

Interactive comment on “Sea level budget over 2005–2013: missing contributions and data errors” by H. B. Dieng et al.

Anonymous Referee #1

Received and published: 22 May 2015

Comments on 'Sea level budget over 2005-2013: missing contributions and data errors' by Dieng et al. (OSD)

This paper looks into how well one can explain global mean sea level change during the altimeter era in terms of ocean mass and steric changes, for which there are different versions of the 3 separate data sets (GMSL, Mass and Steric). Steric refers only to the steric contribution to 2000 m, so they define:

$\text{Residual} = \text{GMSL} - \text{Mass} - \text{Steric}$

so Residual could come from errors in the 3 parameters or from steric changes below 2000 m.

The gist of the method is to see how similar the time series of Residual is to the

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individual time series of GMSL etc. They assume that if Mass (say) is perfect, then the correlation between Mass and Residual time series should be zero. I can agree with this, but they don't discuss other scenarios.

For example, suppose GMSL and Steric are just junk (and white noise) and Mass was perfect. Then Residual and Mass would be correlated and, by the logic of this paper, the authors would conclude that that was the one in error.

So, I can see what they are trying to do, which is worthwhile. But they don't explain themselves as well as they could and they should include reservations about their methods such as my objection above.

There is of course an unsatisfactory aspect to their using only global mean values, in that they discard all the important information in the spatial distributions of these parameters. They should mention that somewhere.

A thing I found irritating is the literature references on page 704 which show the many papers written on variations of this topic by different people in related groups. It would be good to have one decent study of this topic instead of these many small papers.

Finally there are sections for which the wording is poor. I have listed some below.

Detailed comments:

702, 15 and many times elsewhere - what does multi-annual mean in your case? You group them here into 'short timescales'. And I guess longer timescales end with the secular trends you mention in the previous sentence - you have only 9 years to play with anyway.

22 - the high-precision

26 - I would refer to the Table 13.1 in Church et al. 2013. (I assume this is what you are referring to)

703, 1 - amounted to

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22 - help in constraining
 25 - provides an estimate
 704, 14 - gravimetry respectively
 18 - less should be fewer
 20 - came to the
 25 - from the European
 25 - define ESA here instead of lower down
 space after (CCI)
 26 - sentence 'We use' makes no sense. drop it or expand it.

As mentioned above, the authors show that similar work has been done by others from the same organisations in the last year or so. What is the point of these many papers that provide only incremental information? Also, this paper fails in the aim it mentions of clarifying the deeper steric contribution, which these previous papers had concluded already was impossible due to data errors.

706, 3 and 5 - having the minus before the 0.3 may suggest to some people that you reduce the measured value by that amount, whereas it is actually increased to represent change in ocean volume. I would make this clearer.

This paragraph - you don't really discuss the differences in GMSL arising from the averaging methods, but refer to Masters etc. But it would at least be useful to later say whether your groups 1 and 2 for GMSL subdivide as they do because of the averaging methods.

line 15 - .. context of the ESA CCI 'Sea Level' project .. (these acronyms have been defined above)

17 - from TOPEX/Poseidon and Jason-1/2 with
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21 - biases
 24 - tide gauge records as well as
 25 - analysis
 707, 6 - I would insert here the discussion of the effect of the averaging methods you mentioned on the previous page
 6 and other places - Nina has a twiddle over the n
 10 - Deutsches GeoForschungsZentrum (GFZ) RL05
 11 - and the Jet ..
 19 - uncertainties
 22 - computed as described
 708, 10 - intervals
 14 - you write JAMSTEC sometimes and Jamstec others
 23 - averaged
 709, 2 and other places - multi-annual again
 8 - (https
 25 - remove the hyphens. Hyphens are not good English
 710, 1-3 - see my general comments above. This sentence COULD be true but need not be. Also one of the parameters could have a small scale error and there could indeed then be a correlation with the residual, but things would still be acceptable (with a small rms).
 11 - In late 2007
 14 - CU and GSFC

16 - 0.5 mm/yr between them.

17 - residual trends in Table 1

again, at the end of this para I would insert mention of the averaging methods if appropriate

22 - show in Fig.3

26 - trajectory to

27 - obvious → clear

711, 6 - comma for mod-2008,

9 - comma for Thus,

11 - drop somewhat

12 - you use the word 'residual' here to mean the difference from CCI and not your 'residuals'. I would use 'differenced' instead of residual here.

Interactive comment on Ocean Sci. Discuss., 12, 701, 2015.