

# **Crustal xenoliths of the Eocene volcanic rocks in Godar-e-siah area (Jandaq, Central Iran); implications for crust nature and S-type granite**

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## **Introduction**

Granulitic xenoliths are considered to be fragments of the lower crust accidentally brought to the surface by their host magma. Thus, petrological studies of crustal granulitic xenoliths provide the most direct information about processes that take place in the lower crust. In northeastern part of the Isfahan province (Jandaq, Central Iran), the Eocene volcanic rocks present very good exposures. The best outcrop of the crustal xenolith-bearing volcanic rocks is in the Godar-e-siah area. These crustal xenoliths have been used to understanding the lower crust composition and relation to the S-type granite of the study area.

## **Discussion**

The Eocene volcanism of the Godar-e-siah area has carried the crustal granulitic xenoliths to the surface. These xenoliths are consist of plagioclase + phlogopite + sillimanite + corundum ± garnet (core) ± phengite as peak granulitic assemblage. The average P-T estimation for the peak metamorphic assemblage is 7.8 kb and ~780°C. Petrography, mineral chemistry and P-T estimates conclude that they are Al-saturated but Si-undersaturated materials of the deep parts of the continental crust. The Godar-e-siah volcanic rocks carried the xenoliths and rose to the surface along the pathways associated with the Great-Kavir Fault. Transformation of the xenoliths to the surface causes to increasing of Fe/Mg ratio in garnet rim (5.16 at rim and 1.2 at core) and formation of spinel and kelyphite coronas around corundum and garnet, respectively. It is well accepted that the peraluminous S-type granites are the product of anatexi of aluminous metasedimentary rocks in the continental crust. At the approximate 70 km east of the Godar-e-siah area, along the Great-Kavir and Chupanan faults, the Arusan and Aeirakan S-type granites are exposed. It is probable that the productive magma of the S-type granites in these areas is formed by the anatexi of such crustal granulitic materials which some parts of them are brought to the surface by Eocene volcanism in the Godar-e-siah area.