Interactive comment on "Importance of spatial and depth-dependent drivers in groundwater level modeling through machine learning" *by* Pragnaditya Malakar et al.

Anonymous Referee #1

Received and published: 23 June 2020

This study investigated the spatial patterns of the performance of machine learning method for the groundwater level modeling using a large number of observations. the topic of this manuscript is interesting, considering the importance of groundwater resources management in the south Asia. I think this manuscript can be accepted after major revisions. The comments are given below:

Major comments

1. The SVM performs better than ANN model, the reason behind this result should be explained.

2. Figure 4. For Bhahmaputra(DP), it seems that all the models show large errors in

the testing period. The model may loss stability in this region for deep depth modeling. This needs explanations.

3. Section 2.1. The aquifer is heterogeneous. The spatial variations in permeability and other hydrogeology conditions, such as the character of the rocks, the depth of the aquifer, etc, need to be described here.

4. Line 145 "The missing values in the GWL time series data were filled using Multiple imputation". It needs to be clarified that how many wells have missing data. Did filling missing data influence the result? A comparison of modeling results at wells with missing data and other wells without missing data is needed.

5. I suggest the author to add a discussion with previous similar studies to illustrate the differences between this study and other studies.

Minor comments

1. Figure S14. There are errors for the label of y-axis."SVM A" should not be followed by "ANN B" and "ANN C"

2. Figure S3. I suggest the flowchart can be moved to the main text.

3. The manuscript analyzed the influence of population and groundwater withdrawal. These two variables may be related, this need to be clarified, and what are the purpose for groundwater abstraction?