

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2022-91

Anonymous Referee #1

Referee comment on "Remote quantification of the trophic status of Chinese lakes" by
Sijia Li et al., Hydrol. Earth Syst. Sci. Discuss.,
<https://doi.org/10.5194/hess-2022-91-RC1>, 2022

In this manuscript, the authors present a methodological framework, using stepwise multiple regression analysis to find some band ratios and establish the XGBoost of machine learning approaches to estimate lakes TSI across China. Transferability and applications of XGBoost were tested in three different water classification scenarios, which provides a new idea for complex water color remote sensing modeling of class II water. This manuscript is well written and organized and this work is very meaningful, the method used is reasonable, and the model performance is good. I only have a few minor comments.

- Line 37, 475, one or two references here can be helpful.
- Line 339, 445, linear regression was used to identify significantly sensitive spectral variables related to TSI, the authors state that blue/red, green/red band ratios showed a good regression coefficient ($R^2 > 0.59$) with TSI. Have the results ($R^2 > 0.59$) been compared with other band combinations? It is best? What about other band ratios? The selection process of the optimum band should be described in detail. The tables or figures with comparative results should be given.
- Line 382, What is the principle of selecting 555 representative lakes for mapping? Are the mapping images of 555 lakes consistent in date? As you know, the TSI derived from images of different seasons, cloud be completely different.
- Line 484-493, the results showed the support vector machine performed worse than XGBoost and random forest. Why? I suggest that specific reasons need to be explained clearly, from the mechanism of the algorithm or drawbacks or advantages.
- Line 490, the references should be cited here.
- Line 404, Fig.8 did not been cited in text.