

Ocean Sci. Discuss., referee comment RC3  
<https://doi.org/10.5194/os-2021-63-RC3>, 2021  
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## Comment on os-2021-63

Anonymous Referee #3

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Referee comment on "Decadal sea-level variability in the Australasian Mediterranean Sea" by Patrick Wagner and Claus W. Böning, Ocean Sci. Discuss., <https://doi.org/10.5194/os-2021-63-RC3>, 2021

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The article *Decadal sea level variability in the Australasian Mediterranean Sea* aims to disentangle the sea-level variability in the Australasian Mediterranean Sea, by means of ocean model experiments. Through sensitivity experiments, the authors are able to see how wind and buoyancy fluxes contribute to the sea-level variability in the region. Furthermore, they use climate indices (such as ENSO and PDO), to see how atmospheric-ocean events forces sea level. Finally, they look at the influence of temperature and salinity (thermo and halosteric) on sea-level change. They find that ENSO explains most of the decadal variability in the region (with exception of the South China Sea, which they hypothesize to be connected to intrinsic variability and the Kuroshio Current). PDO events seems to have a minor effect in the region.

The paper is relevant to the scientific community and doesn't present any major flaws. I recommend the article to be accepted, given some minor corrections.

General comments:

- A study area map, with the name of the main places (which come up a lot during the text) would help to locate the reader. Just as presented in Figure 1 is not enough.
- On line 89-91, the authors present the different nomenclatures for the region, and explain why they use 'Australasian Mediterranean Sea'. I must admit that I had never heard of such nomenclature, and found the word 'Mediterranean' in specific a bit puzzling at first. I wonder if using a more common nomenclature for the region, such as 'Tropical Asian Seas' and 'Southeastern Asian Sea', won't attract more readers.
- The results section is relatively long, and includes different things. I recommend the authors to create subsections to guide the reader better. For example, on Line 157 and

L221 would be good places to start subsections.

- Section 4 (Summary and conclusion), is more of a discussion section. The main findings are very clear in the abstract, but not so much in Section 4 (which is very long for a summary/conclusion). Some re-structuring of this Section would improve the text.
- The final 'general' conclusion of the paper is about the models' resolutions (from L332). However, while the effect of the resolution is clear for the temperature and salinity, it didn't seem to me so strong on the SSH variability itself. I don't think that these results have enough evidence to back the statements on L335,336.
- The observational dataset and variables used should be presented before the Results Section. Furthermore, it's important to mention that you use altimetry observations to validate the model, and that they are only available from 1993 (in contrast with your model that runs since 1958). Also how was the thermosteric and halosteric components computed? Or are they output of the model? This should be clarified. Also, where did the ENSO and PDO indices come from (from figure A1 it seems you computed it based on the model results, so would be good to say how you computed them. And does it match with the observations indices?)
- Did you do any analysis looking at 'specific' ENSO and PDO events? Does the explained variability change regarding an El Niño instead of a La Niña? Or does the position of the ENSO have an influence on your results? Maybe such analysis would enrich the paper even more.

Technical comments:

- Sea level should be hyphenated when used as an adjective (sea-level change Vs. change in sea level).
- Verbal times: In the introduction the authors use present ("the objectives are " (L75)); they use past tense in Section 2 ('we used a global ocean model" (L97)); future tense when presenting what is showed in the results ("First we will compare" (L139)); and back to present tense in Section 4. I recommend the authors to either keep it constant (i.e., using always present or past tense), or change the tenses accordingly to the Section, but keep it constant throughout the Section (i.e., present in the introduction, past in the methods (since it's something they already did), and present in the results and discussion, for example).
- The terms 'i.e.' and 'e.g.' are usually followed by a comma.
- Use of one-sentence paragraphs (for example, L258-259, L289-290) or very short paragraphs (e.g., L71-73, L84-86) should be avoided.

Please find my specific/minor comments on the attached file.

Please also note the supplement to this comment:

<https://os.copernicus.org/preprints/os-2021-63/os-2021-63-RC3-supplement.pdf>