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

Anonymous Referee #1

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In this paper, the authors illustrate an altimeter Sea Level Record generated within the ESA Climate Change Initiative.

The article fits properly with the aim and scope of the journal. The data set described in the article is certainly unique and useful for ocean sea level monitoring and understanding of its variability as well as the factors at the origin of observed changes. Moreover, the data set is also important to validate climate models used for projecting future changes. In summary, an accurate and homogeneous altimeter sea level record from multi-mission altimetry is very welcome in the ocean and climate communities. The data set is in netcdf and usable in its current format and size. The metadata are

appropriate and everything is well documented in reports and published papers.

With reference to the content of the article, the authors describe the last reprocessed product and then provide some validation results obtained through different approaches. The author use other sea level data sets provided by other groups. Comparisons are made with tide gauge measurements, other sea level data sets generated using available source (Argo and GRACE) as well as model outputs. The sea level errors and uncertainties are discussed and the perspectives of evolution of the sea level product are provided.

This paper is well written and clear, structured properly to support the publication of the data set. The material is also presented in very good editing style. All figures are carefully prepared and clearly illustrated. The language is consistent and only few typos are identified. The rationale is explained clearly. The methods and materials are described in sufficient detail in previous published papers that are properly cited. The comparisons are carried out with rigour. The conclusions and perspectives are included in an appropriate way at end of paper.

Nevertheless, I would like to draw attention of the authors to some important points:

1) 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. Moreover, 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? 2) 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? 3) 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.

This is a paper that deserves publishing in ESSD after above points are addressed.

What follows are some typos identified:

Pg. 4, row 23, “Data from the other missions (also called complementary missions) contribute to improve. . .”: add “that” before contribute the make the whole sentence correct

P. 5, row 16, “are”, change to “is”

Pg. 13, row 27-29, please apply right character type and sie

Pg 19, row 31, “Passaro, M.,”: update the reference (in press or published)

Pg. 20, row 4, “Prandi ..”: update the reference (in press or published)

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