

Contributions to Mineralogy and Petrology

Petrogenesis and amphibole–melt trace element partitioning of the 156 ka Haramul Mic crystal-rich dacite, Ciomadul, Romania --Manuscript Draft--

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Corresponding Author:	Szabolcs Harangi, PhD Eötvös Loránd University Institute of Geography and Earth Sciences Budapest, HUNGARY	
Corresponding Author Secondary Information:		
Corresponding Author's Institution:	Eötvös Loránd University Institute of Geography and Earth Sciences	
Corresponding Author's Secondary Institution:		
First Author:	Emese Pánczél	
First Author Secondary Information:		
Order of Authors:	Emese Pánczél	
	Szabolcs Harangi, PhD	
	Maurizio Petrelli, PhD	
	Răzvan–Gabriel Popa, PhD	
	Attila Virág, PhD	
	Ioan Seghedi, PhD	
	Olivier Bachmann, PhD	
	Réka Lukács, PhD	
Order of Authors Secondary Information:		
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	Hungarian National Research, Development and Innovation Fund (K116528)	Dr Szabolcs Harangi
	Ministry for Innovation and Technology	Ms Emese Pánczél
Abstract:	The 156 ka Haramul Mic crystal-rich (ca. 40 vol%) dacitic lava dome represents eruption of a crystal mush. It is the first product of the Ciomadul Volcanic Complex, eastern-central Europe, following at least 100 kyr dormancy. The mineral phases (plagioclase, amphibole, biotite, apatite, titanite and zircon) and the interstitial glass have relatively homogeneous major and trace element composition suggesting near-equilibrium pre-eruptive state. Geothermobarometric and hygrometric calculations indicate a near-eutectic, low-temperature (730 oC), low-pressure (200–400 MPa), wet (6.5–6.7 wt% melt H₂O content) and oxidized silicic magmatic system. A wide set of amphibole-melt trace element partition coefficient data is provided, which can be used for such low temperature silicic volcanic and plutonic systems. Additionally, mineral-melt trace element partition coefficients are also calculated for titanite, zircon, plagioclase and biotite phases. Quality-check was performed by Onuma-plots and the crystal lattice parameters were determined which fit well with published results. In contrast to the subsequent eruptions, there is no sign for mafic magma recharge as	

	eruption initiation. Thus, volatiles could have played a role such as 'second boiling' or volatile oversaturation due to degassing from underplated mafic magma. The lack of reaction corona around amphibole macrocrysts suggests relatively fast magma ascent, although this can also be due to the still relatively high water content (>4 wt%) of the melt, where amphibole remained stable. The Ciomadul provides an example where various processes can contribute to eruption initiation reflected by the compositional characteristics of the crystal cargo even though the composition of the erupted magma is similar.
Response to Reviewers:	The number of figures was reduced (now there is 10 figures in the main text, all the others are in the Electronic Supplementary Material); tables containing the mean values of trace elements in glass and mineral phases and the calculated partition coefficients are added; figures and tables are separated from the main text.