

Classifications and p-T paths of phenocrysts and volcanic glass from the Quarternary ignimbrite units of the Aragats Volcanic Province, Armenia

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The Quarternary pyroclastic flow sheets make up the reative majority of the Aragats Volcanic Province (AVP) in western Armenia. The areal extent of the AVP is about 5,000 km² around the Aragats stratovolcano, the highest mountain (4,090 m) in the Lesser Caucasus. The ignimbrites have been distinguished into four different units: the crystal-poor Amberd, 1st Yerevan-Leninakan and Artik, and the crystal-rich 2nd Yerevan-Leninakan ignimbrites. However, there is still lack of data for the physico-chemical characteristics of the magma chamber.

The phenocryst assemblage consists of plagioclase (An₂₅₋₅₀) ± diopside ± augite ± orthopyroxene ± amphibole ± ilmenite ± titanomagnetite + apatite in modal composition. All crystals reveal compositions with normal, reverse, and oscillatory zonations. Glass composition varies from andesitic/trachyandesitic to trachydacitic and rhyolitic. The minerals and melt fragments (glass and fiamme) suggest different eruptions, which were tapped from hydrous zoned to anhydrous and unzoned magma chambers.

For the calculation of the p-T paths at a geothermal gradient of 4°C/100 m, the results show that the magma reservoir can be traced up to depths around 33 km.