THE EVOLUTION OF THE STEINBERG VOLCANO, STYRIAN BASIN

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The Pannonian Basin is an extensional basin, which is situated between the Alpine, Carpathian and Dinaride orogenic belts. It consists mainly of two major terrains: a) the northern ALPACA (Alpine-Carpathian-Pannonian) block and b) the Southern Pannonian Eastern Carpathian ("Tisza-Dacia") block. Two sub-basins, the Vienna- and the Styrian-Basin, belong to the Pannonian Basin as well.

The formation of the Pannonian Basin is associated with the northwards motion of the Adriatic plate and its collision with the Southern Alps in the late Oligocene. The compressional forces caused the separation of the two major blocks from the Southern Alps that migrated eastward to form the Pannonian Basin (RATSCHBACHER et al., 1991). The extensional tectonics that occurred in the Early Miocene has been attributed to the retreat and roll-back of the subducting lithospheric slab along the Carpathian Arc (HUISMANS et al., 2002).

An intensive volcanic activity characterizes the Pannonian Basin. The volcanic rocks with compositions that range from intermediate subalkaline to K- and Na-alkalic have been devided into (a) Miocene (21–13 Ma) silicic pyroclastic (mostly ignimbrite) suite; (b) middle Miocene to Quaternary (16.5–2 Ma) calc-alkaline volcanic rocks; (c) Miocene to Quaternary (15–0.02 Ma) potassic and ultrapotassic rocks; and (d) late Miocene to Quaternary (11–0.2 Ma) alkalic sodic (HARANGI & LENKAY, 2007).

The Steinberg volcano with an age of 2.2 Ma, belongs to the Styrian Basin and consists mainly of nephelinites, phonolitic tephrites and basanites (ALI et al., 2013). The volcanic activity is complex and reveals multiple eruption phases that produced different eruptive units, which due to the intensive mining is difficult unequivocally to relate to a certain eruptive phase. The first eruptive phase was phreatic to phreatomagmatic followed by effusive lava flow with columnar appearance, which subsequent filled up a depression that formed a lava lake like unit. The third eruptive phase is characterized by typical Strombolian activity that ejected bombs up to 50 cm in diameter. Finally the last event is the formation of dykes up to 10 m thick cross-cutting the Strombolian eruptive products.

Intercalate layers of ashes and lapilli in the Strombolian volcanic products indicate the temporary change of the eruptive mechanism to phreatomagmatic within the Strombolian volcanism. While the intensive mining, mainly in the NE part of the volcano, revealed the structure of the Strombolian crater, the extrusive center of the lava flow has not been localized but presumably, it is in the southern part where the thickest columnar lava flow exists.

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