

University Uses Advanced Modelling to Predict Landslides



The University of Melbourne has developed an advanced modelling tool that can predict boundaries of landslides up to a fortnight before they occur. Researchers at the School of Mathematics and Statistics built a model that can analyse surface movement at the microstructure level, able to detect the patterns that are the telltale signs of a developing collapse.

One such pattern is infinitesimal motions that change over time, becoming synchronised as the risk of 'failure' increases.

Professor Antoinette Tordesillas said "These warnings can be subtle. Identifying them requires fundamental knowledge of failure at the microstructure level – the movement of individual grains of earth. In the beginning, the movement is highly disordered, but as we get closer to the point of failure motion becomes ordered as different locations suddenly move in similar ways," she said.

"Our model decodes this data on movement and turns it into a network, allowing us to extract the hidden patterns on motion and how they are changing in space and time. The trick is to detect the ordered motions in the network as early as possible, when movements are very subtle," added Tordesillas.

The current effort builds on two key developments: big data analytics, and recent knowledge of the defining patterns of failure from high-resolution measurements in discrete materials.

On the future of the system, Tordesillas continued "Imagine if we could collect data on movements of natural and man-made slope surfaces and structures from a small portable device in real time. We can then take that data and return within minutes a probability of a collapse happening in that structure or slope surface. We are getting close - we just need more data to test the codes on."