

Change detection of the Doren landslide using repeated terrestrial laser scanning

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Our measuring activity started in 2008 at the landslide-endangered site locality Doren (Vorarlberg, Austria): a recurrent mass movement has been producing several events of various orders of magnitudes in the last decades. The area is a part of the Foreland Molasse Zone, freshwater molasse sediments are the most abundant surface lithology, however glacial moraine also occurs in the vicinity. Since the landslide endangers built-up property, the site has been the target of numerous measurement campaigns including repeated Airborne Laser Scanning (ALS) measurements, in order to quantify the motion of the material. In our project we intended to complete these data using Terrestrial Laser Scanning (TLS) in order to quantify the deformation for shorter periods as well.

According to the lessons learnt from previous campaigns, special attention has been paid to the appropriate base point selection for the measurements; in order to improve the scanning coverage of the area including the forested and otherwise vegetated areas. The measurements were carried out with a Riegl LMS-Z420i instrument. The site is especially interesting because the area hosts plenty of microtopographic features that can be related to possible faults. Fig. 1 shows the change of the calculated difference map of the DTM2009 to DTM2011 generated for the common area of the data acquisition (N is towards the top). The reddish colours indicate material accumulation (especially at the foot of the scarp and in the central part of the landslide), whereas blueish colours show partly exhumation (along the scarp) and incision (at the toe of the landslide). The vertical change may reach 2-3 m in total for two years.

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