Geoscientific
Model Development
Discussions

Interactive comment on "HIDRA 1.0: Deep-Learning-Based Ensemble Sea Level Forecasting in the Northern Adriatic" *by* Lojze Žust et al.

Anonymous Referee #2

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This manuscript proposed a model named HIDRA based on a deep learning network to forecast the sea level in the Adriatic. This is a good try and shows the deep-learning-based model has a good future in ocean environment research and forecasting. This work is worthwhile and the manuscript is well-written in general. However, there are still several critical issues to be clarified.

Major comments:

1) The Large and Pond parameterization is suitable for calculating the wind stress over the open sea with deep water. In other words, this scheme cannot use in this study. As the data is the basic and core of machine learning, the authors should find another

scheme to redo this work.

2) In fact, the wind is associated with sea level pressure and latitude (Coriolis force). For the Adriatic, the difference of wind in different locations due to Coriolis force can be ignored, which means the wind is almost determined by sea level pressure. So, wind stress has included information on sea level pressure. I think it's double-counted when the authors used wind stress as well as sea level pressure.

3) Topography is important for the sea level, besides the wind stress (or sea level pressure). Therefore, topography should also be considered in the HIDRA model.

4) Line 327, the description is inaccurate. Usually, the regional ocean model, especially the coastal model, can simulate the sea level including the tidal directly by using the water level boundary condition. Moreover, the authors cannot claim HIDRA is better than NEMO because they only compared with results from only one NEMO configuration they used. If the NEMO is tuned carefully, maybe the results are better. In fact, the NEMO in the storm surge events seems better than HIDRA.

Minor comments:

1) How to deal with the land points in this study is missed.

2) Why did the authors select the 29x37 for the atmospheric tensor?

3) It's better to give a table for the HIDRA and NEMO configuration.