

Interactive comment on “Changes in extreme regional sea level under global warming” by S.-E. Brunnabend et al.

Anonymous Referee #2

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The future sea level change is an important issue in an area that need investigating. The authors describe the future sea level change focusing on the extreme dynamical sea level change using eddy-resolving ocean model comparing with the lower resolution version. The results show that the changes in dynamical sea level extremes are mainly due to the changes in eddy pathways related ocean circulation changes. My only concern with the manuscripts is the lack of explanation of the statistical significant. This result is based on a single ocean circulation model under a single atmospheric condition, which is from results of a coarse resolution climate model. However, some global distinctive features are consistent with previous studies. The main points of the conclusions are plausible. They also use higher resolution model than previous studies. Therefore, I think these results are meaningful for further understanding of the extreme sea level change.

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How about referring to use of the statistical method in abstract or introduction as high-resolution model. It makes it easy to understanding the following sections.

Line 60: Do you mean “slow shutdown beyond 2100”? Please clarify.

Line 97: The authors should refer the reason to choose the member. Are changes in ocean circulation, discussed in this manuscripts, seen adequately in the all ensemble members? If not, we should also consider the other mechanism of extreme sea level change.

Fig. 2: It would be better to add the contours of mean SSH on Fig. 2, that would make it easy to compare the sea level variability to the location of ocean current paths. Coarse resolution model cannot resolve mesoscale eddies. Is the variability seen in the low resolution simulation related to seasonal cycle?

Line 165: It would better to add the AMOC in low resolution simulation to Fig.3

Line 167: I feel that this sentence is not accurate. It is a kind of “Chicken or the Egg”.

Line 180: Is this related to the NADW formation region in the model? Similar features also seen in the Low resolution version? Please add more information.

Line 219: The PDF shifts lefts in both region2 and region3. Does mean sea level rise affect the PDL shift in the region3 or changes in eddy pathway in the region3? Is it possible to show the PDF of minimum DSL? The PDF of minimum DSL could shift right if the intensification of eddy activity affects the sea level change in these regions.

Fig. 7: Blue and green lines indicate fitted GEV distribution? Please explain it.

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