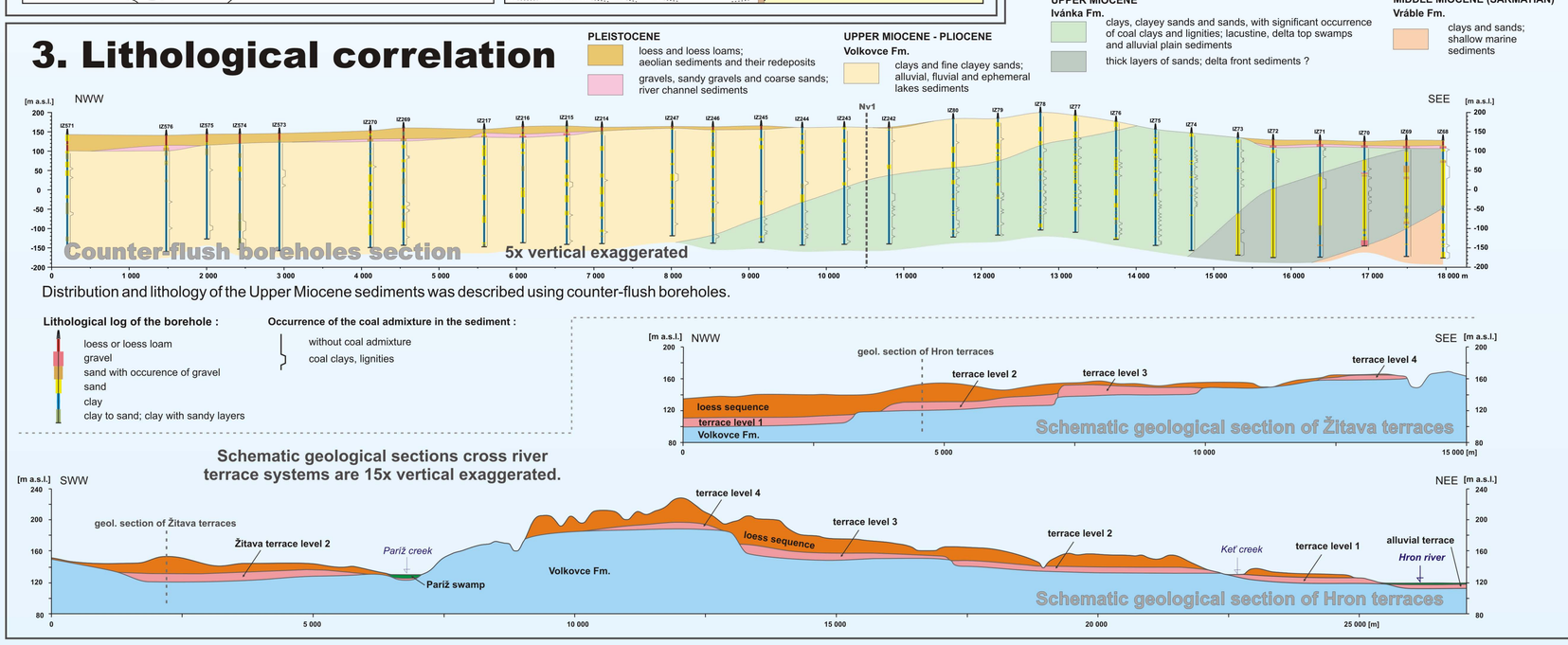


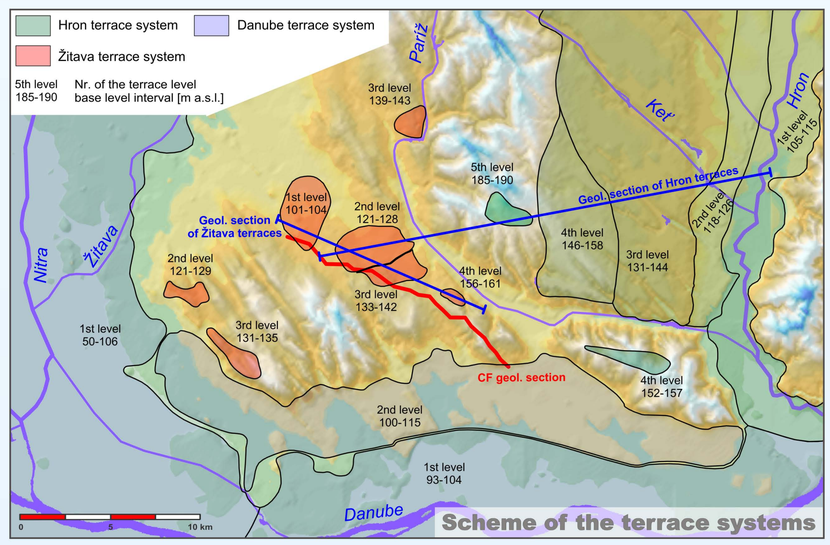
Preliminary results of geological research in the eastern part of the Danube Basin are presented in this study. Geological mapping and sedimentological analysis of outcrops in the southern part of the Hronská pahorkatina upland were done. At selected localities, mammal and mollusck fauna was used to specify age and sedimentary paleoenvironment. The analysis was additionally supported by 918 lithological well logs, which have been correlated and evaluated during this study. Based on obtained data, the hypothesis of accumulation history from Uppermost Miocene to Pleistocene was formulated.

Surface occurrences of two main types of sedimentary formations were documented. The first type consists mainly of fine sands (**Bátorove Kosihy sandpit**) with large planar cross stratification (Sp and Sl facies). Trough cross stratification (St) of wide shallow channels is less frequent. In well logs, lateral lithological changes form fine sands to clays are obvious (see Counter-flush boreholes section). Mollusc fauna found in boreholes (Lunga, 1965) together with newly found opercula of *Bithynia tentaculata* (Strekov - včelíny locality) indicates an environment of ephemeral lakes on alluvial plain of a slowly flowing river. These sediments, earlier known as "pontian sands", can be correlated with **Volkovce Fm**. that was deposited on prograding upper to lower delta plain to delta front and alluvial plain in time span: 8.9-4.1? Ma (Kováč et al., 2011).

Overlying sediments, which are divided from Volkovce Fm. by an erosive contact, are correlated with terminal part of the **Kolárovo Fm.** 4.1-2.6? Ma (Kováč et al., 2011). Sedimentary body can be characterised by planar and trough cross stratification (St, Sp) of coarse sands and fine gravels (**Nová Vieska sandpit, Strekov sandpit**). Occurrence of angular sand grains indicates short transport from source area. Outcrops in Nová Vieska and Strekov are also well known for abundat fossils of mammal megafauna with characteristic taxa including:*"Mammut" borsoni, Anancus arvernensis, Mammuthus meridionalis, Stephanorhinus jeanvireti, Stephanorhinus etruscus, Hipparion* ex gr. *crassum*, *Sus strozzii, Metacervoceros rhenanus*; these taxa indicate the Upper Pliocene / Lowermost Pleistocene age (Middle Villafranchian biozones MN16b or MN16b/MN17a). Nevertheless, the fossil material also includes taxa like: *Dihoplus* cf. *megarhinus*, *Hipparion* ex gr. *crassum* and *Castor* ?*praefiber* that in contrast indicate the MN15 biozone. This leads to an assumption that fossils were derived from different stratigraphic levels, mixed during transport and deposited together in the river terraces (Vlačiky et al. 2008).

3. Lithological correlation





Main attention was focused on the upper part of the basin fill (Pliocene-Pleistocene sediments). Using the correlation of lithological borehole profiles 15 river terraces with different base level altitude were identified. By the scope and layout of terraces and thickness of the overlying loess sequences, river terraces were arranged in three catchments of the paleo-Hron, paleo-Žitava and paleo-Danube rivers. Žitava terraces are errosive remnants of probably more extensive terrace system.

4. Evolution of the sedimentary environment

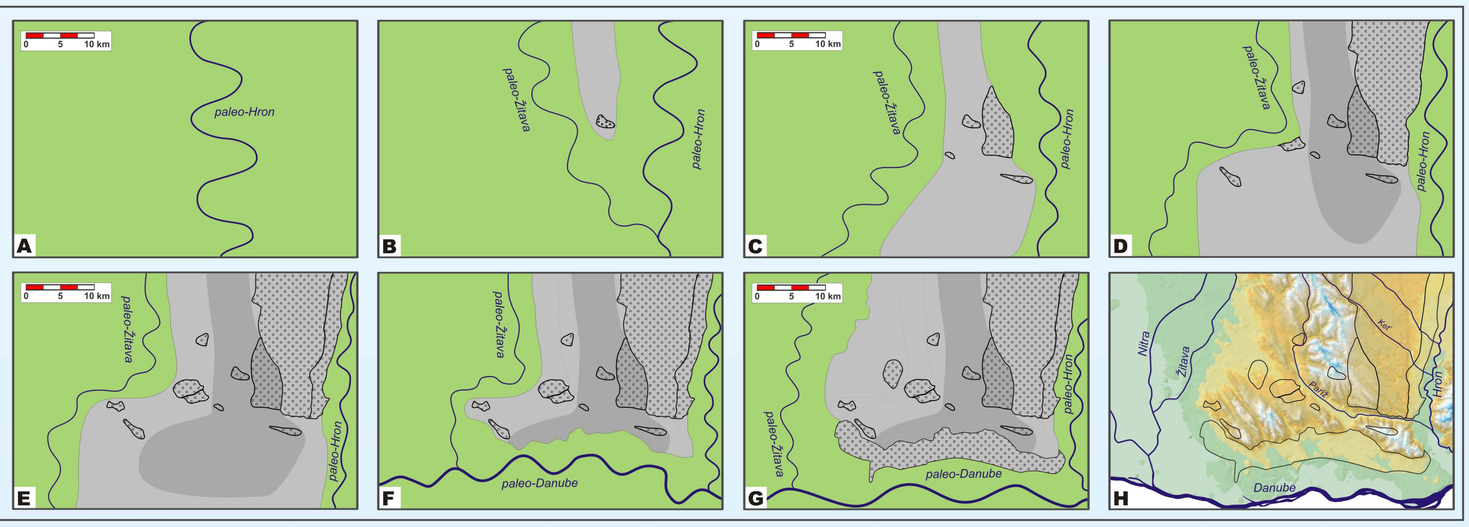
The layout of described river terraces allows us to formulate hypothesis about the evolution of the area. Sedimentary record begins with the oldest terrace in the highest postion (5th level, 185-190 m a.s.l.), which was included in the Hron terrace system. Because the terrace is in higher position than Nová Vieska terrace (4th level of Žitava terraces), this terrace represent erosive remnant of the River level planation surface formed in Pliocene (Minár et al., 2011) (**stage A**).

Next evolution phase (**B**) was affected by initial uplift and separation of paleo-Hron and paleo-Žitava river catchments. In this phase were deposited sediments of Nová Vieska terrace, which was dated to the lowermost Pleistocene (based on mammal megafauna, Vlačiky et al., 2008).

The following gradual forming of Hron terraces continued eastward, while Žitava terraces were formed in northwest direction (**C, D, E**). This fact lead to assumption, that southern part of the area was elevated, what can be documented by the dip of the Upper Miocene sediments (see CF geological section). Deposition of three Žitava and three Hron terraces took place during the time span of Lowermost Pleistocene - Middle Pleistocene.

The next evolution phase (**F**) was strongly affected by the lateral erosion of paleo-Danube river, incised in the Danube Bend (Dunakanyar) during the Middle to Upper Pleistocene (Ruszkiczay-Rüdiger et al., 2005). Danube terraces were deposited on the Lower Pannonian to Middle Miocene sediments, which indicates decreasing of the uplift and more significant incision of the rivers during the last phase (**G**) to the present shape (**H**).

Succesion of the terrace forming is supported by the loess cower thickness. The tickest loess sequence is situated above the 5th terrace level and was dated to Donau-Wurm time span (Harčár & Schmidt, 1975). Presented hypothesis builds on data published by Harčár (1975).



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6. Acknowledgement

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