Provenance and burial history tracking from quartzite hosted detrital garnet grains Delhi Supergroup of rocks, Firozpur-Jhirka ridge, India

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Quartzites of the Delhi Supergroup, exposed along the Firozpur-Jhirka ridge in Faridabad, Gurgaon areas of Delhi-National Capital Area, host detrital garnet grains. The garnet grains are studied for understanding provenance and diagenetic history. Samples were collected from the Badkhal lake area, Faridabad. X-ray diffraction study identifies quartz, garnet, magnetite and goethite as major mineral phases. Whereas quartzites show recrystallization texture, garnet grains record intense fractures and magnetites form large acicular grains. From electron probe microanalysis garnet grains are identified as almandine with high spessartine content and a pegmatite source is suggested. From preserved *in-situ* exsolution of magnetite from garnet it is inferred that a temperature exceeding 550°C (>17 km burial depth) in the course of burial history and magnetites exsolved below 550°C from garnet during the uplift of quartzite.

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grossular and andradite, and a limited solid solution between pyralspite and ugrandite groups (uvarovite–grossular–andradite)[7] make detrital garnet grains serve as a good candidate for the provenance studies. Further, the composition of garnet grains is independent of burial depth and zones influenced by meteoric groundwater compared to other heavy minerals[8]. In addition, researchers[9] have considered exsolution of magnetite from almandine garnet and grain sizes of exsolved phase as signatures for uplift and cooling rate of rock following burial. Detrital garnet grains present within coarse clastic rocks thus provide multiple clues ranging from the nature of provenance to post-depositional burial history.

Medium to coarse-grained quartzitic rocks, belonging to the Delhi Supergroup, exposed in the fringe part of the north Delhi fold belt (NDFB) along the ridge areas of Faridabad–Gurgaon, National Capital Area (NCR) in the south-eastern part of Haryana, India contains detrital garnet