Geophysical Research Abstracts
Vol. 20, EGU2018-13110, 2018
EGU General Assembly 2018

Surface motion detection at the Chambon landslide with terrestrial optical imaging

Mathilde Desrues (1,2), Ombeline Brenguier (2), Jean-Philippe Malet (1), André Stumpf (1), and Lionel Lorier (2)

(1) Institut de Physique du Globe de Strasbourg, CNRS UMR 7516, EOST/Université de Strasbourg, Strasbourg, France, (2) Société Alpine de Géotechnique (SAGE Ingénierie), Gières, France

Several image analysis methods are used to determine surface displacements and generate 3D surface models (DSM) from multiview photogrammetric techniques. In our case, we focused on the contribution of different softwares to generate 3D models fom multiview images and document the surface motion from a fixed monoscopic camera. The methods are presented in the case of the Chambon landslide (Isère, France).

The site was instrumented during the main crisis by the SAGE society and included topographic measurements by automated total station and geophysical surveys. From the topographic displacements and measures by extensometers, it was possible to predict the time of the rupture. The main crisis was predicted at the beginning of July 2015.

After the crisis, several photogrammetric surveys were carried out to detect the still active zones and characterize their evolution in terms of amplitude. Images were acquired with a CANON EOS 600D using a lens with a focal length of 35mm (SIGMA). Later, a fixed CANON EOS 100D camera with a lens with a focal length of 50 mm was installed in front of the landslide. Images were acquired hourly.
A classical approach is used for analysis the two populations of images. For the multi-view images, the workflow consisted in (1) point cloud generation, (2) georeferencing, (3) correlation to estimate the surface displacement fields. For the monoscopic images, the workflow consisted in (1) pre-processing of images (correction of camera movement), and (2) correlation to estimate the surface displacement fields.

A comparison between the results obtained with the commercial Photoscan Agisoft software and the MicMac open source library (IGN) was realized. A DSM generated at high spatial resolution with a Terrestrial Laser Scanner (Riegl VZ2000) is used a reference.

The surface displacement fields are generated from the multi-view acquisitions and from the monoscopic camera time series. The dataset derived concerns motions for the period June 2016 to May 2017. Displacements are compared to in-situ measurements (topographic targets) to determine the performance of the photogrammetric methods.

Methods based on terrestrial optical images provide several information for a space and time characterization of the landslide surface motion. Such information is necessary for a better understanding of the geometry and dynamics of the main movement.

Acknowledgments: These works are part of a CIFRE / ANRT agreement between IPGS/CNRS UMR7516 and the SAGE society.