

# ***Interactive comment on “Major improvement of altimetry sea level estimations using pressure derived corrections based on ERA-interim atmospheric reanalysis” by L. Carrere et al.***

## **Anonymous Referee #2**

Received and published: 15 March 2016

### General comments:

The manuscript addresses the effect on satellite altimetry estimates of the height of the sea surface resulting from the application of new geophysical corrections using reanalysis (ERA-interim) pressure values instead of the ECMWF-based operational corrections. I think that the issue is relevant and the manuscript is scientifically sound. I recommend publication after some revision, mostly minor and concerning mainly the clear presentation of the work rather than the content itself. In this line, some improvement on the use of the English language would also be beneficial.

I would suggest some restructuring of the presentation to improve the readability and clarity of the paper. For example, the DAC is only introduced in detail in page 5 (section

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3.1), and then it is explained that it comes from a barotropic model forced by pressure and wind, but in the introduction the issue with the ECMWF used in the barotropic model is already stated (pg 2, line 22). As another example, the grids of DAC and DT corrections are referred in section 2.2 (pg 4, line 12) without any hint on how those grids are derived from the pressure values until later in the paper. Although a reader familiar with satellite altimetry processing can follow the ideas, I think that the presentation could be improved to make the paper easier to understand for a wider oceanographic readership. The acronyms should be fixed in the beginning and kept as simple as possible – for example, why use Dry\_Tropo\_ECMWF or DT\_ECMWF (pg 7, line 25)?

The comparison of Table 1 and Figure 1 can be confusing because of the differing start cycles used for the individual missions and the long-term series. It should be clear in the text whether the long term series correspond to spatially averaged observations (global MSL) or along-tracks time series resulting from the concatenation of observations from different missions.

Specific comments:

Page 4, line 30: “is calculated from a cyclic way...” - perhaps rephrase (not clear)

Page 5, line 3: “To go further to the coast...” - improve presentation, in the present formulation it appears that to go further to the coast SLA is considered instead of SSH, while what is meant is I think that to approach the coast along-track observations are considered instead of crossovers

Page 8, line 5: section 0

Page 10, line 28: SSH anomalies... SLA? (keep notation consistent)

Page 12, line 9: c.f.

Page 13, line 21: ...

Page 13, line 22: “misses a smaller spatial resolution”... is not clear, I suggest rephrase

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Figure 3: harmonize titles of upper and lower plots

Figure 10: the figure for TP/J1/J2 (left) seems to show a jump in SSH variance reduction at the end of 2013. Is it an artifact of the filter used, or a real feature?

Table 2: please add the corresponding uncertainties to the values presented in Table 2 (e.g 0.07 +- ... ). Is there a reason for the differences being 0 for J1 and highest for J2?

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