

Higher Himalayan Metamorphism and its Relation to Main Central Thrust

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In NW-Himalaya, the Main Central thrust (MCT) separates the Higher Himalayan Crystalline (HHC) belt of the hanging wall from the Lesser Himalayan Proterozoic foreland (LH) of the footwall, now exposed in the Kishtwar window. The footwall side of the MCT is made up of carbonaceous phyllite, quartzite and mica schist having garnet, biotite, muscovite, chlorite, feldspar and quartz. The mineralogy indicate that metamorphism ranges from chlorite to garnet grade condition. Towards northeast and southwest, the base of the hanging wall along MCT consist of staurolite, kyanite, biotite, muscovite, quartz and feldspar, indicating staurolite-kyanite grade metamorphism.

Thermobarometric and garnet zoning data obtained from hanging wall and footwall side of MCT suggest the following:

1. Staurolite-kyanite grade rocks just adjacent to Kishtwar window of the hanging wall show a garnet core temperature and pressure of $\sim 550^{\circ}\text{C}$ and ~ 7.50 kb. The rim temperature show an increase of $\sim 100^{\circ}\text{C}$ without much change from core pressure. Garnet show homogeneous zoning except near the rim, where X_{Mg} and X_{Al} show slight enrichment. The development of homogeneous zoning appears to be because of faster growth accompanied by diffusion in increased temperature condition. Clockwise temperature path suggest that this zone has developed during subsidence and uplift stage in the ductile shear regime. Moreover, the insignificant change in pressure probably indicates that this zone seem to have been remained static relatively, when compared to the faster uplift of higher grade rocks in the hanging wall. The faster uplift of the higher grade rocks are evidenced from the reduced rim temperature and pressure of $\sim 650^{\circ}\text{C}$ and ~ 4.00 kb. Temperature increase in staurolite-kyanite grade is interpreted to have been developed because of the thermal relaxation of the higher grade rocks during uplift, before the movement along MCT.

2. The footwall rocks occurring just below MCT, show rim temperature and pressure of about 560°C and 7.00 Kb. S-shaped mineral inclusions in garnet suggest syntectonic growth, showing normal growth zoning. The P-T data and garnet zoning indicate that the footwall rocks have not been affected by heating either during the thermal relaxation stage of the hanging wall or thrusting along MCT.

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