

Geological Structures, deformation and metamorphism of Lesser Himalaya between Mugling-Damauli area, central Nepal

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Geological study was carried out in the Lesser Himalaya between Mugling-Damauli sections of central Nepal. This area consists of both autochthonous and allochthonous successions of Lesser Himalaya. The autochthonous units are called the Nuwakot Group while the allochthonous units are mapped as the Kahun Klippe. There are several nappes and klippe in Nepal Himalaya. The origin of these nappes and klippe (root zone) has been a matter of debate among the researchers. The Kahun Klippe located at central Nepal in Tanahu District is one of the least studied thrust sheets in the region. In the present study, geological mapping (1:25000 scale), structural analysis, petrographic study and illite crystallinity measurements were carried out covering both the Kahun Klippe and underlying autochthon. The study was also concentrated to compare the tectonics and stratigraphy of the Kahun Klippe with the adjacent Kathmandu Nappe and the Main Central Thrust (MCT) zone as it is believed that all the crystalline klippe of the Lesser Himalaya have been thrust from the Higher Himalaya.

The Mugling-Damauli area forms a part of a large duplex structure. The Dubung Thrust is the roof thrust, the MBT is the floor thrust, the Dewachuli Thrust is the imbricate fault and the Bhangeri Thrust is a back-thrust. The origin of the Lesser Himalayan crystalline nappes can be explained on the basis of single thrust model, i.e., the southward extension of the MCT.

The area shows polyphase deformation (D1-D5) and metamorphism (M0-M3) as in the other parts of the Lesser Himalaya. At least two deformation events (D1 and D2) and one metamorphic event (M0) are pre-Himalayan. The M0 is normal burial metamorphism with grade increasing stratigraphically downwards and peak temperature reaching up to 370°C. The area suffered three deformation events (D3, D4 and D5) and three metamorphic events (M1, M2 and M3) after India-Eurasia collision. The second event (M1) is Eohimalayan event causing garnet-grade prograde metamorphism in the Tanahun Group. This is pre-MCT event. The MCT-related Neohimalayan metamorphism (M2) is inverted also in the low-grade zone of the Lesser Himalaya just below the Kahun Klippe. It is shown by both the illite and graphite crystallinity values.