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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "State fusion entropy for real-time and site-specific analysis of landslide stability changing regularities" *by* Yong Liu et al.

Anonymous Referee #2

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The authors propose a new data-driven approach to quantify various states of activity of landslides and support, in perspective, decision-making within early-warning systems. The topic is undoubtedly interesting and with a potential of providing better information on site-specific landslide activity.

Nevertheless, I find that this paper does not really show whether the proposed approach gives a real advantage over other existing data-driven, empirical or physically-based methods in quantifying landslide stability/instability. A comparison of several methods would be greatly helpful.

Furthermore, there is no evidence that the method can be successfully used in an early-warning perspective, which is the goal set in the abstract. My main concern is that the entropy approach used by the authors is based solely on measurements of dis-

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placements, seemingly in a single point of a landslide. The authors show that the pattern of state fusion entropy is (not surprisingly!) consistent with that of displacements (input information). Thus, what does the entropy tell in addition to what is already obvious by looking at the displacement pattern and, perhaps, by setting displacement rate thresholds to provide early warning? This has not been clarified. In addition, can the performance of the model be improved by integrating several displacement measurements (and perhaps pore pressures, water level, water content, deep deformations, etc.)? This is an important topic to be addressed.

It may be argued that the displacement rate thresholds are set arbitrarily in a displacement-based monitoring system. However, I see that even in this data-driven approach there are arbitrary site-specific decisions made by the authors (e.g. page 9 line 4), which perhaps can affect the model output. So, for a model to be truly data-driven, I expect no arbitrary choices, or arbitrary choices to have little influence: the dataset should provide the answer itself.

Finally, the content of the work does not seem to match its title: monthly displacements are probably too far from a “real-time” landslide monitoring when incipient failure is concerned. I expected to see interpretation of daily, hourly or even more frequent observations of landslide displacements prior to failure.

Due to these concerns, I feel that this manuscript is not ready for publication in the present form. I recommend the authors update their work by addressing the above points and, in particular, by including evidence of good performance of their model in making usable predictions of landslide failure based on high-resolution displacement patterns, which could be used in an early warning system.

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