Integration of ground-based and satellite-based InSAR data for landslide monitoring: example of the Pas de l'Ours landslide, Queyras, France

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Résumé

The "Pas de l'Ours" landslide located in the Queyras valley is undergoing a fast deformation since Spring 2017. This landslide is 400 m upstream of the town of Aiguilles and has developed in unconsolidated schists and moraines. The total volume of the moving mass is estimated at 15 million cubic meters, with a width of the instable area of 1 km and a length of 600 m, which makes it one of the largest active slow-moving landslides in the Alps. Since April 2017, numerous rockfalls and large deformation of the road at the foot of landslide have been observed. The principal threat identified is the possibility that a large part of the mass would collapse suddenly and block the Guil river in the valley below. This could create an important natural dam and totally block the access to two towns (400 inhabitants) located upstream in the Queyras valley.

We used a combination of ground-based SAR, satellite S1-SAR an repeated terrelstrial laser scanning and UAV surveys to document the landslide deformation at high spatial and temporal resolution. This presentation will focus on the InSAR processing and the integraiton of the derived displacement field. The ground-based InSAR data were collected every 2 minutes and processed using a time serie approach; the S1 satellite SAR data were processed with ISCE.

Our early results show that parts of the landslide have displacement rates that can exceed in some places 1m per day. The InSAR data displacement field are consistent with the terrestrial laser scanning datasets and the UAV surveys. The integration of space-borne and

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ground-based data sets provides a more accurate delimitation of the landslide boundary and a better understandng of the forcing environmental factors.