

Interactive comment on “DUACS DT2014 : the new multi-mission altimeter dataset reprocessed over 20 years” by M.-I. Pujol et al.

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Referee: This paper describes the latest revision (DUACS DT2014) of the processing system behind the very popular satellite altimeter-based gridded sea level product - known to many researchers as the 'AVISO sea level data'. Indeed, this gridded altimetry product is frequently used in preference to the along-track source data, so many users have lost sight of the many issues associated with the processing of the along track data to the SLA stage, or the multimission gridding process. In this context, the release of a new version of this data set is a very significant announcement, and is an opportunity to inform and educate the users. The paper describing the production and assessment of the data set, and how and why it differs from its predecessor, is bound to be heavily cited. In my opinion, however, the present draft of this paper is not yet satisfactory for this heavy responsibility.

C1

Authors: We acknowledge Rev. #1 for his/her review. All the comments and remarks have been considered and we think that they have contributed to the improvement of the manuscript. In the next paragraphs we present the reviewer's comments followed by our point-by-point reply.

Referee: I think this paper needs to be extensively re-written. It is very light on specifics, but still manages to be 24pp of text, which takes far too long to read for the amount of detail that is presented. The 2nd sentence of the abstract "Numerous and impacting evolutions have been implemented at each step of this new data processing" is indicative of the poor English and imprecise style of the whole paper. Reviewing criterion 11 "is the language fluent and precise?" is certainly not met.

Authors: The authors will ask for an English grammar and spelling correction service.

Referee: There are many details of the processing that should be explained, but are not. Indeed, the abstract mentions only "The main one is the use of...". The other 'evolutions' are not listed in the abstract. Review criterion 9 is therefore not met.

Authors: The abstract was changed in order to mention all the other changes directly impacting the SLA grids field quality. The change of the reference period is rather identified as "impacting change for users".

Referee: Section 2 on "Data processing" says the "altimeter standards" were chosen by a rigorous selection process (described by Ablain et al 2015). Altimetry specialists will know what is meant by this but a little more explanation would help the target audience of this paper, so that they can understand the cause of the differences between the resulting product and its predecessor (which will have impacts on analyses and interpretations of the older dataset). For example, on p23 line 26 there is mention of

C2

the east-west dipole error that has now disappeared because of the new 'standards'. This needs to be much better explained.

Authors: We do agree with you comment and we have improved the paper describing in more details the impact of new altimeter standards.

Referee: Page 8 discusses the changes made to the 'multimission mapping' or gridding process. A critical change is a 'better defined correlation scale' which needs a more quantitative explanation. Conversely, the change to a finer spatial (0.25 deg) and temporal (1 day instead of 7 day) sampling could be much more compactly described.

Authors: Additional information about the new correlation scales was added in the text. The authors however considered that the description of the change of the spatial & temporal grid sampling is also important. Some users indeed asked details about this change via AVISO services. The description of this change was moved in a specific annex.

Referee: Page 13 says that dynamic height anomalies from T/S profiles are compared with the 'equivalent' field from altimetry. There should be mention here that the third term in this equation is the eustatic change of sea level.

Authors: The physical content of DHA and SLA are indeed not directly comparable. Mass contribution deduced from GRACE measurement need to be added to the DHA for absolute comparison with altimetry field. In this paper, we however use the T/S profiles for a relative comparison, considering two different SLA datasets. In that case, DHA may be sufficient to detect the differences between the two SLA datasets considered

The section was completed as follow: "Quality controlled Temperature/Salinity (T/S) profiles from CORIOLIS Global Data Assembly Center were used. The T/S profiles

C3

processing used in this paper is the same as described by Valladeau et al (2012) and Legeais et al (2016). The Dynamic Height Anomalies (DHA) deduced from T/S profiles (reference depth 900dbar) are compared to the SLA field from gridded "all-sat-merged" products. As discussed in Legeais et al (2016), the DHA are representative of the steric effect above the reference depth, while SLA is representative of both barotropic and baroclinic effects affecting the entire water column. In spite of this difference of physical content, the relative comparison between altimeter SLA and in-situ DHA is sufficient to detect differences between two SLA altimeter products."

Referee: The results of the comparisons of the new data set with its predecessor, and with independent data (tide gauges, drifters) are an interesting part of the paper, but the description of these results needs to be much clearer and informative. For a start, there is too much use of the word 'products' instead of geophysical quantities. See the caption to Fig. 5, for example. Wording in many places needs to be much clearer, for example page 17 line 25 refers to the 'DT2014 currents intensity' and then the 'variability'. My guess is that the 'intensity' is a measure of the time-mean, but I am not sure.

Authors: The term "product" was replaced in various place of the manuscript by the physical field considered ("SLA" in the major part of the cases). Additionally, the legends of the figure were clarified (see also specific comment on figure captions). The terms "current intensity" in page 17 was replaced by the appropriate term "current speed". In the same way, "variability" was replaced by "rms of the zonal and meridional components of the current".

Referee: Some qualitative conclusions could also be better justified. The page 19 line 25 statement "thus reinforce our confidence in these good results" came as a surprise to me after reading of changes that are near zero, or a mix of positive and negative

C4

values.

Authors: This sentence does not give additional information to the reader. It was removed from the manuscript.

Referee: The English of the paper (grammar, vocabulary, spelling, phrasing) certainly needs to be improved throughout (as well as the imprecise style). In some places the poor English is understandable "...error was quite two time more stronger.." but in many places it is not (e.g. "where belong +400cm²/s² are observed"). I had to consult a dictionary to find out what 'restitute', 'conduce' and 'traduce' all meant. The word 'underline' is idiomatically correct but heavily over-used, as is 'impacts'. "From" is spelled "form" in several places.

Authors: The authors will ask for an English grammar and spelling correction service.

Referee: The Figure captions all need to be improved. Example 1: it is ambiguous to describe Fig. 12b as showing the 'variance reduction'. The values are mostly negative. Is a negative reduction a reduction or an increase? It is clearer to say 'change'. Example 2: Fig. 15a shows the "MSL trend difference between DT2014 and DT2010" while 15b shows the "MSL differences..". The M in MSL usually stands for 'mean', sometimes a time-mean, but sometimes a spatial mean. In 15a it can be neither, while in 15b it must be the spatial mean.

Authors: The figure captions were modified in order to avoid possible ambiguity.

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