

Review for: "Regional sea level budget over 2004-2022" by Marie Bouih, Anne Barnoud, Chunxue Yang, Andrea Storto, Alejandro Blazquez, William Llovel, Robin Fraudeau and Anny Cazenave (<https://doi.org/10.5194/egusphere-2024-3945>).

The paper and the figures have been significantly improved. However, additional adjustments could further improve the overall quality. The authors may wish to consider the following comments:

- Even though the estimation of trend uncertainties is not in the focus of this paper, the uncertainties are still crucial for the interpretation of the residual trends. Do you include formal fit errors in your trend estimates? For Figures 5 and 6, one could assume that the uncertainty of the CIGAR reanalysis is similar to the uncertainty of the whole ensemble and add this information to the corresponding plots.
- Subsection 4 is a bit confusing and may need a revision. For comparisons between GRACE and altimetry, the GRACE data is commonly transferred to the centre of figure (e.g. <https://doi.org/10.1029/2004GL020461>). You question whether the altimeter data are actually given in the centre of figure and conclude that they appear to be. You also mention possible inconsistencies in the modelling of polar motion in GRACE and altimetry data. Could you add a few sentences to explain the possible inconsistencies in more detail?
- The largest regional trend residuals occur in the North Atlantic, and the authors suggest that a spurious drift in the salinity measurements after 2015 may be responsible. This conclusion is not very well supported. Figure 7c shows that there is a residual drift throughout the whole time series rather than a drift starting in 2015. This should be discussed further.

#### **Specific comments:**

Lines 143-145: Since the barystatic component is related to mass changes on land, the water should not be distributed evenly but according to the fingerprint-pattern. However, these are very small numbers.

Lines 383-386 & lines 395-397: Now you mention signal of the large earthquakes in the GRACE mascons twice.

Lines 429-430: Check sentence: The results confirm the referential of altimetry ?

Lines 512-513/545: In fact, the residual trend patterns are similar, even though the manometric components do not agree. The dominant feature seems to be differences between the total and steric components that cannot be compensated by the rather small manometric component.

Lines 561/562: wouldn't the circulation estimate be shifted due to the spurious salinity values?

#### **Supplement:**

- Figure S1: could be improved by using same colorbar for trends as in figures 1 - 6, and the same color bar for all uncertainty-subplots
- Figure S2, Table S1: It is difficult to relate the low degree spherical harmonics to the actual physical drivers. Do different versions of the low degree terms give different results?