

This study develops a PIML framework that integrates physically based modeling with machine learning and incorporates dynamic land-use/land-cover changes to simulate and project permafrost evolution in Northeast China. The methodology demonstrates a certain degree of innovation. Since the study area is located near the SLLP in East Asia, its permafrost characteristics are regionally representative, and the findings provide valuable regional applicability and scientific insight. The manuscript is overall well written, but minor improvements can be made regarding clarity of expression as well as figure and text descriptions. The specific comments are as follows:

1. The abstract predominantly provides qualitative descriptions. It is recommended to include more quantitative results to enhance informativeness.
2. In Section 3.2, it is suggested to add comparisons with existing permafrost maps developed for the same region.
3. In Figure 7, please indicate the spatial extents corresponding to the Da Xing'anling Mountains, Xiao Xing'anling Mountains, the northern Song-Nen rivers Plain, and the Hulun Buir Plateau.
4. Lines 327–328 and 564–565 contain inaccurate wording, as the predictive accuracies of MLP and CatBoost differ depending on the metric used; thus, it is inappropriate to state that both models simultaneously exhibit the best performance.
5. In Lines 564–565, MAE is mentioned without prior reference, which seems to be a typographical error where MSE was mistakenly written as MAE.
6. The unit of MSE in the manuscript should be  $^{\circ}\text{C}^2$  instead of  $^{\circ}\text{C}$ .