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Neogene and Quaternary development of the Western Carpathian lithosphere: impact on georelief and geohazards

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Some essential features of the Western Carpathian (and adjacent regions) lithosphere and land surface were created simultaneously in the Neogene and Quaternary. Synthesis of published as well as new geophysical, sedimentological, thermochronological and geomorphological data provide following results:
Our newest morphostructural division and modelling of the crustal thickness fit together very well. Newly identified distinct core root under central part of the Western Carpatians explains rise of the annular morphostructural regions. Despite of variant possible reasons of creation of the isostatic disequilibrium, coupled morphological features suggest neotectonic (post Miocene) age.
Re-evaluation of geophysical and geological data from the northern Danube Basin and Turiec Basin, together with new field-work and laboratory results formed the ground-work for a new determination of particular sedimentary facies and their changes in time and space. The results enable a better correlation of depositional and denudational history including formation of the system of planation surfaces.
Apatite fission track data reflects mainly older Alpine orogenetic phases. However, the last uplift connected with the rise of modern topography is reflected by newest low-temperature termochronology data from the central part of the Western Carpathians. They specify the last stages of exhumation in the Pliocene and Pleistocene and define maximum age of preserved remnants of planation surfaces. A cosmogenic nuclide dating of deglaciation of the highest mountain (Tatras) suggests their quick Quaternary uplift, too.
The Neogene and Quaternary development of the Western Carpathians projects onto distribution and intensity of recent geodynamic processes and subsequently natural hazards and risks. As an example the Quaternary development of the northernmost part of the Danubian Basin is presented (including changes of tectonic regime and river network as well as estimation of the erosion and deposition budged). Finally, an explanation of distribution of synthetic hazardous regions of the Western Carpathians in terms of their Neogene and Quaternary development is presented.

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