

The authors address a significant topic by mapping key soil properties across China's forests using a comprehensive dataset. The resulting high-resolution products have the potential to be a valuable resource for the scientific community. However, several methodological and descriptive aspects require substantial improvement to ensure the reliability and reproducibility of the findings. I recommend a major revision to help the manuscript reach the high standards required for publication. My main comments on the manuscript are as follows:

General comments:

1. Resampling covariates with diverse native resolutions to a 90-m grid introduces significant uncertainty, particularly for inputs derived from coarser scales. This issue warrants a detailed discussion and quantification to assess the reliability of the final high-resolution maps.
2. The manuscript provides insufficient discussion on the variable importance for BD and pH across different soil layers. The underlying reasons for these variations require further elaboration.
3. Natural and planted forests possess distinct driving mechanisms. Developing separate models for each forest type is advisable to accurately capture these specific variations.
4. Providing spatial distribution maps for every covariate listed in Table S1 is advisable. The figures need to clearly display the value ranges for continuous variables and the distinct spatial patterns for each category within categorical variables. Specifying the number of sample points in both the training and validation sets for each categorical variable is recommended.
5. Forest age represents a critical covariate. Incorporating this variable into the analysis is advisable to improve model performance.
6. Providing the original data is necessary to facilitate the reproducibility of the study by other researchers.
7. Comparing the current results with existing soil BD and pH products is recommended. The manuscript needs to clarify specific improvements and explain the reasons for these advancements.
8. Presenting the spatial distribution of sample points for both the training and validation sets is necessary. The manuscript should also address whether these distributions are spatially balanced.
9. A more detailed description of the raw data is necessary. The manuscript should specify the sample sizes and spatial distributions across different temporal periods, soil types, and forest types.

Minor comments:

1. Lines 1-3: The general phrase "Soil properties" creates redundancy with the specific variables "Bulk Density and pH," necessitating a more concise revision such as "High-Resolution, Multi-Depth Mapping of Soil Bulk Density and pH in China's Forests Using Machine Learning"
2. Lines 20-21: The claim of being 'first' is inaccurate due to the existence of prior 90-m products, so the text should be revised to focus on the specific contribution to forest ecosystems instead.
3. Lines 73-74: The phrase "in heterogeneous" is grammatically incorrect.
4. Lines 109-111: This sentence is redundant and should be deleted.
5. Lines 111-112: Specify the quality control and data harmonization methods.
6. Lines 139-155: The 41 environmental covariates lack necessary citations, and the sources or the data itself should be made accessible to readers to ensure reproducibility.
7. Lines 159-160: The number of standardized soil layers should be corrected from four to five.
8. Lines 222-223: $q_{0.50}$ denotes the median prediction.
9. Lines 429-430: The use of "first" is an absolute claim that is prone to dispute.