

## Geology of the High Altitude Niyendigala Landslide, Belihuloya, Sri Lanka

L.V. Ranaweera, E.P.N. Udayakumara and M.T.M. Anuradha

*Department of Natural Resources, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*  
*laliwr@appsc.sab.ac.lk*

Niyendigala landslide is a 'skewed' debris flow (width, 10-50 m) of more than 1.6 km in length which originated ~1260 m above MSL on 3<sup>rd</sup> May 2016 in Paraviyangala Mountain, Belihuloya. Although landslides are most common in mountainous areas, geology beneath is deterministic. In this report, we present the geology of the Niyendigala landslide. Spatial analysis and mapping of the landslide were done using Google Earth and the *ArcGIS™ 10.3 software*. Field investigations were carried out to confirm the spatial distribution and mapping of the landslide. Representative rock samples were collected at seventeen locations from different layers of the newly exposed bedrock on the slip surface. Dip and strike of foliation and joint planes were measured using geological compass at these locations. 'Geo rose' was used to plot the attitude of foliations and joints. A Fracture lineament (FL) map of the area was prepared based on the field data and aerial photo interpretation. Slopes along the entire landslide path vary between 7° - 33°. Slope at the crown is 25° - 27°. The bedrock along the landslide consists of interbanded quartzite, pelitic gneiss, garnet- biotite gneiss, garnet bearing charnockitic gneiss, metagranitoid and gabbroic gneiss dipping mainly NW with a strike variable between N75°W to N40°E. Landslide axis can vary between S25°E to S30°W. Bedrock at the crown is weathered and highly fractured. Many joint planes are highly inclined while some are parallel to the slip surface. It shows at least five joint sets (090°/65°S, 45°/90° 115°/67°SW, 180°/70° E and 040°/63°SE) with joint intensities of 3-6/m. Fracture lineaments in Panniloya catchment where the landslide occurred are mainly oriented from NNW to NNE. The catchment shows ~5 km/km<sup>2</sup> of FL density while that of adjacent catchments are ~3-6 km/km<sup>2</sup>. Soil profiles along the slide show gradual weathering or sharp contacts towards the bedrock. The slope of the main scarp before initiation of the landslide is within the optimum angle of repose for unconsolidated materials, 25° - 40°. The landslide falls along a scarp slope that consists of a folded package of inter-banded rock layers with high joint intensity. Its axis is oblique to the strike of the foliation. Fractured and weathered bed rock at crown helped initiation while many joint planes at the body of the landslide contributed to the failure. However, FL density is not the highest among adjacent catchments. Debris flow took place along a slip surface developed between partially decomposed bedrock and overlying soil overburden at places and soil overburden and the bedrock at other places.

**Keywords:** fracture, joint, landslide, Niyendigala, soil