Landslides analogue modelling and related INSAR patterns simulations

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Context

The remote sensing technique of radar interferometry (InSAR) has been a key development in slope investigation and geohazard assessment in general for the last 15 years. It has revealed unexpected slope movements and provides a kind of information that no other technique can provide. However interpreting InSAR results (i.e. the fringes of an interferogram) of complex movements is not straightforward. That is why developing controlled experiments of various types of slope movements in the lab and simulating the resulting interferograms may help to decipher real interferograms.

Objectives and Methods

The main goal is to understand how the conditions of acquisition interact with the type of ground displacement to produce inteferograms. Various types of slopes and surface movements will be modelled in laboratory (sand box) and monitored with high-resolution laser scanning. That will include rotational and translational sliding, toppling, swelling, subsidence and strike-slip. 3D printing may also be used to build models of real historical cases. Then acquired laser scans will be used to simulate the InSAR response, with the advantage to be able to vary easily the antenna positions, frequencies, etc. Finally LiDAR data from a couple of real landslides will be used to compare simulations to real interferograms (satellite data will be processed though open-source platforms for differential and SBAS interferometry).

Literature

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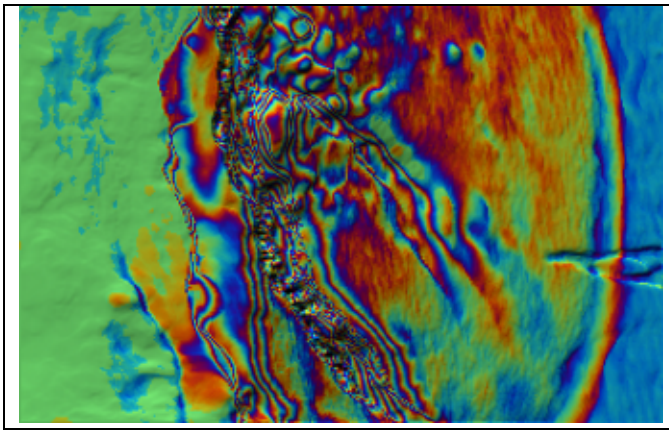

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