

EGU2020-7584

<https://doi.org/10.5194/egusphere-egu2020-7584>

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



Volcanoes morphology of the North Harghita (Romania) Volcanic chain segment : similarities and differences

Viorel Mirea and Ioan Seghedi

Institute of Geodynamics - Romanian Academy, Endogenous Processes, Romania (vmirea@geodin.ro)

Using numerical reconstructions of the morphology of the volcanoes in correlation with petrography, paleomagnetic and K-Ar age data we are showing the differences in eruptive activity between volcanoes in a post-collisional setting. North Harghita is a chain segment of the Całlimani-Gurghiu-Harghita(Romania) volcanic range, composing by row of volcanic of partial overlapping edifices. It is formed from north to south by the following volcanic edifices: Răchițiș (small monogenetic aphanitic dacitic shield volcano) and the Ostoros, Ivo-Cocoizaș, Vârghiș (including Harghita Băi) andesitic (dacitic) composite volcanoes.

The Miocene-Pliocene calc-alkaline volcanism developed in the North Harghita Mts. for ca. 2.4 Ma (6.3-3.9 Ma). The Răchițiș monogenetic volcano has been generated at ~ 5.8 Ma. The volcanic edifices of Ostoros and Ivo-Cocoizaș were build up in the same time interval (6.3-5.0 Ma), lasting ~1.5 Ma each; Vârghiș main edifice indicate a <1 Ma-long activity (5.5-4.8 Ma), however dated debris avalanche suggest longer duration.

The Ostoros and Ivo-Cocoizaș volcanic edifices after the build-up stage were followed by destructive east-oriented debris avalanches events (~ synchronous) and eruption activity stopped.

The Vârghiș edifice complex (including Harghita Băi volcano), experienced an intense build up stage followed by a south-west-oriented debris avalanche failure event. The southernmost Rupea basaltic andesite mega-block is 6.8 Ma old and can be attributed to the Vârghiș volcano suggesting a much longer duration for the volcano lifespan; later at 3.9 Ma a small effusive event was generated in the failure crater.

DEM volume calculations include present exposed edifices and debris avalanches. Răchițiș is only of 0.8 km³; Ostoros volcano edifice have 16 km³ and a debris avalanche deposits of 6.1 km³ suggesting a total volumes of 22.1 km³; Ivo-Cocoizaș volcano has 18.6 km³ and its debris avalanche deposits is of 12.6 km³, suggesting a total volume of 31.2 km³; Vârghiș volcano, the southernmost, has the largest volume of 84.9 km³ (111.7 km³ including Harghita Băi associated edifice) with a total debris avalanche deposits of 8.7 km³ with a total volume of 120.4 km³.

East-oriented debris avalanches of Ostoros and Ivo-Cocoizaș travelled up to 20km where has been blocked by a higher morphology. South-west-oriented Vârghiș debris avalanche traveled up to 55km on a lower morphology, and it is much thinner.

The North-South-directed spatio-temporal evolution of North Harghita volcanic edifices reflect the southward propagation of strike-slip and normal faulting, following the post-collisional events in the East Carpathians.

Acknowledgements: This work was supported by a grant of the Ministry of Education and Scientific Research, CNCS-UEFISCDI, project number PN-II-IDPCE-2012-4-0137 and by grant of Ministry of Research and Innovation, CNCS-UEFISCDI, project number PN-III-P4-ID-PCCF-2016-4-0014, within PNCDI III.