Detrital zircon U-Pb ages and Hf-isotope record from the Delhi Supergroup, Aravalli orogen, NW India

PARAMPREET KAUR[1], ARMIN ZEH[2] AND NAVEEN CHAUDHRI[1]*

[1]Department of Geology, Panjab University, Chandigarh, India. (*correspondance: naveen.geol@gmail.com)
[2]Karlsruher Institut für Technologie, Karlsruher, Germany.

In this work, we present detrital zircon U-Pb-Hf isotope data from two metasedimentary samples, one each from northern and southern domains of the Delhi Supergroup.

In a quartzite sample from the Alwar complex, northern Delhi domain, 123 zircons have yielded concordant $^{207}Pb/^{206}Pb$ ages ranging from 1422 Ma to 2893 Ma with a significant age peak at 1874 Ma and minor peaks at 2049, 2474 andd 2574 Ma. The youngest concordant magmatic zircon at 1715±26 Ma constrains the maximum depositional age, which is also correlative with the maximum depositional age of the Alwar quartzite in the Khetri complex [1]. The ca. 980 Ma metamorphic overprint in the region brackets the depositional age between 1700 and 1000 Ma. The 58 concordant zircon grains from a greenschist facies metapelite, lower part of the Kumbalgarh Group in the southern Delhi domain, yielded $^{207}Pb/^{206}Pb$ zircon ages from 944 Ma to 3630 Ma with age peaks at 999, 1649, 1749 and 2549 Ma. The youngest age peak of ca. 1000 Ma corresponds to metamorphic zircons. A concordant younger magmatic zircon grain of 1552±44 Ma along with eight concordant zircons (1603-1636 Ma) yielding a weighted mean age of 1614±16 Ma (MSWD = 1.4) constrain the maximum depositional age at ca. 1600 Ma, and ca. 1000 Ma intrusive granite in the upper part of the Kumbalgarh Group along with metamorphic zircons of identical age, sets the upper limit for the depositional age of southern Delhi domain. Lu-Hf isotope data reveal that the source regions for the sediments of Delhi Supergroup were affected by minor juvenile crust formation at ca. 3.1-3.0, 2.6-2.5 and 1.87 Ga, while crustal reworking was dominant at ca. 2.6-2.5, 1.87, 1.75 and 1.65 Ga. Taken together, both the domains of the Delhi Supergroup apparently show similar depositional ages. They also show the occurrence of Eoarchaean (3655-3630 Ma) detrital zircon grains [2], supporting 3.8-3.7 Ga zircon-Hf model ages determined previously [1, 3].

[1] Kaur *et al*. (2011) *Precambrian Res.* 187, 155-164. [2] Kaur et al. (2014) *SPTM-2014*, Dharwad, 36-39. [3] Kaur *et al*. (2013) *Gondwana Res.* 23, 1040-1052.