

Review of

Can satellite altimetry observe coastally trapped waves on sub-monthly timescales?

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General comments

The manuscript focuses on the potential of improved altimetry products to detect coastally trapped waves (CTW). So far, those waves were identified using tide gauge data that is very accurate with a high temporal resolution but sparsely spaced along the world's coastlines. The manuscript successfully demonstrates that new products are able to show how CTWs propagate anticlockwise along the eastern Australian coast.

The author uses a combination of standard (correlations, EOFs) and (to me) less known techniques (image processing) to arrive at their conclusion. I find the argumentation convincing but I think the presentation of the results could be improved (see below).

Specific comments

Line 68: Remove parentheses for Woodham et al.

Figure 1: I found the green rectangle a bit hard to see. Consider a different color and thicker lines.

Line 68: Can you say something about the temporal resolution of this dataset, and how this compares to the other datasets used in this study?

Line 71: what kind of sea surface height data is assimilated? Remote-sensing data I assume?

Line 86: To be clear: The major difference between CMEMS and MIOST is the inclusion of the swath-altimeter data in MIOST? Both, MIOST and CMEMS use the MIOST technique to solve the mapping problem? I found that a bit confusing and would recommend choosing a different short name for what is now the MIOST product.

Line 95: Here you assume that CTWs have periods between 7 and 29 days? Can you justify this? Have most of the CTWs observed so far fallen in that range? (Aydın and Beşiktepe, 2022, state that CTWs typically fall into the 8-16d range and I'm wondering why you extend your range to 29 days.) Equation 7: T is the number of time steps but also denotes the transposed matrix X' , right? Maybe choose another letter for the number of time steps (N ?) to avoid confusion.

Line 146: "The TG clearly shows...": is this from visual inspection only or is there more evidence?

Figure 2: Legends: A bit pedantic but could you show the TG first or last in the legend? As it is the ground truth. Also, one legend might be enough – the filtered/unfiltered can be in the titles for the two panels. The time step is days?

Line 148: Have you already shown that the variability seen in the data is due to CTWs? Maybe based on previous literature? Or is it only an assumption at this point? Could the oscillations be caused by something else?

Line 172-173: In the previous paragraph you identified Bermagui as the TG with the lowest correlation of the filtered time series with the altimetry data. It seems a bit unfair using that one for the 2D validation. I understand that you choose the southernmost location and that it shouldn't matter as the shelf gets wider northward. But could you still justify that choice?

Figure 5: For better readability consider giving the distance from first point in kilometers on the x-axis. Also, you could have a marker on the x-axis to show the approximate location of the tide gauges such that the Hovmöller diagrams are easier to relate to the maps in Figure 4. In addition, for consistency, use the same labels for the time (y-) axis as in the other figures, i.e. time steps (which are days, I presume?) instead of actual dates.

Line 193: The EOF analysis is very informative but I think it needs to be explained better, particularly the spatial EOFs. You can compare them to the correlation maps in Figure 4 at lag 0 – there, you clearly see a see-saw on the shelf which is consistent with the first spatial EOF (of Bluelink, at least). Also, the figures need to be improved:

Figure 6:

- Shouldn't either the EOF amplitude or the PC amplitude have a unit (m)? That would be useful and would make the results more physical.
- upper panel: what is the location index and how does it relate to the distance in Figure 5?
- lower panel: time steps is days?

Figure 7: The information to be conveyed here is interesting but I wonder if you could do it differently? Instead of showing one panel for each day with all three datasets how about showing only three panels, one for each dataset. In the panels the EOFs could be shown for each time step (using different shades of blue/red/green) so that the anticlockwise rotation becomes very clear.

- as above, what is the location index and how does it relate to the distance in Figure 5?
- I think a unit is missing here.