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Combined use of optical remote sensing and GIS for landslide mapping

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Landslide activity usually alters the spectral signal of the earth surface significantly through the displacement and disruption of the surficial vegetation layer. This makes landslide areas considerably easy targets for detecting and mapping from space-borne data. We employed data from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) to detect and map landslides in Pakistan and in Northern Norway. Digital Terrain Models (DTMs) generated from ASTER stereo data were used to calculate volume estimates for the individual landslides. Orthophotos and DTMs were generated from corrected level 1B data. Orientation of the 3N and corresponding 3B band from GCPs, transformation to epipolar geometry, parallax-matching, and parallax-to-DTM conversion was done using the PCI Geomatica 10.0 Orthoengine software. Orthophotos and DTMs were then integrated into a GIS (ArcGIS 9.2), where landslides were automatically detected and mapped using the normalized difference vegetation index (NDVI), thresholding of band 1 (green) and band 2 (red), and selected terrain information, such as slope and curvature. The resulting landslide inventory data was used to supplement existing field data.