

## **Tectono-thermal evolution of the Veporic Unit in the Western Carpathians (Slovakia): evidence from geochronological data**

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The Western Carpathians are the north-eastern most part of the Alpine orogenic belt in Central Europe. The Carpathians share a Variscan and Alpine tectono-metamorphic history that is in the Tatric, Veporic, and Gemeric units. The Veporic Unit, the central unit of these three major south dipping, thick-skinned basement/cover imbricates, overrides the Tatric-Fatric units in the north-west along the Čertovica thrust. It is overthrust by the Gemeric Unit that is tectonically overlain by a Jurassic subduction-accretionary complex emplaced during the closure of the Meliata Ocean and by the Hronic and Silicic superficial nappes. Tectono-thermal evolution of the central portion of Veporic Unit (Western Carpathians) was revealed by multiple geochronological methods, such as <sup>87</sup>Rb/<sup>86</sup>Sr on muscovite and biotite, zircon and apatite fission track, and apatite (U-Th/He) analysis. Based on the newly obtained geochronological data, several Alpine tectono-thermal stages can be distinguished. During the Cretaceous nappe stacking (~120–90 Ma) the Veporic Unit was buried beneath the Gemeric Unit and Jurassic accretionary wedge of the Meliata system nappe pile and suffer metamorphic peak of greenschist-to lower amphibolite facies. After the nappe stacking the Veporic Unit was exhumed in response to orogen-parallel extension followed by denudation at the Late Cretaceous to Eocene time (~90–35 Ma). This tectonic process led to formation of upright large crustal-scale folding resulting in fundamental differences in the Alpine peak PT conditions (from up to 650°C in the antiforms to 380°C in the synforms) of the exhumed Veporic Unit. According to new geochronological data (biotite <sup>87</sup>Rb/<sup>86</sup>Sr, zircon and apatite fission track data), the whole central portion of Veporic basement cooled en-block from temperature of ~350°C up to 60°C between ~80 and 55 Ma. Tectonic exhumation was replaced by denudation processes, indicating by obtained older group of apatite (U-Th/He) ages of ~55–35 Ma. The erosion/denudation processes resulted in formation of planation surface before the Late Eocene transgression. However, the Central Carpathian Palaeogene

deposits did not exceed a thickness of ~1.5–2.0 km, revealing by the younger group of apatite (U-Th/He) ages of ~21–17 Ma. The Early to Middle Miocene is characterized by destruction and denudation of intra-Carpathian Palaeogene basin (~20–13 Ma) and formation of the Sarmatian Veporic volcano-plutonic complex (~13 Ma). The final shaping of the Veporic domain has been linked to destruction and denudation of volcanic structure since the Late Sarmatian. A relatively young uplift (Pliocene and Quaternary), but not so intensive or most probably delayed, can be inferred from considerable preserved initial planation surface (midmountain level) which has not been destroyed yet (Vojtko et al., 2016).

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