

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

Anonymous Referee #2

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

The manuscript analyses the decadal variability of the Caspian Sea thermohaline properties. A high-resolution ocean general circulation model is used including sea ice thermodynamics and air-sea interaction, forced by prescribed realistic atmospheric conditions and riverine runoff. The important outcome of the study is to find the reason of the rapid sea level rise (~ 2.5 m) between 1978–1995 that is depending on the variability of riverine and atmospheric forcing, rather than other any factors. Thus, authors results

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are consistent with the commonly recognized theory, relating the Caspian Sea level fluctuations with global climate changes.

The abstract is compact containing the purpose of the study, the short methodology information, the most important results and the evaluation of the reconstruction experiments.

The scientific approach and applied methods are valid. It is well organized and accomplished by briefly reviewing some of the relevant literature and explaining how the current study is related to them beginning from earlier studies upto recent researches. Nevertheless, 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. 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. On the other hand, 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.

Here is the list of suggested some corrections and changes:

- Adding the explanation of the coupling sigma and z coordinate systems in methodology section. - Line 29; instead “work (Dyakonov and Ibrayev, 2018)” is better to write “work of Dyakonov and Ibrayev (2018)” - Line 43; instead “In (Ibrayev, 2001; Ibrayev et al., 2001; Ibrayev et al., 2010)” is better to write “In Ibrayev (2001); Ibrayev et al. (2001) and Ibrayev et al. (2010)” - Line 57; instead “in (Ibrayev and Dyakonov, 2016; Dyakonov and Ibrayev, 2016) is better to change “in Ibrayev and Dyakonov (2016) and Dyakonov and Ibrayev (2016) - Line 59; same “in (Dyakonov and Ibrayev, 2018)” —> “in

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Dyakonov and Ibrayev (2018)" - Line 81; same "in (Ibrayev et al., 2010)" —> "in Ibrayev et al. (2010)" - Line 85; same "in (Dyakonov and Ibrayev, 2018)" —> "in Dyakonov and Ibrayev (2018)" - Line 89; same "in (Schrum C. and Backhaus, 1999)" —> "in Schrum C. and Backhaus (1999)" - Line 286; same "in (Tuzhilkin et al., 2011)" —> "in Tuzhilkin et al. (2011)" - By Author contributions part, "The research was carried out by GD under the supervision of RI" GD and RI abbreviations are not known.

Please also note the supplement to this comment:

<https://www.ocean-sci-discuss.net/os-2018-128/os-2018-128-RC2-supplement.pdf>

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