Response to reviewer comments

Dear Editor and Reviewer,

We are very grateful for your time and valuable comments, which we found very helpful. We have addressed questions and comments raised by the reviewer in the revised manuscript with tracked changes. Please find our point-by-point response (in blue font) to the comments below. We hope our revisions have properly addressed your concerns.

Thanks again for your time.

Sincerely,
The authors

Reviewer 1

In this paper, the authors present interesting methods for wind speed corrections from the NWP model with multi-step methods. Below are a few minor suggestions for revision:

1. The main issue that I see in this paper is the short period for training and testing of the model, and the authors claim from this that the model is robust. Similar studies for wind speed correction from NWP models usually use several years for training and at least one year for testing. As I understood, this paper is trained only on data from February 2022, and the main conclusions are based on testing in December 2021 and January 2022, with some additional verification of stability over 10 months.
Response: Many thanks for pointing this out. While it is true that similar past studies for wind speed correction from NWP models usually use several years for training and at least one year for testing and our periods are shorter, the size of our data set is sufficient, if not greater than others'. For example, Sun et al. (2019) used a data set that contained 1827 days, from January 2012 to December 2016, using 143 grid points with a resolution of 0.5°*0.5° predicted by ECMWF, followed by 24 features for each sample, with a training set size of 1827*143*24 for each prediction time. Meanwhile, the size of our training set mentioned in lines 238-242 is about 2160*410*12. Therefore, even though it only took us a month to train, we actually trained millions of data; Second, the training data we used was obtained through daily operational runs of numerical weather forecasting, so we would have to run it for several years to get an equal amount of training data. The data we tested were mainly used to analyze the spatiotemporal changes after the model revision in December 2021 and January 2022. All the indicators of the proposed model (VMD-PCA-RF) are relatively robust for the other eight months. We will continue to add new training datasets going forward, however, it will be a challenge to train data over several million levels.

2. order of figures in the text: Fig. 1, Fig. 2, Fig. 3, Fig. 6, Fig. 4, Fig. 5, ... Fig. 11,

Fig. 14, Fig. 12.
Response: Many thanks for your suggestion. We have adjusted the order of the figures.

3. Sometimes authors refer to figures in the text as "Fig. NN" in other cases as "Figure NN", and even once as "figure NN". According to Journal rules, I think it should always be "Fig. NN." Fig. 6 and 9 are unreadable.
Response: Many thanks for your suggestion. We have corrected them all to "Fig. NN".

4. On lines 56–57, the authors state that "Currently,..." and cite a publication from 1999, but there are more recent publications for the HIRLAM model or consortium.
Response: Many thanks for your suggestion. We have updated to a more recent reference.

5. The authors claim in line 520 that "In general, VMD-PCA-RF is the best wind speed correction model for winter and even throughout the entire year in the five southern provinces," while on Fig. 14 for 2022-01, VMD-PCA-lightGBM is better.
Response: Thank you very much for pointing this out. As seen in Table 4, although VMD-PCA-lightGBM model has the best indicators for January 2022, compared to VMD-PCA-RF, the errors of the two models in various indicators are very small, and the error of MAE and RMSE is only 0.01 m/s. However, in Fig.14, the VMD-PCA-lightGBM model performed worse than VMD-PCA-RF in all of the other 9 months except January 2022.
To clarify this, we have added the following in the text: “In general, VMD-PCA-lightGBM is the superior wind speed correction model for the winter, and VMD-PCA-RF performs the best throughout the entire year in the five southern provinces.”

6. There should be more clarification about observational data. In line 132, the authors wrote "For the purposes of this paper, the 10-meter wind speed data is interpolated across 410 sites". Are those 410 sites the weather stations? Why did the authors use interpolation from this database instead of observations from stations?
Response: Thank you for drawing our attention to this. The observed data comes from the China Meteorological Administration land data assimilation system (CLDAS-V2.0) real-time product data set (https://data.cma.cn/data/cdcdetail/dataCode/NAFP_CLDAS2.0_RT.html).
After post-processing by the China Meteorological Public Service Center, the data’s resolution is reduced to 3km by 3km, and it is interpolated into the meteorological station. The observed data source has been integrated with the observation data of weather stations for consistency.
To clarify this and add more context to the data description, we have added the following in the text: “The observed data comes from the China Meteorological Administration land data assimilation system (CLDAS-V2.0) real-time product data

set
(https://data.cma.cn/data/cdcdetail/dataCode/NAFP_CLDAS2.0_RT.html).
After post-processing by the China Meteorological Public Service Center, the data's resolution is reduced to 3km by 3km, and it is interpolated into the meteorological station. The observed data source has been integrated with the observation data of weather stations for consistency."