



## **A DEM-analysis of the youngest (30 ka) volcano in the Carpathians: Ciomadul (Csomád), East Carpathians**

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Ciomadul (Csomád) volcano, hosting the twin craters of the lower, larger Mohos swamp and Sf. Ana (Szt. Anna) crater lake, is site of a more than 200 yrs study with regard to its exceptional young age within the Carpathian Neogene to Quaternary calc-alkaline volcanic chain. Recent radiocarbon dating and crater lake drillings confirm its very late Pleistocene age ( $\sim 30$  ka; Magyari et al. 2009 [Hydrobiologia, 631:29-63], Harangi et al. 2010 [CBGA 2010 XIX Congress, Thessaloniki, S16]).

Additional volcanic geomorphological information to verify its youthful morphology can be extracted by using the digital elevation model (DEM). In our study, the best available 1:20,000 scale topographic map was digitized producing a  $\sim 10$  m horizontal resolution DEM. This model highly improves the previously (and generally) used 90 m-resolution SRTM.

Preliminary results of DEM analysis reveals that the northern rim (the ridge of Ciomadul Mare [Nagy Csomád]) and partly the outer slopes of the twin crater is uniform, suggesting an older, larger crater and caldera. No individual lava domes appear on Nagy Csomád ridge, in contrast to previous views. As far as the age succession of the two craters is concerned, Mohos swamp, which is thought to be older, shows regular dissection (gully erosion) on its eastern flanks, supporting an older age relative to Szt. Anna crater lake. This confirms a  $270 \pm 20$  ka Ar/Ar age of Mohos crater obtained on biotite separate from pumice fall deposits. Sf. Ana, which may have been formed by highly explosive (e.g. subplinian) final eruptions ca. 30 ka ago, is significantly deeper than Mohos, it is deeply cut with respect to the Nagy Csomád crater/caldera rim, and it truncates the western portion of Mohos.

The slope maps, derived from the DEM, show very steep ( $>30^\circ$  and in places  $>35^\circ$ ) slopes at Nagy-Haram (Háromul Mare) and Vár-tető (Vf. Cetatii), both having relatively flat top. Such a morphology suggests a primary origin (i.e. constructional slopes) and a young age. Steep slopes also occur inside Nagy-Csomád crater/caldera rim, in accordance with the suggested primary (collapse? deep explosion?) landform. On the contrary, steep slopes on the western mid-flanks of Csomád volcano, facing the Tusnád Gorge, reflect intense post-eruptive erosion related to formation of the gorge (incision of river Olt).