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Definition of a geometric model for landslide numerical modeling from the integration of multi-source geophysical data.

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Landslide hazard can be assessed through numerical hydro-mechanical models. These methods require different input data such as a geometric model, rheological constitutive laws and associated hydro-mechanical parameters, and boundary conditions.
The objective of this study is to fill the gap existing between geophysical and engineering communities. This gap prevents the engineering community to use the full information available in geophysical imagery.
A landslide geometrical model contains information on the geometry and extent of the different geotechnical units of the landslide, and describes the layering and the discontinuities. It is generally drawn from punctual geotechnical tests, using interpolation, or better, from the combined use of a geotechnical test and the iso-value of geophysical tomographies.
In this context, we propose to use a multi-source geophysical data fusion strategy as an aid for the construction of landslide geometric models. Based on a fuzzy logic data fusion method, we propose to use different geophysical tomographies and their associated uncertainty and sensitivity tomograms to design a “probable” geometric model. This strategy is tested on a profile of the Super-Sauze landslide using P-wave velocity, P-wave attenuation and electrical resistivity tomography. We construct a probable model and a true model for numerical modeling.
Using basic elastic constitutive laws, we show that the model geometry is sufficiently detailed to simulate the complex surface displacements pattern.