Constrains on the timescale of the silicic magma reservoir system during the Miocene ignimbrite flare-up episode in the Pannonian Basin, eastern-central Europe.

RÉKA LUKÁCS[1*], SZABOLCS HARANGI[1], OLIVIER BACHMANN[2], MARCEL GUILLONG[2] AND ISTVÁN DUNKL[3]

[1]MTA-ELTE Volcanology Research Group, H-1117 Budapest Pázmány P. sétány 1/C, Hungary (*correspondance: reka.harangi@gmail.com)

[2]Institute of Geochemistry and Petrology, Department of Earth Sciences, ETH Zürich, Switzerland

[3]Sedimentology & Environmental Geology, Geoscience Center, University of Göttingen, Germany

The prolonged and periodically active Miocene silicic ignimbrite flare-up episode in the Pannonian basin provide an excellent opportunity to study timescales associated with magma reservoirs during period of intensive lithosphere thinning. The new in-situ zircon U-Pb geochronology data obtained by LA-ICP-MS on volcanic units allow us to constrain the eruption ages as well as the extent of crystals recycling. The zircon crystallization ages cover a near continuous period from ~20 Ma to 14 Ma. There are only a few spot ages out of over 1000 data that could indicate xenocrystic zircons. Thus, the zircon population of the studied samples contain dominantly antecrysts and autocryts in various amounts.

Six volcanic eruption phases can be distinguished based on the youngest zircon age populations in the spot data of individual samples. They occurred between 14.0 Ma and 18.2 Ma. However, based on the evaluation of the entire data set, at least 10 zircon crystallization peak periods were recognized, starting at 19.6 Ma, well before the onset of the volcanism. Within this prolonged silicic volcanic activity, only a single significant zircon crystallization gap could be distinguished (between ~16.2 and ~15.0 Ma). These results are consistent with a model involving existence of long-lasting silicic crystal mush zones in the continental crust, where periodic rejuvenation of zircon crystallization and withdrawal of medium to large volume eruptible magmas occurred. This requires elevated heat-flux and thermally prepared upper crust, a condition that was consistent with the syn-extensional stage of the Pannonian Basin during the Mid-Miocene. Our LA-ICP-MS study highlights that in-situ U-Pb zircon age data enable to get a deep insight into the timescale of zircon crystallization and recycling in the silicic magmatic system.