

Interactive comment on “A fast monitor and real time early warning system for landslides in the Baige landslide damming event, Tibet, China” by Yongbo Wu et al.

Anonymous Referee #2

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SUMMARY: The manuscript describes the technical development and implementation of a monitoring system with data analyses based on Kalman filtering, fast fourier transformation and a support vector machine based on displacement data. The study area is a landslides in the Sichuan/Tibet, China which also caused a landslide dam.

GENERAL COMMENTS: There are many typos and language errors that need revision. Please consider using a language editing service or ask a native speaker for assistance. I think the review of existing landslide early warning systems should be more extensive. I provided some sources. I find that monitoring, forecasting, nowcasting and early warning systems should be distinguished more clearly, e.g. by applying

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the UNISDR/UNDRR classification that you cited. The description of the landslide, its geomorphology, trigger, the aftermath (dam and lake) etc is very brief and not appropriate to understand the conditions in the field. The focus clearly lies on the technical development and aspects of warning are not covered. Thus, I recommend to not describe this as an early warning system. The presentation of the research could be made more clear.

SPECIFIC COMMENTS: Title: The title is not in proper English. It should be "monitoring" system, not "monitor". It is also unclear whether this is a local scale system (because you name Baige landslide event) or a regional system (because you use landslides in plural).

Abstract: P1L8: Please avoid capitalisation where not appropriate. "Early", the second word, should not be with a capital "E". P1L8: I would also argue, that an EWS (early warning system) does not really avoid a disaster as it does not stop the landslide from happening. P1L9: for A specific landslide OR for specific landslideS. P1L10: people not familiar with China have no idea what Beidou or a Beidou terminal is. Please rephrase. P1L11: The real time precursor predication method IS based

There are obviously substantial language issues that need to be resolved. Please revise. No further comments on typos and language are provided from my side in the remaining review.

P1L11: there is no explanation what a KF-FTT-SVM model is. What does the abbreviation stand for? P1L13: rather use landslide instead of slide.

Introduction: P1L21: Provide a citation for the claim that landslides are the third largest (?) geological hazard. P1L22: Add a space before the bracket. There are also several instances of missing spaces in the remaining document. P1L26ff: additional information on landslide EWS could be added, consider adding information from

Overview on landslide EWS and review of existing systems: Thiebes, Benni, and

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Thomas Glade. "Landslide Early Warning Systems – Fundamental Concepts and Innovative Applications." In *Landslides and Engineered Slopes. Experience, Theory and Practice*, edited by S Aversa, L Cascini, L Picarelli, and C Scavia, 1903–1911. Naples, Italy: CRC Press, 2016. <https://doi.org/10.1201/b21520-238>. Thiebes, Benni. *Landslide Analysis and Early Warning Systems: Local and Regional Case Study in the Swabian Alb, Germany*. Springer Theses Series. Springer, 2012. Case studies: Thiebes, Benni, Rainer Bell, Thomas Glade, Stefan Jäger, Julia Mayer, Malcolm Anderson, and Liz Holcombe. "Integration of a Limit-Equilibrium Model into a Landslide Early Warning System." *Landslides* 11, no. 5 (June 14, 2013): 859–75. <https://doi.org/10.1007/s10346-013-0416-2>. Calvello, Michele, Ricardo Neiva d'Orsi, Luca Piciullo, Nelson Paes, Marcelo Magalhaes, and Willy Alvarenga Lacerda. "The Rio de Janeiro Early Warning System for Rainfall-Induced Landslides: Analysis of Performance for the Years 2010–2013." *International Journal of Disaster Risk Reduction*, October 2014. <https://doi.org/10.1016/j.ijdrr.2014.10.005>. Michoud, C., S. Bazin, L. H. Blikra, M.-H. Derron, and M. Jaboyedoff. "Overview of Existing Landslide Early-Warning Systems in Operation." In *EGU General Assembly Conference Abstracts*, 14:2919, 2012. <http://adsabs.harvard.edu/abs/2012EGUGA..14.2919M>. Piciullo, Luca, Michele Calvello, and José Mauricio Cepeda. "Territorial Early Warning Systems for Rainfall-Induced Landslides." *Earth-Science Reviews* 179 (April 2018): 228–47. <https://doi.org/10.1016/j.earscirev.2018.02.013>. Piciullo, Luca, Mads-Peter Dahl, Graziella Devoli, Hervé Colleuille, and Michele Calvello. "Performance Evaluation of the National Norwegian Early Warning System for Weather Induced Landslides." *Natural Hazards and Earth System Sciences Discussions*, January 16, 2017, 1–28. <https://doi.org/10.5194/nhess-2017-24>. Rossi, Mauro, Silvia Peruccacci, M. T. Brunetti, I Marchesini, S. Luciani, Francesca Ardizzone, V Balducci, et al. "SANF: National Warning System for Rainfall-Induced Landslides in Italy." In *Proceedings of the 11th International & 2nd North American Symposium on Landslides*, edited by E Eberhardt, Corey R. Froese, A. Keith Turner, and S. Leroueil, 2:1895–99. London: Taylor & Francis, 2012. Segoni, S., A. Battistini, G. Rossi, A. Rosi, D. Lago-

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marsino, F. Catani, S. Moretti, and N. Casagli. "Technical Note: An Operational Landslide Early Warning System at Regional Scale Based on Space–Time–Variable Rainfall Thresholds." *Natural Hazards and Earth System Science* 15, no. 4 (April 16, 2015): 853–61. <https://doi.org/10.5194/nhess-15-853-2015>. Kirschbaum, Dalia Bach, Robert Adler, Yang Hong, Sujay Kumar, Christa Peters-Lidard, and Arthur Lerner-Lam. "Advances in Landslide Nowcasting: Evaluation of a Global and Regional Modeling Approach." *Environmental Earth Sciences* 66, no. 6 (July 2012): 1683–96. <https://doi.org/10.1007/s12665-011-0990-3>.

P2L10: you presented the UNISDR/UNDRR classification of EWS; however, the systems you mention in this line and the following are not necessarily real EWS that include works on all 4 fields of action. They are mostly monitoring and/or forecasting systems. Please check carefully whether they are really fully fledged EWS, e.g. by checking to which extent they are really in operation (most are not but are monitoring systems with some aspects of predictions). P3 Figure 1: Typos in figure. Seneor should be sensor. P5L8: can you provide more information on the characteristics of the landslide, the dam and the lake? What are the geological and geomorphological conditions? Why was the landslide triggered? Have there been any movements before? P11L5ff: the language is not appropriate. Please rephrase this section.

Discussion: The discussion does not really reflect on the limitations and uncertainties of the study but rather summarises the research. This should be revised.

Interactive comment on *Nat. Hazards Earth Syst. Sci. Discuss.*, <https://doi.org/10.5194/nhess-2019-48>, 2019.

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