

Prolonged magmatic activity during the break-up of Rodinia

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Prolonged time span of the magmatism during Rodinia break-up was envisioned via zircons from Precambrian granites in the Nagar Parker Igneous Complex (NPIC), southeast Pakistan. The NPIC is the western extension of Aravali Craton of the Indian Shield. Granitic plutons in the area represent Late Proterozoic rift-related magmatism during the breakup of Rodinia. Granites from the Malani Igneous Suite in India, Madagascar, and those in Seychelles have been dated as 750 Ma, based on U-Pb zircon age. However, span of the continental crustal growth during the Rodinia breakup was not clear. This study reports U-Pb zircon age data (LA-ICP-MS) for the gray and pink granites of the NPIC. The data clusters around 748 Ma (core domains) suggesting the peak of magmatism around this time and the crustal growth (envisioned by the oscillatory crystal growth of zircons) extended up to 600 Ma (age from zircon rims). The studied zircons are euhedral, oscillatory zoned, and contain common inclusions of needle-like apatite and less common monazite, xenotime, and K-feldspar. Selected grains in six samples from gray and pink granites were analyzed for U-Pb dating and the concordant results show mean ages around 748 ± 9.5 Ma from gray granites and 694 ± 51 Ma from pink granites. The age data show a continuous crustal growth with a peak around 748 Ma and the growth persists until 600 Ma. These results indicate a magmatic span of about 150 million years for the magmatic plutons to cool off.

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