Hydrology and Earth System Sciences Discussions

Hydrol. Earth Syst. Sci. Discuss., referee comment RC1
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Comment on hess-2022-236

Anonymous Referee #1

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-RC1, 2022

General Commentsï¼□

This article develops two deep learning based models - TCN and LSTM regarding the prediction of groundwater level in coastal area with different ahead period by relying on historical dynamics of variables like precipitation and tidal. A novelty of this study is that the developed approach is able to forecast the groundwater level variation in a longer leading time rapidly rather than only one time step that adopted in most widely used DL methods. The article is clear, concise, well-structured, and fits well within the scope of the HESS journal. The study is of interest to hydrologists and modelers alike, but still have several points that need to be further clarified. In my opinion, the paper can be accepted after moderate corrections.

Major points:

- Based on the platform information, the efficiency of the two developed DL methods needs to be checked. They often take minutes to hours to complete a network construction, especially for the advance prediction part.
- The manuscript built two models and compared their results simultaneously, it would be better to include the LSTM in the title and further clarify the performance of the two models in the abstract and discussion part.

Minor points:

Highlights: please check if the monitoring wells are all located in the same aquiferï¼□ and be consistent through the paper.

Abstract:

Line 27: a full name of TCN is needed here.

Line 29: change the “first” to “beginning”, and the following three months data

Line 31: Please check the time steps“24ï¼□72ï¼□18 and 360 time steps in advance.”. It should have an increasing order.

Line 32: The sentence is redundant with two “prediction” statements. And why only the one time step result is stated here, please modify the words. All the results from different leading periods should come together. Meanwhile, please correspond the time steps to the real time when talking about leading periods.

Introduction:

Line 54: China experiences critical saltwater intrusion as well and has great research on this area, please check the paper (you could add two papers that you want us to cite)

Line 62-64: This sentence does not make sense, please check.

Line 117: delete “several”

Line 128: change “prediction” to “predict”

Line 132: change “concept” to “concepts”

Line 140: delete “basically”

Line 144: change “have been” to ‘were”

Line 150: please make sure that you are describing the data is integrate and how the wells are distributed in this area.

Line 159: change “three wells” to “two wells”

Line 160: Please check the total real available data items in this area, as the precipitation is daily monitored.

Line 366: please check the typo error “may not ensugare better rFesults.”

Line 392: The Fig.7 includes prediction stages as well. Please is the description “The simulated groundwater level in the training and testing stages” correct.

Line 396: “the values of RMSE are 0.0019 and 0.0166 for BH1”, I only found one well for two values, which needs to be checked.

Line 460: It would be better if you add the leading periods with the markers in Fig.10. Then it can clearly show the precision of each model.