Geophysical Research Abstracts
Vol. 16, EGU2014-7578, 2014
EGU General Assembly 2014


# An example of Precambrian channel flow: Anasagar granite revisited near Ajmer, Rajasthan, India.

Keyur De (1), Nandini Dasgupta (2), and Nilanjan Dasgupta (1)

(1) Presidency University, Department of Geology, Kolkata, India (ndg.geol@presiuniv.ac.in), (2) Department of Geological Sciences, Jadavpur University, Kolkata 700032, India

Anasagar Granite Gneiss is exposed in the northern part of the South Delhi Fold Belt, around Ajmer city, western India. It is a K-feldspar megacrystic granite gneiss, emplaced as a concordant sheet like body emplaced within and deformed along with the metasediments of South Delhi Fold Belt (Lopez et al, 1996). The gneiss and its enveloping supracrustals are deformed by polyphase folding, producing a gneissic dome. Field observation suggests that the grain size of the gneiss varies from core to the contact with the associated meta-sediments. Within the core of the granite megacrysts with lengths of 1 to 5 cm are embedded within a gneissic matrix, defined by alternate medium to fine grained felsic (quartz or feldspar) materials and foliated layers predominantly of mafic (biotite and hornblende) composition. The same granite becomes fine grained looking like quartz-biotite-muscovite schist at the margin. Shearing along the granite margin during subsequent deformation has been proposed (Chattopadhyay et al, 2006), leading to grain refinement. To the contrary we believe that the fine grained nature of the contact zone is a primary feature developed due to quick chilling of the magma along its margin. The map pattern shows that the contact zone in the western part has a persistent thickness of 10m on an average. We test the hypothesis of shearing vis-à-vis granite magma flowage structure and probe the microstructural evidences in support of this hypothesis. We propose that differential flowage between the viscous granite magma in the interior domains with respect to the quickly chilled fine grained boundary during emplacement has rotated, stretched and aligned the crystallizing grains to the flow direction along the magmatic foliation. A comparative study of the types of microstructures between the core and the margin of the granite reveal the extent of annealing during later deformation episodes. There is a positive trend of recrystallization in the quartz grains from the rim to the core of the granite. On the other hand the quartz grains in the rim of the granite are fine grained and show intracrystalline deformation with a strong preferred orientation and recovery of internal strain. The early formed mica grains are either athwart to the foliation or show micro-kinks. Within the core of the granite, the quartz grains not only grow in size but also tend to form definite grain boundaries but also are internally strain free due to recrystallization.

References

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