



**Field Transect: ER008, Understanding the landslide failure mechanisms, hazard and risk scenarios in Darjeeling Himalaya**

**Geological Significance:**

- Darjeeling-Sikkim Himalaya is part of the active Himalayan Fold-Thrust-Belt (FTB) where rugged topography coupled with the folded, deformed, metamorphosed and thrust lithology of varied competence acts as a very favourable geological milieu for initiating different types of landslides. The proposed traverse area is one of most complicated landslide prone Himalayan terrains in India owing to varied lithology, structure and extremely high amount of monsoon rainfall (2000-5000 mm between June-October). This fragile Himalayan terrain experienced a number of prominent landsliding events in the past. All sorts of landslide failure mechanisms – deep-seated, shallow translational, flows are observed in this terrain which have been strongly influenced by prevalent geology and geomorphology of the area.
- The proposed field transect offers comprehensive exposure for witnessing the varied landslide failure mechanisms and their intimate relationships along with the interactions of landslide hazards with thick settlement and built-up areas for evaluating its risk, in this terrain.

**International Attraction:**

- Geological Survey of India (GSI) as part of a multi-institutional international consortium is actively pursuing a societal project at Darjeeling-Sikkim Himalayas called LANDSLIP. LANDSLIP stands for Landslide Multi-Hazard Risk Assessment, Preparedness and Early Warning in South Asia: Integrating Meteorology, Landscape and Society. Several frontline international landslide research teams from UK (Kings College, London, Newcastle University, Met Office, London) and CNR-IRPI (Italy) are working with Indian researchers from GSI and Amrita University till 2020, which will provide an excellent opportunity to portray the research outcome in front of the global landslide researchers during IGC 2020.
- GSI has also recently accomplished another project on landslide movement monitoring by analysis of RADARSAT-2 images to model time-dependent ground displacement, in collaboration with Natural Resources Canada (NRCan) in the area. The know-how of the project can also be detailed during IGC 2020.

**Duration: 5 Days**

**Date of Excursion: Post Congress**

**Max. Participants: 15**

**Legacy of Landslide events:**



*Devastation during 1968 landslide event*



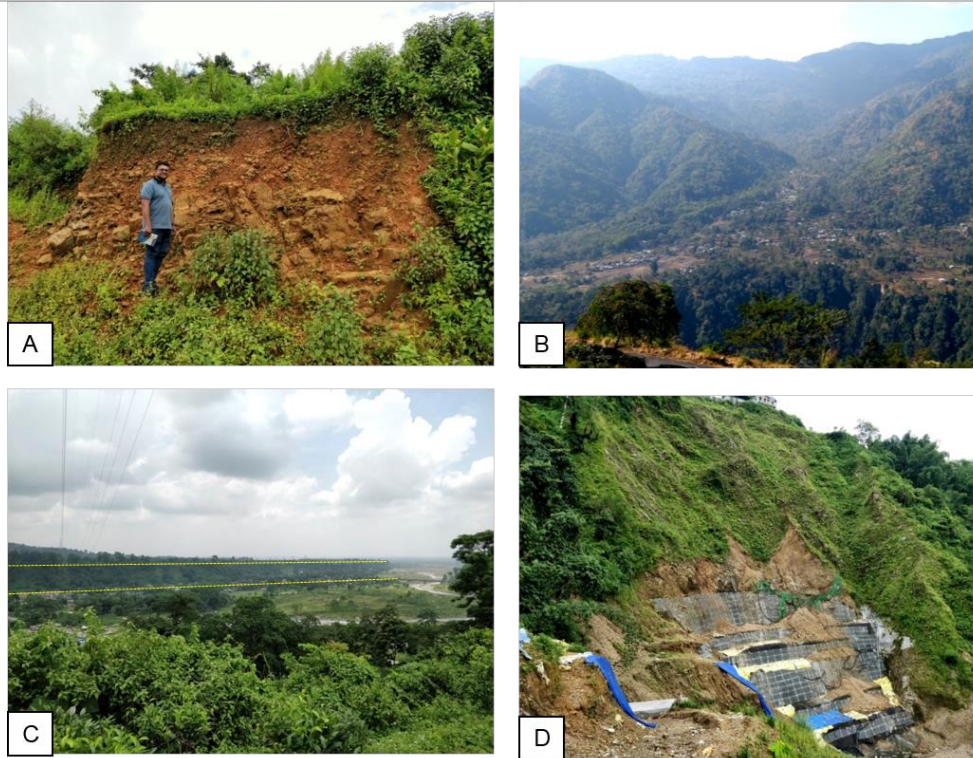
*Landslides affecting the alignment of NH-31*



*Landslide affecting alignment of NH-55 and adjoining villages near Kurseong (Present day)*



# Field Photographs:



A. Exposure of typical medium to coarse grained Siwalik sandstone; B. Spectacular old debris fan of Bungkulung; C. Unpaired terrace of Quaternary deposits, left bank of Balasun river; D. Engineering mitigation measures at Tindharia landslide area.

## GEOTOURIST SITES



*Sprawling Tea gardens of Darjeeling district*



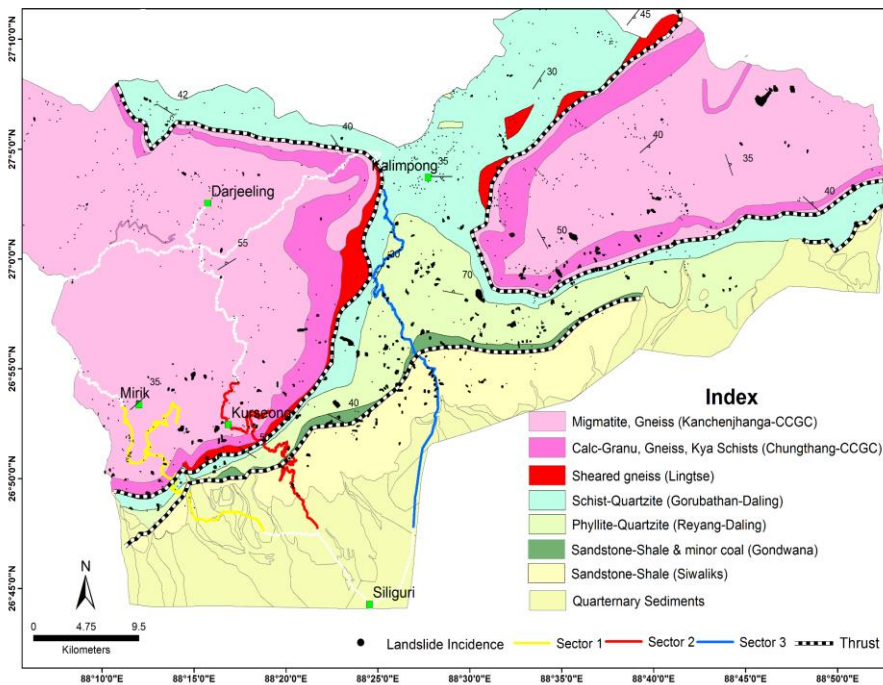
*View of Sumendu lake, Mirik*



*Darjeeling Himalayan Railway (DHR), UNESCO World Heritage site*



*View of Kanchenjunga from Darjeeling*



Geological map along with traverse routes