



Dynamics of the Sanières rockslide from the time-lapse analysis of airborne and terrestrial point clouds.

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The Roche-Plombée rockslide (South French Alps) has been triggered in early August 2013 in the lower part of the Sanières catchment as a result of undercutting of the torrent banks after a debris flow event. During several days, a large amount of debris have been mobilised along a 300m length cliff. Deposits have reached and filled the torrential channel downslope. Several field observations carried out in the following weeks have shown the progressive opening of fissures along the main scarp. Today, large volumes of unstable debris are still available on the slope. Local stakeholders are now expecting the formation of a debris-dam in the channel which could lead to a debris flow in case of failure.

This work is focused on the use of remote sensing techniques (terrestrial photogrammetry, airborne and terrestrial LiDAR) to detect and quantify spatial and temporal distribution of materials on the slope. The Structure From Motion (SFM) technique is used to generate multi-date high-resolution digital elevation models (HRDEMs) in order to quantify volumes changes; a time-lapse image correlation analysis of four terrestrial LiDAR scans is used to estimate displacements at the surface. The analysis of the point cloud dataset indicates a global deformation of the rockslope along several slip surfaces. The progressive development of the main scarp with velocity of a few cm.month⁻¹ is also monitored. The analysis of an airborne LiDAR point cloud allows to characterize the main discontinuities. The possibility of extension of the rockslide is discussed.