

Magmatism and Metamorphism in the Khetri Complex, Rajasthan, NW-India

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Summary

The NE-SW trending Proterozoic Khetri Complex is part of the 800 km long Aravalli Orogen, forming an important constituent of the Indian Plate. The complex consists predominantly of metasedimentary sequences that were intruded by a 1822 Ma old, subduction-related I-type granite and several 1711-1660 Ma old, extension-related A-type granites. These underwent pervasive albitization due to a Na-metasomatic event of regional extent. During our long-lasting cooperation with the Indian colleagues, we contributed a wealth of bulk rock and mineral analyses that helped to constrain the geochemical character and petrological evolution of these granites. Zircon ages and Nd-isotope data were determined at Mainz and oxygen isotope data at Lausanne.

In 2009 we started a companion research project on the petrology, geochemistry and geochronology of the metamorphic sequences with the goal to reconstruct the P-T evolution of the Khetri metamorphics, using conventional geothermobarometry and calculated pseudosections. In the Frankfurt isotope laboratory, in-situ U-Pb and Lu-Hf isotope analyses on zircons and monazites are performed, using laser-ablation multicollector ICP-MS. The first results obtained on detrital zircons in a quartzite sample provided a comprehensive overview on the source areas of the (meta-)sedimentary sequences, with ages ranging between 3700 and 1700 Ma. Interestingly, the age of the youngest zircons overlaps - within limits of error - with the oldest intrusion age of the A-type granites. Although field evidence is somewhat ambiguous, it is clear that the granites form the crystalline basement, on which the protoliths of the metasedimentary sequence were deposited well after 1700 Ma. Judging from an in-situ U-Pb date on monazite, the metamorphic overprint took place much later, about 900 Ma ago.

Publications

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