

Interactive comment on “Two multi-temporal datasets to track the enhanced landsliding after the 2008 Wenchuan earthquake” by Xuanmei Fan et al.

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FAN ET AL.: Two multi-temporal datasets to track the enhanced landsliding after the 2008 Wenchuan earthquake

This paper gives a detailed and useful introduction to two very interesting multi-temporal data sets which are probably the first data sets free available for the scientific community. The first data set is a multi-temporal polygon-based inventory of pre- and co-seismic landslides, post-seismic remobilizations of co-seismic landslide debris, and post-seismic landslides induced by the Wenchuan earthquake (2008) in Sichuan province China. The second dataset contains information of the debris flows that occur

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curred from 2008 to 2017 in the same area. together with information on their triggering rainfalls recorded by a network of rain gauges. The two multi temporal data sets, which are made freely available, offer a good opportunity to analyze, at various scales, the patterns of enhanced land sliding caused by the earthquake. The first data set gives insight about the types and distribution of co-seismic landslides and their types of reactivation. It opens the way for scientist to analyze the factors influencing the distribution of co -seismic landslides, to make comparisons with the distribution of co-seismic landslides in other earthquake area, to analyze the factors causing the reactivation of these landslides and to explain the decrease in temporal frequency. And last but not least the data offers insight in the temporal evolution of the source materials for debris flows which is important for the modelling and understanding of the decrease debris flow frequency after the earthquake. The second data set about the temporal evolution of debris flows in the the Wenchuan seismic area is a very rich source of information due to the large number of debris flows which are registered The combination with information about the triggering rainfall data make it possible to construct general ranges in rainfall thresholds and more specific thresholds in relation to available source material and catchment characteristics. The detailed information about the catchment morphometry in the form of DEMS, time of occurrence of debris flows, antecedent rainfall patterns, available source materials and last but not least runout volumes at the outlet of the catchments make it possible to tests and bench marking all kinds of very detailed to more general debris flow models following different concepts with a very detailed to a more general character The paper is a good guide for the data sets but some parts need a bit more explanation. I do not understand how the distribution of co seismic landslides can give insight in the mechanism of an earthquake. We need also more comments on the different ways the co-seismic landslides are mapped in the past, the variety in interpretation of individual landslides and their presentation in maps (as points or polygons) and the consequences for analyzing these kind of data sets. I would like to ask the authors why they think their mapping methodology has delivered the most reliable data set. The mapping of the landslides has been carried out by 5



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interpreters following a set of common rules (see Fig 6). The authors mention also a methodology given by Harp et al 2006. We need more information about the criteria used by the mapping of these landslides. In the temporal data set of co-seismic landslide and post seismic reactivation and new landslides are also included debris flows which are small debris flows (hillslope debris flows and so called channel deposits). The question arises what is the difference between these debris flows and the debris flows incorporated in the second data. Probably the two types of debris flows in the first data set have a limited displacement (not reaching the outlet of the catchment). The first type are so called hill slope debris flows while the second type are channelized debris flows with a limited displacement. A significant amount of materials are involved in these channel deposits, which of course are very important source areas for future debris flows because the highest concentrations run-of water during future events are found in these channels. I suggest to call these two types :a) hillslope debris flows with limited run-out b) mainly channelized debris flows with a limited run-out. Can you also describe their relation with the co-seismic landslides. Give also information in the text about the time period in which these landslide reactivation in the form of debris flows occurred: just after the earthquake or over a longer period? In Figure 4 you add a third type of debris flow namely "debris flows in a channel". What is the difference with the channel deposits? So I would ask for a more precise description of these types of debris flows? The level of activity in A1, A2 and A3 are defined as a percentage of area which is remobilized. Are these activated areas delineated and do we get an impression of the degree of displacement (limited displacement or larger displacement in the form of debris flows see above). I cannot see that in Fig 3 and I have no possibility to open the shape files to look in detail. Regarding the debris flows: can the authors also give an estimate about time period in which the pre-earthquake registered debris flows were formed? In the debris flow data base we have no information whether the debris flows started as sliding mass failures or by run-off erosion, which is very important for the type of modelling and for understanding the type of meteorological thresholds. I do not understand in the caption of Table 4 the difference between "Time 24" and "T".

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The available material during the initiation of the flow changes with time. From where did you get this information? From the first data set about the Multi-temporal inventory of landslides ? The authors also mention a general travel time of 1 hr which makes it possible to get an estimate for the initiation time of the debris flow (important value for calibrating and validating models). I wonder whether that is not a too general statement. Are there no large variations in travel time of debris flows between catchments? To come to a conclusion I would say that these data sets merit to be published and I advise minor revision to give some more explanations on certain aspects.

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