

Zircons U-Pb geochronology of the Mtkvari Ignimbrites Flow, Samtske-Javakheti volcanic highland, Georgia

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At Late Cenozoic intensive subaerial volcanic activity occurred in the N-W part of the Lesser Caucasus. It resulted in formation of the large volcanic plateau, which extends across the present-day territories of Turkey, Armenia and Georgia. The part of the plateau located within the borders of Georgia is known as Samtskhe-Javakheti volcanic highland and occupies an area of more than 4500 km². Within the highland in the Mtkvari river canyon a large pyroclastic flow crops out, which is built up of ignimbrites of andesitic-dacitic composition. In spite of the fact, that one of the most significant cultural monuments of Georgia – the cave city of Vardzia – is hewn into this flow (Okrostsvaridze et al., 2015) the questions of its radioisotope age is still unclear.

The geological survey showed that the volcanic flow extends continuously over more than 35 km from the Karzameti castle to Khertvisi castle. Thickness of the flow increases obviously from the presumed magma center (40 m on average) to the periphery (80 m on average), though its width is still undefined. The flow horizon is inclined northwards at the angle 2-4° angle. The perfectly straight surface of the flow and its bottom conformed to the relief confirm its magmatic formation.

The U-Pb radioisotope dating of zircons from Mtkvari ignimbrites flow was conducted by means of Agilent 7500s ICP-MS coupled with a New Wave UP213 laser ablation system in the Department of Geosciences, National Taiwan University National Taiwan University following the analytical procedures by Chiu et al. (2009). The samples were taken from three main parts of the flow: from the end of the flow, near the Khertvisi fortress (at 35 km; #13Geo4), from the central part of the flow, near the Vardzia cave-city (at 15 km; #13Geo5) and from the beginning of the flow, near the Karzameti fortress (#13Geo6). The results are close to being identical within the margin of error and correspond to the Upper Miocene epoch: #13Geo4=7.50±0.42 Ma; #13Geo5=7.54±0.21 Ma; #13Geo6=7.52±0.21 Ma. The obvious similarity of the results indicates a great credibility of this dating.

REFERENCES

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