



## **A low-cost method to orient small-scale landslide scars photogrammetric models**

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Thanks to increased computing capacities and the development of affordable and user-friendly softwares, photogrammetry is now widely used in various fields of research. For landslide hazard assessment and particularly to model slope failure and run-out, the reconstruction of precise topographies is often of prior importance. However an accurate geo-referencing requires a DGPS acquisition, which can be expensive and difficult in practice.

In this work we propose instead a low-cost method to set the orientation of a model constructed by photogrammetry. It relies on a mast that is fixed on the side of the studied area, with two aligned panels containing calibration targets. The vertical of the mast is set with a spirit level, and the panels are oriented with a compass. The 3D point cloud generated by Photoscan is then oriented by simple manipulations with CloudCompare to recover the orientation of the panels. We illustrate this method with the construction of a 3D model of a 30-meter long clay flow located near Rilly-la-Montagne in Champagne, France. The resulting orientation is compared to the one that would be derived by assigning DGPS coordinates to specific points of the model.