**The relationship between geology and rock weathering on the rock instability along Mugling-Narayanghat road corridor, Central Nepal Himalaya**

ABSTRACT

The present study was conducted along the Mugling–Narayanghat road section and its surrounding region that is most affected by landslide and related mass-movement phenomena. The main rock types in the study area are limestone, dolomite, slate, phyllite, quartzite and amphibolites of Lesser Himalaya, sandstone, mudstone and conglomerates of Siwaliks and Holocene Deposits. Due to the important role of geology and rock weathering in the instabilities, an attempt has been made to understand the relationship between these phenomena. Consequently, landslides of the road section and its surrounding region have been assessed using remote sensing, Geographical information systems and multiple field visits. A landslide inventory map was prepared and comprising 275 landslides. Nine landslides representing the whole area were selected for detailed studies. Field surveys, integrated with laboratory tests, were used as the main criteria for determining the weathering zones in the landslide area. From the overall study, it is seen that large and complex landslides are related to deep rock weathering followed by the intervention of geological structures as faults, joints and fractures. Rotational types of landslides are observed in highly weathered rocks, where the dip direction of the foliation plane together with the rock weathering plays a principle role. Shallow landslides are developed in the slope covered by residual soil or colluviums. The rock is rather fresh below these covers. Some shallow landslides (rock topples) are related to the attitude of the foliation plane and are generally observed in fresh rocks. Debris slides and debris flows occur in colluviums or residual soil-covered slopes. In few instances, they are also related to the rock fall occurring at higher slopes. The materials from the rock fall are mixed with the colluviums and other materials lying on the slope downhill and flow as debris flow. Rock falls are mainly related to the joint pattern and the slope angle. They are found in less-weathered rocks. From all these, it is concluded that the rock weathering followed by geological structures has prominent role in the rock slope instability along Mugling–Narayanghat road section and its surrounding regions.

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| **Keyword:** | Himalaya; Landslides; Weathering; Geographical information systems (GIS); Geological structures |