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Lava dome morphometry and geochronology of the youngest eruptive activity in Eastern Central Europe: Ciomadul (Csomád), East Carpathians, Romania

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Volcanic evolution of the Ciomadul (Csomád) lava dome complex, site of the youngest (Late Pleistocene, late Marine Isotope Stage 3) eruptive activity in the Carpathians, has been studied by advanced morphometry and radiometric (U/Pb, U/He and 14C) geochronology. The volcano produced alternating effusive and intermittent explosive eruptions from individual domes, typical of common andesitic-dacitic lava domes. A comparative morphometry shows steep $\geq 30^\circ$ mean slopes of domes' upper flank and the Csomád domes fit well to the 100-200 ka domes worldwide. Morphometric ages obtained from the mean slope vs age precipitation correlation results in $\leq$100 ka ages. The morphometric approach is supported by U/Pb and U/He chronology: preliminary results of zircon dating indicate ages ranging between 200(250) and 30 ka.

The youngest ages of the data set obtained both from lavas and pumiceous pyroclastics argue for a more or less coeval effusive and explosive volcanism. Based also on volcanological data, we propose vulcanian eruptions and explosive dome collapses especially toward the end of volcanic activity. Moreover, radiometric chronology suggests that, possibly subsequently to the peripheral domes, a central lava dome complex built up $\leq$100 ka ago. This dome complex, exhibiting even more violent, up to sub-plinian explosions, emplaced pumiceous pyroclastic flow and fall deposits as far as 17 km. We propose that the explosive activity produced caldera-forming eruptions as well, creating a half-caldera. This caldera rim is manifested by the asymmetric morphology of the central edifice: the present-day elevated ridge of Ciomadul Mare (Nagy Csomád), encompassing the twin craters of Mohoş (Mohos) peat bog and Sf. Ana (Szent [St.] Anna). These latter craters may have been formed subsequently, ca. $\sim$100-30 ka ago, after the caldera formation.

Drilling of lacustrine sediments in the St. Anna crater shows that beneath the Holocene gyttja several meters of Late Pleistocene sediment occurs. Although we did not reach the very bottom of the crater, radiometric dating of the lowest layer indicates that the formation of the crater exceeds 26,000 cal yr BP. This is in accordance with magnetic susceptibility curves and pollen results from the lake sediments, as well as the 31,450 cal yr BP radiocarbon age of the youngest dated eruption at Csomád.

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