

Zircon U-Pb Geochronology and Geochemistry of the Eastern Caucasus Intermountain Neogene Basin Volcanic Ash Layers: Implications for their Source

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The geochemistry of the volcanic ash layers and the U-Pb geochronology of zircons in the Neogene intermontane basin of the Eastern Caucasus (Skhirtladze, 1964) has been studied. Investigation of the zircon U-Pb geochronology showed that the ash layers of the intermontane neogene basin of the Eastern Caucasus were deposited ~7.5 million years ago, in the Upper Miocene epoch.

The U-Pb geochronology, geochemistry and geomorphology of zircons from these ash layers were fully correlated with zircons from the Kura ignimbrite flow (~7.5 Ma) of the Goderdzi volcanic complex, of the Samtskhe-Javakheti highland. In addition, these ash layers show significant geochemical similarities with the Mtkvari river ignimbrites flow and volcanic ash layers of the mentioned highland (Okrostsvaridze et al., 2019).

Based on the obtained results and the geography of the region (the distances between the volcanic source and the sedimentation areas are 150-300 km) it is assumed that the source of the ash layers was represented by the Upper Miocene volcanic eruptions on the Samtskhe-Javakheti volcanic highlands. According to the Volcanic ash layers distribution, thickness and age and the analysis of the structure and scale of the Mtkvari ignimbrite flow we assume a large collapse caldera-forming eruption, in the Samtskhe-Javakheti volcanic highland (Okrostsvaridze et al., 2017). This eruption led to formation of the large-scale caldera structure (Niala caldera) and the Mtkvari ignimbrite flow. The youngest andesitic flow of this caldera structure has been dated as ~6.5 Ma. This time should be considered as the end of the active action of this volcanic structure. This caldera extends to the southern territory of Turkey, where field work could not be carried out. Hopefully, this part will be studied in the future and a unified structure model of this volcanic center will be created.

References

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