

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2
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Comment on hess-2022-236

Anonymous Referee #2

Referee comment on "Advance prediction of coastal groundwater levels with temporal convolutional and long short-term memory networks" by Xiaoying Zhang et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2022-236-RC2>, 2022

Review manuscript titled "Advance prediction of coastal groundwater levels with temporal convolutional network" by Zhang et al.

This manuscript presents an innovative and practical approach to predict the coastal groundwater levels. The authors developed a TCN-based model to predict coastal groundwater levels and compared the results to the existing popular LSTM model. These methods have promising application in real-time prediction of hydrogeological data. As the authors argue, it is essential to achieve single step real-time prediction. The novelty part is the discussion of advanced prediction, which is necessary as sometimes we are more concern about the variation in a longer time. The work presented in this manuscript can have a substantial contribution to the studies of coastal groundwater levels' prediction. Overall, the contents of the manuscript are interesting. Logicality of the paper is clear, and the results are well discussed and explained. However, there are some issues should be better explained after I had read through the paper.

Major comments:

Are BH01 and BH05 predictions using the same TCN and LSTM models? Or the prediction models for different wells need to be trained separately, and each well needs to use the model trained on its own data for prediction. It is recommended that the authors clarify this point to help the reader better understand the overall forecast implementation process.

During the hyper-parameter comparison process, different models are evaluated based on the training set or the test set. If the evaluation is based on the training set, whether the performance of the test set is consistent with the training set under different hyper-parameters.

There should be more discussions for the comparison results of LSTM and TCN.

The detailed information of the data that the neural network used is needed to further illustrate the structure of the network.

In the methodology, the tidal, precipitation and groundwater level are corresponding which variables in the equation.

Minor comments:

Abstract: The full name of TCN should be defined before using this abbreviation.

Line 42-43: "... localized groundwater prediction..." should be "... localized groundwater level prediction..."?

Line 94, Here the BP neural network is first mentioned. An explanation is needed here or add the relationship between BP and other networks that mentioned before.

Line 123, a reference is need before "Therefore"

Line 123, have the longer periods prediction have been used in other area?

Line 317, typo ")"

Figure 6: The author needs to add the legends corresponding to the different colors to avoid confusion to the reader