

## The Slovenj Gradec Miocene basin: palaeogeography and reflection on the Pohorje tectonic block unroofing

Mirka Trajanova<sup>1</sup>, Kristina Ivančič<sup>1</sup>, Stjepan Ćorić<sup>2</sup>

<sup>1</sup> Geological Survey of Slovenia, Dimičeva ulica 14, SI-1000 Ljubljana, Slovenia; e-mail: mirka.trajanova@geo-zs.si

<sup>2</sup> Geologische Bundesanstalt, Neulinggasse 38, 1030 Wien, Austria; e-mail: Stjepan.Coric@geologie.ac.at

The Pohorje tectonic block (PTB) in northern Slovenia was a subject of investigations in the frame of several projects. Gathered data comprise structural, petrographic, radiometric, palaeomagnetic, and geochemical studies. In recent years, new evidence of its unroofing was obtained on the basis of the Slovenj Gradec sedimentary basin (SGB) evolution (Ivančič *et al.*, 2017). The focus of this study is the basins' Miocene palaeogeographic evolution obtained through provenance of the sedimentary rocks, their tectonic setting, and sequence stratigraphy. The work is based on mapping, section recording, nannoplankton biostratigraphy, petrography, and tectonic evolution of the wider area of PTB (Trajanova, 2013).

The SGB evolved at the margin of the Pannonian Basin System (PBS) in connection with global third-order cycles. Sedimentation started in terrestrial environment at the transition of the Ottnangian to the Karpatian and terminated in the late early Badenian. During this period, three transgressive-regressive cycles can be traced, corresponding to the TB 2.2, TB 2.3 and TB 2.4 cycles. The sediments reflect proximity of the hinterland and evolution from fluvial/limnic via transitional to marine environment in advanced stages of transgressions. At the highstand system tract in the early Badenian, the sea flooded the entire SGB and obtained connection with the Mediterranean. At the end of early Badenian, the SGB connection with the Central Paratethys was closed. Deposition terminated with fresh-water coal, marking basins' dying-out. After the late early Badenian, the area of SGB was exposed to compressional deformations and erosion.

Structures of the SGB sedimentary fill show east- to south-eastward deepening of the basin, excluding sediment delivery from this area. The material originated mostly from its north-western to south-western hinterlands. Lithological composition of the basin fill without indicative granodiorite clasts opposes erosion of the PTB. This is in accordance with the apatite fission track ages, which are as low as 10 Ma for the eastern Pohorje (Sachsenhofer *et al.*, 1998), and indicate that PTB was exposed to erosion after the early Badenian. The results suggest that PTB granodiorite was not subjected to erosion in the Karpatian as argued earlier.

**Acknowledgements.** The Slovenian Research Agency (ARRS) in the frame of the P1-0025, P1-0020, and Young Researchers Programmes, and the GBA International Cooperation Programmes funded the research work.

### REFERENCES

- Ivančič, K., Trajanova, M., Skaberne, D., Šmuc, A. 2017. Provenance of the Miocene Slovenj Gradec Basin sedimentary fill, Western Central Paratethys. *Sedimentary Geology*, doi:10.1016/j.sedgeo.2017.11.002
- Sachsenhofer, R.F., Dunkl, I., Hasenhüttl, C., Jelen, B. 1998. Miocene thermal history of the southwestern margin of the Styrian Basin: vitrinite reflectance and fission-track data from the Pohorje/Kozjak area (Slovenia). *Tectonophysics* 297, 17–29.
- Trajanova, M. 2013. *Age of the Pohorje Mountains magmatism; new view on the origin of the Pohorje tectonic block*. PhD thesis. Ljubljana University, 182 pp. (unpublished).