Review for Chou et al., "Predicting Deep-Seated Landslide Displacements in Lushan Mountain through the Integration of Convolutional Neural Networks and an Age of Exploration-Inspired Optimizer"

I reviewed a previous version of this manuscript and suggested major revisions. The authors have taken care to address my suggestions point-by-point, and their revised manuscript reflects well the efforts of the authors to incorporate these suggestions. The results shown herein are impactful, and I appreciate the thorough investigation of models that can help guide future researchers who may undertake similar efforts. I therefore recommend publication of this work in *NHESS*; however, I include some additional line-by-line comments for the authors to address below:

1 (Title): It is a good idea to insert the country name here so people know where the Lushan mountains are located

38-44: Much improved with the added context here!

45: Should have references to support this

49: There are much older references than these, e.g., Iverson and Major (1985) and references therein

63: It is not mentioned what the constraints are of traditional machine-learning models

73: A term to use throughout the manuscript would be "deep-seated landslide displacement"

74: Would insert the country name here as well

131: Specify which atmospheric variables will be used instead of the term "weather conditions"

134 (Fig. 1): Why is the orange layer filled in on the second panel and not the first? Why not the upper layer too? Additionally, water tables typically include an inverted triangle denoting their position.

149: change to "physically based" from "physical-based"

164-171: There is a deep literature on this subject and I encourage the authors to include some more fundamental contributions to slope stability analysis here. It does not need to be a substantially longer paragraph as that is not the focus of this work. However, some more foundational work should be briefly referenced.

172-180: I'm not sure I understand this paragraph. Why are AI models better suited to incorporation of new data than, say, deterministic models? I think the advantage may be that

most deterministic modeling requires some knowledge of physics to predict displacement, which can be exceedingly complex in a large landslide, and these kinds of models rarely can achieve predictive success of a few percent.

184-186: There is somewhat of a disconnect here because the Margarint et al. paper does not appear to utilize AI, it just presents an analysis using a standard logistic regression model. The preceding sentence should therefore be changed, or a more appropriate example should be provided.

474-477: The DBSCAN algorithm is not mentioned previously to this point and thus it is confusing. Furthermore, Equations 13 and 14 do not exist in the manuscript. Some additional prior explanation is needed here.

490 (Fig. 6): It would be useful to have the approximate failure plane depths measured for G20 and G21 shown graphically here.

494: I think the term “youthful” is too colloquial here

514-521: I don’t think my previous comment regarding the definition of “cleavages” was sufficiently addressed here. Please specify what this term means in this context, or utilize a different term throughout

546 (Fig. 7): This is much improved from the previous figure, although there is an issue now in that the timing does not appear to line up between the plots. For example, the large displacement in 2012 appears to come *before* the rise in water levels in (D).

554-556: Did a previous study show specifically that a structural alteration in soil took place? Also, the failure plane is well below the “soil” depth and the landslide displacement should be insensitive to the soil present at the landslide surface. I recommend re-writing to say that, based on the temporal association of rapid displacement with a rapid rise in groundwater levels, it could be inferred that enhanced pore water pressure lead to the onset of motion.

616: “Deep-seated landslide displacement”

776 (Fig. 10). Why are the descriptions at (a) and (b) above the introduction to Fig. 10? Second, in panel (a) there are a bunch of confusing floating dots that fall below the main plot and cover the legend. Third, the dots in general are distracting because it is difficult to see the subtle differences in each time series. I would remove the dots and just show lines for each model.

783: This is not entirely fair as there are a number of studies now that use AI to forecast landslide displacement as a function of environmental variables.

826: I would specify that this study addresses the persistent threat of large, slow-moving landslides.

References

IVERSON, R. M. and MAJOR, J. J.: Rainfall, ground-water flow, and seasonal movement at Minor Creek landslide, northwestern California: Physical interpretation of empirical relations, GSA Bulletin, 99, 579–594, https://doi.org/10.1130/0016-7606(1987)99<579:RGFASM>2.0.CO;2, 1987.