

## GENERATION OF JUVENILE GRANITIC MAGMA IN THE ARC CRUST : OBSERVATION IN THE KOHISTAN ARC, NORTHERN PAKISTAN

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The generation of granitic magma in the lower crust is observed in the Kohistan block, northern Pakistan. The Kohistan block represents a surface-exposed crustal cross section of an ancient island arc which was sandwiched between Eurasian and Indian continents during Tethys closure. Since the Kohistan arc crust was uplifted tilting south side up, deep-seated rocks of near-MOHO level occur in the southernmost part of the block and it goes up to higher crustal levels towards north, such as, from the lowermost dunite/wehrlite, pyroxenite, garnet pyroxenite, garnet granulite of the Jijal complex, various kinds of banded amphibolite in Kamila amphibolite unit, to gabbro-norite with ultramafic association of the Chilas complex as the lower crustal units. These units are geologically continuous without a major tectonic boundary between them.

Felsic rocks do not exist in the dunite/wehrlite and pyroxenite units in the Jijal complex. They appear in the garnet granulite unit as a small pocket and veins. They are presumed to be derived from silicic melt with their occurrence of segregation-like outline and accumulation at the microfold axes. They are lithologically inhomogeneous with some coarse-grained minerals in part. They are mostly rich in plagioclase, and with subordinate amount of quartz and hornblende. Epidote is often accompanied. K-feldspar is nearly absent.

The felsic rocks occur more often in the Kamila amphibolite. Felsic rocks with granitic texture appear from the lower part of this unit. It is a meter-sized small body at the first occurrence but larger bodies are found ubiquitously throughout this unit. Tonalite sheets of several kilometers in total thickness (called Dasu Tonalite) occur in the upper part of the Kamila amphibolite. The Dasu tonalites were emplaced concordantly to the structure of the host amphibolite, suggesting syn-tectonic intrusion. Dasu Tonalite is extremely poor in K and Rb, and have low Sr initial isotope ratio, indicating lower crust-derived juvenile granitic magma without upper crustal components.

It is concluded that the generation of silicic melt started in mafic lower crust and was accelerated and grown in the hydrous amphibolite unit in the Kohistan arc. The SHRIMP zircon U-Pb age of the Dasu Tonalite is ca.98Ma. It indicates that the granitic rock was formed before the Indian continent collided to the Kohistan arc, namely when the Kohistan was either an island arc or a continental margin of Eurasia.