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One year terrestrial laser scanning monitoring of an active rockslide in highly deformed rocks in western Swiss Alps

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The area of Montatuay (Val Ferret, Valais) is known for numerous instabilities affecting its mountain sides. The February 10th 2011 a sudden rockslide of ∼200 m high and ∼1'000 m3 happened on western flank of Montatuay which results in obstructing the river. The rockslide morphology is divided in two zones. An active zone in the upper part producing blocks and fine grained material and a deposit talus in the lower part. The geological context shows highly deformed rocks of different lithologies as limestone, black shale, dolomite, gypsum from Ultrahelvetic sedimentary cover.

During 2011, studies were carried out in the field, as well as terrestrial laser scanner and high resolution DEM analysis. After one year of TLS monitoring, newly developed algorithm enabled to measure displacements and deformation rate. The algorithm is based on a multi-steps automatic shape tracking process in MATLAB providing roto-translation matrix of discrete parts of the topography. Fallen volumes and potentially unstable volumes were estimated from DEM and TLS data combined with Sloping Local Base Level (Jaboyedoff et al. 2004).

First results obtained by algorithm have shown a deceleration of movement in the upper part and reduction of deposition in the talus deposit. The monitoring with TLS of the talus deposit also points out that it is still unstable due to river erosion. In a global setting, this active rockslide is part of a larger sagging area and potentially influenced by a deep-seated gravitational slope deformation affecting Montatuay.