#egusphere-2024-1931

Documentation of changes and reply to the review comments

*[The original review comments are in **bold and italic**]*

REVIEWER COMMENTS:

Referee 1

This manuscript presents a marginal sea basin-scale reconstruction of palaeogeography based on the combination of a big dataset including the eustatic sea levels, the GIA and the Holocene sediment accumulation for the Baltic Basin. A comparison between the modelled results and proxy-data-based reconstruction can improve the GIA model parameters, which is important for the study on Holocene sea-level history. I only have minor comments as below:

1. Line 130, please explain why ΔSED should be included in the equation of relative sea level.

Author response #1:

Sorry, it was our mistake in the writing process. ΔSED should not be included into eq. (1). This term was not included in our reconstruction procedure.

We have removed it from the revised version.

2. line 305, constant sediment accumulation rate was assumed in the estimation of sedimentation thickness at each time slice. However, sedimentation rate varies largely because of the changes in relative sea level, sediment supply, etc. particularly in coastal zone. Authors made a discussion in the last section of 5.3 for effect of the sediment dynamics. I feel this is not enough and expect an evaluation of the spatial distribution of areas characterized by changing sedimentation rate.

Author response #2:

We are aware of the fact that the sediment accumulation rates varied throughout the Holocene. Even though these rates could be estimated based on analysis of sediment cores (being point data), expanding it to other sections of Baltic Sea basin would be difficult to justify as sedimentary environments of the Baltic vary not only in time but also in space. Moreover in the Baltic Sea, the magnitude of ΔSED remains relatively small compared to the magnitudes of ΔEC and ΔGIA. Also, the highest sedimentation rates are situated in the deeper basins. Therefore assuming different sedimentation rates would have only minor influcence on the paleo-bathymetry. We will add discussion for an evaluation of the uncertainty related to changing sedimentation rate to the revised version based on the above-mentioned arguments.

It is worth to note that our attempt is one of the first complex applications integrating ΔSED to paleogeographic reconstructions at a marginal sea scale. As pointed out in discussion, applying it to more sedimentation-dominated environment, such as i.e. SE Asian shelf, would require slightly different approach by taking into account sediment compaction, erosion and different accumulation rates.

3. line 401, "whereas the Vistula Spit curves shows continuous sea-level fall" should be "whereas the Vistula Spit curves show continuous sea-level rise".

Author response #3:

This mispelling will be corrected. Thank you for pointing it out.