

Interactive comment on “Long-Term Evolution of the Caspian Sea Thermohaline Properties Reconstructed in an Eddy-Resolving OGCM” by Gleb S. Dyakonov and Rashit A. Ibrayev

Gleb S. Dyakonov and Rashit A. Ibrayev

gleb.gosm@gmail.com

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We thank the referee for his/her constructive comments and suggestions. Further the indicated remarks are discussed one-by-one. Attached is the revised manuscript provided in 2 versions for your convenience: with and without mark-up of changes (otherwise, the two documents are identical). Note: only substantial changes are marked-up in the attached manuscript.

1. Referee Comment: It is hard to follow the manuscript because of absent a map that showing name of the all geographic features (i.e. rivers, Karabogazgol etc.) that they are mentioned in the text.

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Author Response: We agree that the paper lacks such map and have added geographical information on the fig. 1.

Changes in manuscript: Figure 1 was supplied with additional information.

2. Referee Comment: The weakness of the manuscript is that authors did not make any comparison between the model results and the temperature and salinity observations obtained in the Caspian Sea as they did for the sea level data. It is necessary to see the model results how agree with the observations in the point of view of model validation.

Author Response: Indeed, the paper lacks T and S observational data for comparison, so we have added section “5 Model validation” including plots for Middle and Southern basins comparing T and S at 100 m in two locations with measurements data from Tuzhilkin and Kosarev (2004). More comprehensive validation against observational data would greatly expand the paper, so, as a compromise, only these two plots and sea level comparison are presented in this section.

Changes in manuscript: Section “5 Model validation” was added.

3. Referee Comment: It would be nice to put some circulation patterns at least one winter and one summer circulation together with temperature and salinity fields in the manuscript to show how good the model is by reconstruction the thermohaline properties. To add the circulation pattern before and after the period of climate shift would be also appropriate for the manuscript content.

Author Response: We agree that visualization of the model solution would greatly help reader to follow the text and is necessary to explain some of the results presented. The paper is supplemented with section “4 Surface circulation” including 2D-plots of instantaneous sea surface salinity and temperature as well as monthly mean surface currents. The latter are presented for winter and summer and were averaged over two periods: before and after the climate regime shift, as suggested by the referee.

Changes in manuscript: Section “4 Surface circulation” was added.

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4. Referee Comment: Referee suggested “Adding the explanation of the coupling sigma and z coordinate systems in methodology section”

Author Response: Coupling sigma and z coordinate systems is based on continuity of model solution and its z-derivative at the interface of the two systems. Thus it is rather straightforward and can be found by an interested reader in Ibrayev and Dyakonov (2016), referenced in the paper. In the present study we would like to refrain from describing such details of model design and focus on model results.

Changes in manuscript: None.

5. Referee Comment: Referee suggested changing the form of references, e.g.: “in (Tuzhilkin et al., 2011)” → “in Tuzhilkin et al. (2011)”, etc.

Author Response: We agree, the suggested form is preferable.

Changes in manuscript: The form of the references, mentioned by the referee, was changed accordingly.

6. Referee Comment: GD and RI abbreviations are not known

Author Response: GD and RI are the authors’ initials (Gleb Dyakonov and Rashit Ibrayev). This form of the “Author contributions” section is standard for the Ocean Science Journal, though rather uncommon elsewhere.

Changes in manuscript: None.

Please also note the supplement to this comment:

<https://www.ocean-sci-discuss.net/os-2018-128/os-2018-128-AC2-supplement.zip>

Interactive comment on Ocean Sci. Discuss., <https://doi.org/10.5194/os-2018-128>, 2018.

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