

Interactive comment on “Operative and reliable landslide forecasting and influence of geology to predictability” by E. Intrieri and G. Gigli

Anonymous Referee #1

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I appreciate the effort by the authors on pursuing a landslide prediction tool that accounts for the reliability in its predictions. The proposed methodology is based on careful consideration of the work done by others and supported by its implementation on several case studies. This is important work that should be encouraged in landslide research for risk management purposes.

I do have some general comments and discussion.

The authors state the importance of kinematics over geomechanics, based on their interpretation of results. I would suggest that not only does geomechanics play a major role in the kinematics of some of their case studies, but also that predictability of other landslide types not included in the database in this paper are likely controlled by the geomechanics. Clear examples are landslides in sensitive clays and other materials

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prone to collapse.

The authors should also discuss the issue of timely predictability. Methods used to predict landslides that are based on displacement monitoring assume that slope collapse will be preceded by accelerations, sufficiently in advance to make adequate predictions followed by emergency measures. Again, landslides in sensitive clays and other collapsible materials are examples where this assumption might not be valid. Moreover, the recent failure of the Mount Polley Dam (IEEIRP, 2015) suggest that, under certain conditions, undrained responses leading to failure might not provide enough warning time for emergency plans to be in place. It is suggested the authors state such limitations of the methods proposed.

The methodology presented addresses the variability of the forecasting methods used. The reliability index, based on this variability, the convergence and non convergence of forecasts; appears to be a measure of data scatter and trend variation, rooted in the behavioural nature of the landslide in its pre-failure stage. To assess the reliability of any forecasting method, the range of forecasts for a number of case studies needs to be compared against observed time of failure. This requires, in my opinion, to subdivide the case dataset in groups of same landslide type, kinematics, materials, triggers, etc., and compare the forecasts with the observed times of failure.

For particular comments:

- 1.- How was brittleness assigned for the cases in Table 1?
- 2.- In Table 1, the event at Vaiont is classified as a "Rock Avalanche". This term refers to the material (rock) and its post-failure behaviour. I suggest it should be classified following its detachment process, as this is what we are monitoring prior to failure and would give more insight into the role of landslide kinematics vs. predictability.
- 3.- What are the artificial landslides?

For editorial comments:

1.- I suggest the improvement of the excel figures. fonts are too small, and layout is not technical. The text refers to dashed black and grey lines that appear continuous red and blue in the figures.

2.- Should the title read "...influence of geology on predictability" rather than "...influence of geology to predictability"?

References:

Independent Expert Engineering Investigation and Review Panel (IEEIRP) (2015) Report on Mount Polley Tailings Storage Facility Breach. Province of British Columbia. <https://www.mountpolleyreviewpanel.ca>

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2016-221, 2016.

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