

## **The Pliocene-Quaternary South Harghita (Romania) volcanic chain-ending segment - a review**

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South Harghita, the chain terminus segment of the Călimani-Gurghiu-Harghita volcanic range is notorious for its specific characteristics. It consists of different and unique volcanological and petrological features, as compared with the rest of the range, including lowest erupted magma volumes and eruption rates, which originate from changes of the geodynamic setting along with magma generation processes.

The Pliocene-Quaternary calc-alkaline volcanism developed in the 5.3 - 0.3 Ma time interval with two gaps at 3.9–2.8 and 1.6–1.0 Ma, respectively, but the volcanoes partially overlap each other along the NW–SE direction, crosscutting the Carpathian internal folded units. At 1.6 – 1.4 Ma K-alkalic volcanism developed at Bicsad/Malnaş at the southward extension of the South Harghita chain, whereas Na-alkalic volcanism (1.2-0.6 Ma) developed 40 km to the west in the Perşani Mountains.

There are four major volcanic edifices recognized in this chain segment: Luci-Lazul, Cucu, Pilişca and Ciomadul. Luci-Lazu, the northernmost andesitic volcano shows a typical shield morphology. The Cucu andesite-dacite volcano displays a multiple-crater edifice topped by lava domes. Inside the craterial area there is a complex intrusive assemblage. The next volcano in the row, Pilişca is an andesitic composite volcano topped by steep dacitic lava dome complexes.

The south-easternmost dacitic Ciomadul volcanic complex is most well-preserved consisting of a lava dome and flow complex and twin-crater pyroclastic cones developed during several explosive eruptions between 55.9 – 32.6 Ka. According to the recent studies Ciomadul can be viewed as having some residual magma in its crustal magma chamber whose future eruption potential is unclear.

The compositional changes from calc-alkaline (Luci-Lazul) to adakite-like calc-alkaline (Cucu-Ciomadul) may be connected to the sinking of the block/slab beneath the active Vrancea seismic zone and coeval with the tearing along the Troţuş fault system. The sudden change in magma composition and its complexity (i.e. the generation of Na- and K-alkalic varieties in nearby areas) is suggestive of various magma sources and melting mechanisms. This may also be related to particular geodynamic conditions: (1) the existence of a rheologically different domain as is the lower plate in the SE Carpathians (i.e. the Moesian Platform and its distal margins), (2) the inversion recorded in the SE Carpathians which started at the beginning of the Quaternary.

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