

## ***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.***

**R. Scharroo (Referee)**

remko.scharroo@eumetsat.int

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I am very pleased to have read this paper, as it makes very clear the progress made in determining the DAC for altimetry using the ERA-Interim sea level pressure and wind speed fields.

Nonetheless, I have numerous suggestions to improve the paper. Some are merely textual, some conceptual, but none ought to be too hard to apply in a minor revision.

Comments below are indicated by a pair of (page/line number).

(2/8) "deeply improved" -> "greatly improved"

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(2/11) "IB correction" was not previously introduced/explained.

(4/5) "If compared" -> "When compared"

(4/7) "improved compared" -> "better than"

(4/8) "Six-hour ERA-interim analysis" -> "Six-hourly ERA-interim analysis grids"

(4/24) "each studied" -> "each of the studied"

(4/26) "10 days". Why not 5 days, as this is the maximum time difference between ascending and descending tracks. With 10-day time differences you will create duplicate statistics, using the same measurements more than once.

(4/30) "HF part". "HF" was not previously introduced or explained.

(4/32) "computed ;" -> "computed;"

(6/1-6/8) Why would different filtering be used for TOPEX/Jason on the one hand (20 days) and ERS/Envisat on the other (70 days)? DAC is a physical phenomenon independent on the sampling frequency (just as tides). Of course, there are different aliasing characteristics just like tides, but the DAC per se is the physical phenomenon of the sea level variation due to pressure and wind ("weather") just like tides are due to sun and moon. Also, the Nyquist frequency is not 20 days, but 10 days in crossovers. So why the insistence on using a 20-day filter. Please explain.

(6/17) "radiationnal" -> "radiational"

(6/24) "Ocean ... Earth." -> "oceans ... land."

(7/4) "EN" -> "Envisat" (as in most other cases)

(8/1) "altimeter" -> "altimetry"

(8/7-8/10) Would it not be better to "remove-replace", i.e. remove the S1-S2 atmospheric tides from the model grids, then replace it along-track.

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(9/9) "cm" -> "cm<sup>2</sup>"

(9/10) "2-3 cm" -> "1-2 cm". I doubt this range. First: the difference DAC\_ERA-DAC\_ECMWF is no more than 1.8 cm std.dev. globally, so how can the SSH error reduce 2-3 cm std.dev. globally? Second: the crossover variance reduction is quoted as 5-12 cm<sup>2</sup>, which leads to SSH variance reduction (on a single track) of 2.5-6 cm<sup>2</sup>, which suggests an error reduction of 1.6-2.4 cm maximum. Therefore 1-2 cm is a better indication.

(9/13) "+/- 1 cm" -> "+/- 1 cm<sup>2</sup>"

(9/15 and a number of other places) "DAC-ECMWF" -> "DAC\_ECMWF"

(10/26) "ERA-1" -> "ERS-1"

(10/27) "10 cm" -> "10 cm<sup>2</sup>"

(11/30) "nearly the global" -> "nearly everywhere across the global"

(12/29) "2-3 cm" -> "1-2 cm" (see comment on (9/10))

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