Dear Referee:

We are glad to receive your comments on our manuscript. We revised the text in line with your comments and responded to some of your questions based on our humblest opinion, as described below accordingly:

1. First, the main reason we chose to use VGGNet in this study is because the basic idea of our research is very similar to *neural style transfer*, a common image style transfer processing algorithm in popular culture, which is built on the VGGNet framework. Second, in searching for relevant literature on seafloor topography inversion involving machine learning, we found several target literatures that can be compared with our method in accuracy (all listed in ref.). Through comparison, we found that our method using VGGNet can make the inversion accuracy higher than the RBF, MPS and other algorithm models used in previous studies. Finally, we have taken on board your comments and revised the title of the manuscript. Our original idea was to emphasize that this was an "improved" approach to accuracy.

2. In **Table 1**, we add the latitude and longitude information of the center points of each pair of the dataset to describe the location information of the data used in the study in more detail. However, since the rate of change of seabed topography, especially in the oceans far away from land, is extremely slow, requiring at least thousands or tens of thousands of years as a unit, it is of little significance to describe the acquisition time of seabed topography data in oceanographic research. Thus, the seabed topographic data obtained at different times can be regarded as on the same standard. As for the reason for using these three pairs of data in this paper, it is because we want to test our model by experimenting with the conditions of the water environment in different regions as possible. Therefore, we selected data from the Northwest Pacific, Southeast Pacific, and Southern Oceans while balancing the difficulty of data acquisition and processing with the evenness of geographic distribution. We understand that there is room for improvement.

3. In this study, we performed interpolation preprocessing on the satellite altimetry data due to the non-uniform resolution between the data pairs. We performed general bilinear interpolation on the data in ArcGIS Engine 10.6. The reason for choosing this method is to balance the amount of data computation and the accuracy of interpolation.

4. Regarding the input and output parameters of the model, what you pointed out is the case of the overall model, with the to-be-corrected satellite altimetry bathymetry data being input, and the multibeam sonar bathymetry data as the true value being output. What we have mentioned in this paper is a more intuitive explanation that focuses on the key intermediate layer in order to make the concept of loss (distance) clearer. That is, from the central perspective of the intermediate layer, the satellite altimetry and multibeam sonar bathymetry data are all input, and the corrected satellite altimetry data is output after processing and calculation in the intermediate layer. We apologize for the misunderstanding caused by the unclear expression, and have added explanations in **Line 188**.

5. In our experiments, considering the size of the data, we only divided the data set into training and testing sets (or validation/development sets in this case) in the ratio of 1:1. In future studies, if larger data sizes are applied, the validation and test sets need to be treated separately.

6. In **Line 130**, we cited *Charette et al., 2010* because we initially wanted to cite the result of global ocean mean water depth in their study. After reconsideration, we have decided to delete the reference here.

7. In **Section 3.1**, we modified the references to multibeam sonar and satellite altimetry bathymetry data. We are sorry for the mistakes here.

8. In **Line 278**, [26][29] were misplanted. We have corrected it to a GMD-compliant reference format.

9. In **Line 333**, "previous studies" has been attached with corresponding references.

10. In **Line 29** and **Line 278**, we have modified the text to NRMSE which has been improved. RMSE cannot be compared directly and needs to be converted into a normalized indicator.

11. In **Line 182**, the upper mark 40 was misplanted. We have removed it from the text.

12. We have resized **Fig.4**, **Fig.5** and **Fig.6** to meet GMD standards.

13. Professional language polish has been applied throughout the manuscript now.

Once again, we greatly appreciate your valuable comments, which have greatly benefited our manuscript. Above are our modification and responses accordingly. We would like to apologize for the mistakes and misunderstandings caused by our

carelessness, and share our views with you with a sincere heart. We are looking forward to hearing from you again.

Yours respectfully,
Xiaowen Luo
Sept. 1, 2022