

Comment on egusphere-2023-3011 by Anonymous Referee #2

Title: High-resolution numerical modelling of seasonal volume, freshwater, and heat transport along the Indian coast

We thank the reviewer for the comments that helped us improve this manuscript. Given below are detailed replies to each of their comments. The reviewer's comments are in black and our responses are in red. The text from the manuscript, added or modified, can be identified by blue in italics and quotation marks.

This is a very well-documented and very well-written paper. It concerns the application of a high-resolution model in the Northern Indian Ocean (NIO) with the view of revealing important patterns of the volume, salt, and heat transport under the prevailing climatological conditions. Apart from the direct outcome of this application, it also provides a quite interesting comparison with the findings of other numerical models in the region and available real-life datasets which is important and an asset of the paper. As a result, a pragmatic picture and features of the existing circulation and local physical phenomena are produced, most of which agree at a considerable degree with those described and analyzed by other researchers as well.

A general comment though is that the paper omits a discussion section but incorporates it instead in the results. Given that the authors devote little space on the affiliation and contribution of their results to the environmental problems of the NIO region (e.g., ecological, and biological processes, nutrient and carbon transport, fisheries etc.), I would recommend adding a separate section and elaborate more on the matter, so that the scientific contribution of this paper's findings to real life problems can be better stressed.

The authors thank the reviewer for the encouragement. As suggested by the reviewer, the results and discussion will be reported as separate sections. Regarding the biophysical relationships in the north Indian Ocean, we are already in the process of finishing an interesting article and communicating it in a suitable journal very soon.

Other than that, only some minor comments follow:

Line 59 'augmenting its physical model to extend to various biogeochemical processes' This doesn't read very well because this is a numerical model that implements the laws of physics but does not involve any physical modelling. Please rephrase.

Answer: This suggestion has been addressed. We have rephrased the line to: 'This model includes several built-in packages, facilitating the ability to simulate various biogeochemical processes, thereby advancing our understanding of complex oceanic interplays'

Line 72 INC-HYC is only explained in section 2.1.2 and line 124 but the acronym needs to be determined here.

Answer: This has been addressed and line 72 has been rewritten as:

'... we conducted a model-to-model comparison of transports using another assimilated model data'.

INC-HYC has also been explained at its first appearance in the manuscript.

Line 85 Please rephrase to 'this study aims further to help'

Answer: The suggestion has been incorporated.

Line 88 This sentence sounds like a phrasal error. Please rewrite it.

Answer: The line has been rewritten as *'In Section 3, we present the results and discussion'.*

Line 94 Refer to "Fig. 1 " inside the parentheses

Answer: This suggestion has been addressed.

Line 123 what do you mean by simulated? The model is run, built or setup at INCOIS?

Answer: The HYCOM model configuration is set up and maintained at INCOIS, which includes the T-SIS data assimilation scheme.

Line 131 ETOPO-1 acronym is not explained.

Answer: The line has been rewritten as *'A combination of GEBCO and Earth TOPOgraphy One Arc-Minute Global Relief Model (ETOPO-1) is used as the model bathymetry'.*

Line 139 NRL-HYCOM, INCOIS-GODAS. Please explain acronyms NRL and GODAS.

Answer: We have addressed this suggestion by adding the acronyms Naval Research Laboratory (NRL)-HYCOM and INCOIS-Global Ocean Data Assimilation System (GODAS) in the revised manuscript.

Line 515 similar comment to that for line 59 regarding the use of the term 'physical model'

Answer: The word 'physical' has been removed from the line in the revised manuscript.

Figure 1. The purple color does not work well in contrast to the red symbols. Change the color for the ADCP locations so that they can be better distinguished. There is a purple symbol missing from the Sri Lanka transect. Remove the brackets (in color scale). Please indicate where is AS and where BoB on the map.

Answer: The suggestions have been addressed and figure 1 has been revised.

Figure 5 Add units in the stick plots.

Answer: To make the validation section of the manuscript more concise, which was also suggested by the first reviewer, we have removed Figure 5 and its description from the revised manuscript.