

**Geophysical investigations of a potential landslide area in
Mayoon, Hunza District, Gilgit, Baltistan, Pakistan**

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The Mayoon landslide in the Hunza District has become a growing concern, particularly in recent years, due to its sudden activation and rapid movement. This area is highly susceptible to earthquakes, classified as zone 3 with peak ground acceleration values ranging from 2.4 to 3.2 m/s² according to the Building Code of Pakistan, owing to frequent seismic activity. Previous earthquakes have displaced foliated rocks southward and contributed to the opening of bedrock joints. Loose, unconsolidated material covers the landslide's head and body, displaying fractures of various sizes. To assess the subsurface of the Mayoon landslide, non-invasive geophysical methods, namely Ground Penetrating Radar (GPR) and Electrical Resistivity Soundings (ERS), were utilized. The subsurface was interpreted as a two-layer model. The upper layer (L-1) is characterized by reflections and highly variable resistivity, indicating loose, heterogeneous, fragmented material deposited over the existing bedrock, likely from glacial activity. The lower layer (L-2) displays hyperbolic reflections and intermediate resistivity, indicative of foliated metamorphic bedrock containing faults/fractures. The depth extension of these faults/fractures is uncertain due to signal decay with depth in GPR. Intermediate resistivity within L-2 suggests weathering and foliation of the bedrock. Reflections within L-1 directly above fractures/faults indicate potential movement. A bright reflection between the layers signifies the presence of a debonded surface. The combination of loose material in L-1 and debonding poses a significant hazard for landslide generation during intense rainstorms or earthquakes, highlighting the importance of proactive measures to mitigate risks in vulnerable areas.