



## Karst processes in Latvia

Peteris Dzerins, Sandra Karusa, and Janis Karuss

University of Latvia, Riga, Latvia (peteris.dzerins@gmail.com)

Karst is defined by (Jennings 1985) as “terrain with distinctive landforms and drainage arising from greater rock solubility in natural water than is found elsewhere”. In Latvia, depending on the soluble rock, two types of karst processes are distinguished – carbonate karst (in dolomites and limestone) and sulphate karst (in gypsum) (Kalvans 2018).

This study is a compilation of karst process research in Latvia since 1903 and focuses on karst feature distribution and methodology used for karst exploration in territory of Latvia. For this purpose historical data regarding karst processes in Latvia were gathered, evaluated and compiled.

In the geological section of Latvia karst rocks occur in the Upper Devonian and Permian sediments. Dolomite is the most abundant karst rock in Latvia, found in a number of Upper Devonian formations. Gypsum is mainly limited to the Salaspils formation of Upper Devonian, but limestone is more typical for the Upper Permian formations (Delina et al. 2012). Geographically karst processes are observed in unevenly distributed areas, with the most widespread distribution in central and southern part of Latvia. In Latvia karst processes are caused by infiltration of meteoric water, therefore it is most abundant in areas with no or thin Quaternary cover (Kalvans 2018).

In some areas surface features of karst processes such as sinkholes, karst shafts, land subsidence, lakes and dolines are present (Paukstys, Narbutas 1996). The maximum density of sinkholes in Latvia is 138 per km<sup>2</sup>. The greatest average density of karst features is in Skaistkalne vicinity with 13 sinkholes per km<sup>2</sup> (Tracevska 1988). This region is located in southern part of Latvia (on the border with Lithuania) and it is part of the Gypsum Karst Region of the Baltic States that continues south and is well pronounced in territory of Lithuania. It is also thought to be the only territory in Latvia where karst processes have developed without human interference. Other areas have been strongly influenced by technogenic processes which caused groundwater level disturbances (Tracevska 1988)

### Acknowledgements

This work was financially supported by performance-based funding of University of Latvia within the “Climate change and sustainable use of natural resources”

### Bibliography

- Delina, A., Babre, A., Popovs, K., Sennikovs, J., Grinberga, B. Effects of karst processes on surface water and groundwater hydrology at Skaistkalne Vicinity, Latvia. *Hydrology Research*, 2012: 43 (4). 445-459.
- Jennings, J. N. *Karst Geomorphology*. Oxford-New York: Blackwell, 1985.
- Kalvans, A. Karst and suffosion formations. Book: Nikodemus, O., Klavins, M., Krisjane, Z., Zelcs, V. (editors). *Latvia. Land, nature, nation, country*. Riga: UL academic publisher, 146-150, 2018.
- Paukstys, Bernardas and Narbutas, Vytautas. Gypsum karst of the Baltic Republics. *International Journal of Speleology*, 1996: 25: 279-284.
- Tracevska, L. Explanatory text of Latvia PSR 1:2 500 000 exogenic processes development map. Complex hydro-geological and engineering geological group report for 1987.-1988. research results. Riga: Geology Department, 1988.