

Structural Geology and petrography of the Karora Hydropower Tunnel

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The 2580 m long Karora Hydropower Tunnel (KHP), is located about 20 km S of the Indus suture zone (ISZ) or Main Mantle Thrust between the Kohistan island arc and Indian plate. The tunnel passes through the Early Proterozoic Besham group of basement metasediments and heterogeneous gneisses, and deformed and undeformed granites and pegmatites, of which the deformed varieties are intruded by mafic dykes metamorphosed to amphibolites. Some 1230 m length of the tunnel exposes granitic gneisses, 550 m graphitic schists, 290 m amphibolites, 120 m dioritic rocks, 145 m hornblende leucogranite and simple pegmatites, and 135 m highly sheared rocks; the remaining ca. 100 m is occupied by pyroxenites, hornblendites, metagabbroids and chromitite. The pyroxenites and hornblendites are coarse-grained. The pyroxenites consist essentially of diopside (80-90 vol%), with small amounts of orthopyroxene, olivine, serpentine, chlorite and opaque grains. Hornblendites are monomineralic (90-96% Hbl), with small amounts of pyroxene, epidote, chlorite and magnetite. Samples of the chromitite are made up of chrome spinel (70-80%), olivine (>15%), small amounts of serpentine, magnesite, chlorite, and taces of pyroxene. The studied ultramafic rocks in the tunnel show remarkable petrographic similarity with the ultramafic rocks forming the lower part of the Jijal complex in the hanging wall of the ISZ, the gabbro-norites are similar to the gabbro-norite relics in the garnet granulites of the Jijal complex, whereas the dioritic and orthopyroxene-free gabbro-diorites resemble those of the amphibolite belt just north of Patan. Since such mafic- ultramafic rocks have not been reported from the Besham group, therefore, these rocks have probably been derived from the southern Kohistan arc. They may represent remnants of a possible nappe which may have extended at least 20 km south of the ISZ and presently enclosed in the Besham group as a sandwich.