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Synkinematic intrusion of the Mt. Abu granitoids, NW Indian craton: evidence from combined magnetic fabric and microstructural studies

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Neoproterozoic acid magmatism in NW India represents a transition from late-tectonic granitoids in the Sirohi - Mt. Abu region (Erinpura granites) to the non-orogenic Malani Igneous Suite (felsic volcanics and granites). The Mt. Abu batholith is a composite pluton consisting of a deformed granite gneiss and a relatively undeformed medium grained pink granite. The latter variety has been correlated with the post-tectonic Malani peraluminous granites as described in the published maps of the Geological Survey of India. Both the granitoids are intruded by rhyolitic and mafic dykes. In this study we present magnetic fabric data and microstructural observations of the medium-grained pink granite (quartz, K-feldspar, plagioclase, biotite) from the Mt. Abu batholith to evaluate the intrusion mechanism of this pluton.

Petrographic studies of the Mt. Abu granites show feldspars rimmed by granophyric quartz – feldspar intergrowth, which can be considered as a primary magmatic feature indicating a change from slow to rapid cooling of the granitic melt during crystallization. Locally, there is evidence for strain-induced exsolution of quartz in feldspar along microshear planes, coeval with the formation of perthitic exsolution in the feldspar. These submagmatic structures were developed at a stage when crystallization of the magma reached a critical state of interconnectivity of crystals that allows the support of differential stresses. Features of solid state deformation under high-temperature conditions include sets of shear bands in feldspar with oblique alignment of biotite and recrystallized elongated feldspar. In the vicinity of the shear zone subgrain for-

mation in the sheared feldspar gives evidence for dislocation creep and plastic deformation. All these observations indicate a fabric evolution from submagmatic to high-temperature solid state deformation. The geometry of this fabric (steep NE-SW trending foliations and subvertical lineations) is clearly documented by the AMS data and shows a remarkable similarity to the fabric geometry in the metasediments of the Sirohi Group. Our results, therefore, point to syn-tectonic emplacement of the Mt. Abu granites coeval with the Sirohi orogeny and a shared tectonic evolutionary history of the Mt. Abu granites and the metasediments of the Sirohi Group. Such an interpretation argues against the basement-nature of the Erinpura granites and necessitates a detailed investigation of this terrane.