InSAR based terrain motion mapping in support of landslide hazard assessment in high mountainous areas

„Rock slope stability assessment
in the High Himalaya of Bhutan"

Executive Summary

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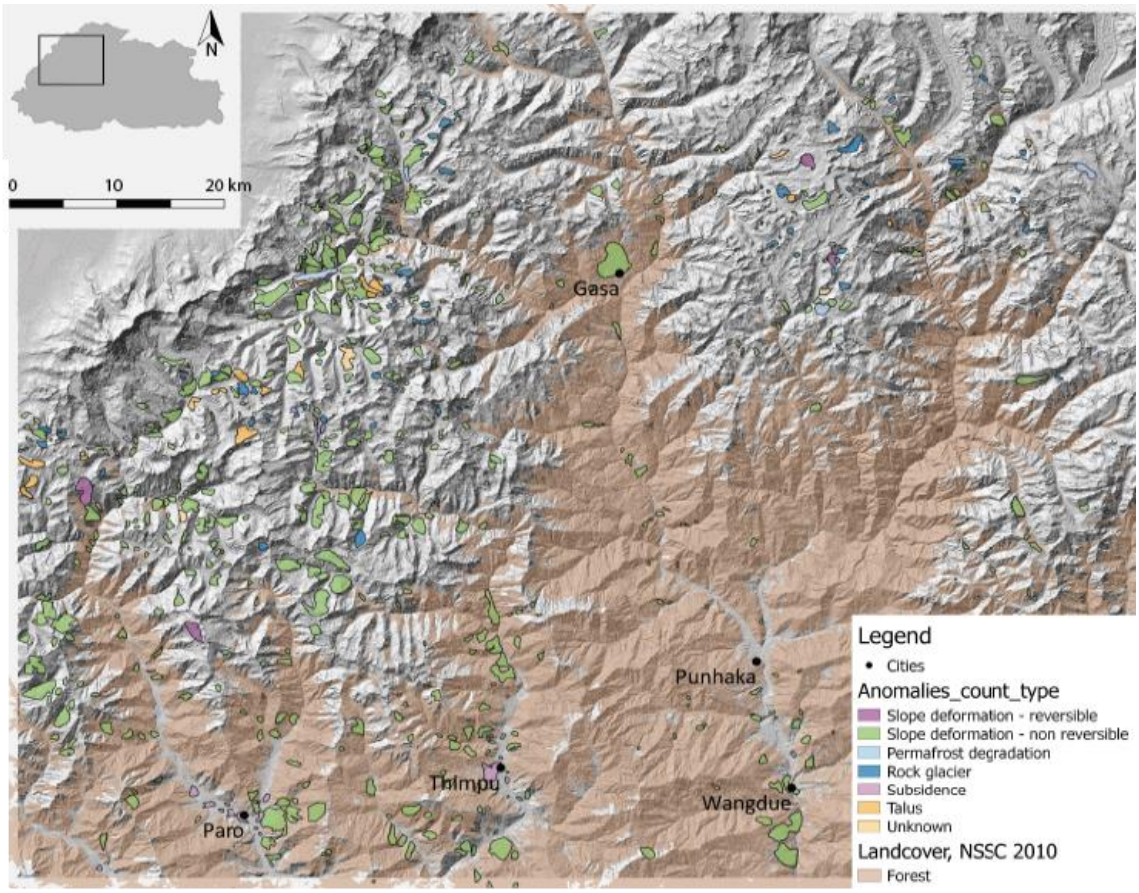
Alcantara Study Reference No.: 15/P25
Study Type: Pilot
Contract Number:4000117652/16/F/MOS

Picture:



Inventory of surface deformation phenomena in the High Himalaya of Bhutan generated by integrating the information from visual interpretation of HR optical imagery, HR DEM and DInSAR results.

Motivation: (40 words)

Study landslide hazard in the High Himalaya of Bhutan

Methodology: (150 words)

Combining classical geological and geomorphological approaches, including field surveys and installation of monitoring instruments, with remote sensing analyses on satellite data acquired from different optical and radar sensors, to perform reconnaissance, mapping, and assessment of large rock instabilities in the High Himalaya of Bhutan. Training Bhutanese scientists on the combined use of EO data and field work to produce landslide catalogues, which are the base for hazard assessment. Partnership with a local Technical Institute allowed to design, produce, and install monitoring systems at specific locations identified during the project.

Results: (4 items)

1. Surface displacement velocities and time series by processing Envisat and ALOS-1 in the High Himalaya of Bhutan

2. Inventory of active slope processes

3. Design, production and installation of Corner Reflectors in cooperation with Bhutanese partners

4. Preliminary landslide hazard map in the area of an important hydropower project

Publications:

B Dini, A Manconi, K Leith, S Loew, Preliminary assessment of active rock slope instabilities in the high Himalaya of Bhutan, EGU General Assembly Conference Abstracts 18, 11739

Highlights: (80 words)

Results of this pilot project provide new hints on landslide occurrence in high alpine environments, and shows the enormous potential of satellite-based techniques to map, classify and explore large bedrock instabilities that represent significant hazards throughout remote regions. Moreover, our findings are extremely important especially for developing countries as Bhutan, where systematic acquisition and exploitation of EO data can allow for a better evaluation of landslide hazard at relatively low costs.