

Interactive comment on “An Accurate and Homogeneous Altimeter Sea Level Record from the ESA Climate Change Initiative” by Jean-François Legeais et al.

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We would like to thank reviewer #1 for his/her contribution to our paper. First, an anomaly occurred in the numbering of the sections (there was two section 4). This has been corrected.

Reviewer 1, comment 1: Errors and uncertainties:

“Sources of errors are discussed in the article as well as discrepancies, however, a reader is left without an error quantification for some outputs of the data set. I would expect error bars for global sea level rise and error maps for regional trend map. More-

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over, I don't see any reference to the IPCC, where sea level was well considered, e.g. will this data set contribute to the next IPCC report? “

Answer to reviewer:

Section 6 is dedicated to the mean sea level error characterization and uncertainties. We would like to stress that the first goal of this section is to make the users aware of the different contributors to the altimeter sea level errors (with associated references). An estimation of the global MSL trend uncertainty is provided (0,5 mm/yr during 1993-2015 within a confidence interval of 90% / 1.65 sigma), which can be considered as an error bar of the GMSL rise. The regional MSL trend uncertainty is discussed and the sources of errors are listed with some references. Within the SL_cci project, different studies have been carried out regarding the sources of uncertainties, errors bars, confidence envelope and inter mission biases (see for instance: http://www.esa-sealevel-cci.org/webfm_send/537). However, the MSL error characterization is still an activity in progress within the project with a focus on the estimate of a confidence envelope of the GMSL during the total altimetry period (error bar of the global mean sea level rise). A dedicated article will be written when results are finalised.

Text modified:

Section 5 (will be section 6) has been reworded considering this comment and the additional comments of reviewer #3. In addition, the following sentence has been added at the end of the section: “The MSL error characterization is still an on-going activity within the SL_cci project and further details regarding error bars and uncertainties will be published when results are finalised.”

Answer to reviewer:

The IPCC 2013 is cited in the first sentence of the introduction, highlighting how important the sea level record has been considered. We currently do not know whether the SL_cci dataset will contribute to the next IPCC report. However, intense com-

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munication has been carried out during international conferences and with scientific publications to make the scientific community aware of this dataset. In addition, a dedicated delivery has been made to the Obs4MIPs community which aims at making observational products more accessible for the climate modelling community.

Reviewer 1, comment 2: Arctic sea level:

“Two new Arctic sea level records are mentioned and cited but nothing is showed in the article. Due to the importance of the Arctic Sea, some results have to be presented and discussed, in particular agreements/disagreements between the two products and some validation and comparison of the two products. Why the first data set does not include ERS and CryoSat?”

Answer to reviewer:

It is mentioned in section 2 (will be section 3) that two different Arctic sea level products have been developed within the SL_cci project but we have not provided more details on these products for different reasons: i) this is not the first objective of the paper, which rather focuses on the sea level ECV product (gridded sea level maps) and we wanted the article to keep a reasonable length; ii) dedicated papers have been or will be published regarding these Arctic sea level datasets: the processing of the CLS/PML product is described by Poisson et al. (2017) and the one of the DTU/TUM products is described by Passaro et al., 2017. In addition, both products have already been compared and the results can be found in Carret et al. (2016).

Text modified:

A reference to Carret et al. (2016) was missing and has been added in the text (at the end of section 3). An additional quality assessment of these Arctic sea level products has been carried out and the associated results are planned to be published soon. Thus, we have only added the reference to Carret et al. (2016).

At last, note that the CLS/PML Arctic sea level product has been generated within

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some SL_cci R&D task and the time required for its development and production did not allow the ERS and CryoSat-2 data to be included.

Reviewer 1, comment 3: Access to the data:

“The data set accessible via the given DOI identifier, however, the access mechanism to data is questionable as people have to send an e-mail and get permission. I see the producers want to take track of users, but there are automatic methods to do that, while users want download easy and immediate.”

Answer to reviewer:

The access to the data is for free after sending an email. Such a choice compared to a direct and immediate access has been the subject of long discussions within the CCI projects in charge of the different ECVs covered by the ESA program. Indeed, the plan was to provide a free access to the sea level data. However, ESA and the SL_cci consortium thought that it is essential to know the users in order to inform them about evolutions and above all to better answer their needs. Thus, a request for access by email has been selected.

Text modifications (typos listed by reviewer #1):

Page 4, row 23: Done.

Page 5, row 16: Done.

Page 13, row 27-29: Done.

Page 19, row 31: Passaro et al., 2017 is still under review.

Page 20, row 4: the reference Prandi et al. (2017) has been removed as it is still not published.

In addition, the overall quality of the written English has been improved following the review of co-authors. Figure 16 has been changed in landscape format and the pre-

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sentation of Figure 17 has been improved. Additional evolution of the text and figures has been provided following the comments of reviewers #2 and #3.

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