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Interactive comment on "Evaluation of wet troposphere path delays from atmospheric reanalyses and radiometers and their impact on the altimeter sea level" *by* J.-F. Legeais et al.

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Received and published: 25 July 2014

Please find below the point by point answer to the Referee Comment:

1. We agree that for the ECMWF operational model, we use the already interpolated values provided in the altimeter products. This will be clarified in the text, at the beginning of section 2.3. We did not estimate the ECMWF operational WTC from the products provided by EUMETSAT because we did not have the access to these products for all missions over the altimetry era. Thus the operational ECMWF WTC has been received from a third-party whereas the correction from ERA-Interim has been computed by us from gridded fields. As we have access to the ECMWF operational 3D

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fields over 2013, we have been able to check that our procedure used to compute the correction from the gridded fields gives the same results as the procedure employed by the third-party and this difference of procedure has no impact in our results. The fact that there is no difference between our procedure of computation and the one from the third-party will be added in the paper when describing the method of comparison in section 2.3.

2. Page 1619, line 14: We have not discussed the method used to calculate the MSL since it is described in the reference given in the text (AVISO MSL webpage) with enough details for someone who would like to apply this procedure. In addition, except for the radiometer corrections described in section 2.2, we have not given details concerning the altimeter corrections / standards adopted for all missions since it has no impact on our results. Indeed, the altimeter SLA has to be corrected from various geophysical effects (ionosphere, ocean tide...) but using version Vx or Vy of any of these corrections will not change the results of our study: the impact of using a modeled or instrumental WTC will not be affected. So we think it is not worth to give more details on this subject in the paper.

3. We agree that more details should be given on the lack of consistency in the ECMWF model provided in the altimeter products and the following reference will be added in the paper: "Fernandes, M.J.; Lázaro, C.; Nunes, A.L.; Scharroo, R. Atmospheric Corrections for Altimetry Studies over Inland Water. Remote Sens. 2014, 6, 4952-4997".

4. Page 1620, lines 5-7: The criteria used to select the crossover points were not used for other analyses. This will be added in the paper at the end of section 2 with this sentence: "This selection is performed only for the crossover point analysis in section 3." For other analyses, the selection is indicated in the caption of the associated figures (Fig. 1, 3, 4 and 9). In addition, the only editing criterion used for the radiometer WTC is a threshold so that WTC out of the range [-0.50m, 0.0m] are edited. This information will be added in the paper at the end of sec-

tion 2.2. More general information on the editing criteria of the altimeter SLA is available in the handbook of each altimeter mission available on the AVISO website (http://www.aviso.altimetry.fr/en/data/calval/systematic-calval.html).

Minor points:

Page 1618, line 1: this will be corrected: "grids with a 0.75° x 0.75° spatial resolution for ERA-Interim"

Page 1618, line 17: This should be: "T/P Merged-GDR products". This will be corrected.

Page 1618, line 25: OPR will be defined and the sentence will be modified as: "the correction of the Ocean Product (OPR, ERS equivalent of GDR product) is used."

Page 1619, line 26: Terminology "SSH performances" used in section 3. A statement describing what it means will be added in the paper: "In this study, the term 'SSH performances' is used to assess in which extent altimeter sea levels are similar at the crossover points between ascending and descending tracks, which is thus only related with high frequency signals".

Page 1620, line 26: Even if the 6-hour temporal resolution of the ECMWF operational model has not changed, we consider that the short temporal scales of the associated WTC have been improved since 2006 thanks to the updated data assimilation process and evolutions of the model itself. So we have not changed the sentence.

Page 1622, line 18: this will be corrected: "wet troposphere correction"

Page 1622, line 25: "Biases between the different radiometers have been removed": In this study, we are not interested in the absolute biases between radiometer measurements but rather in their relative long term evolution. Thus, the biases between the different instruments have to be removed. Otherwise the estimations of the drift of the differences with models are affected and the long term behavior of the wet troposphere content cannot be discussed. For information, the observed biases are 0.13

cm (ERS2-ERS1), 0.58 cm (Envisat-ERS2), -0.80 cm (Jason1-TOPEX) and -0.07 cm (Jason2-Jason1). The measurements from the 'verification phases' are used to precisely estimate these biases. During these periods, the satellites follow each other in close succession and the same atmosphere is measured by the onboard radiometers. By convention, the first mission (TOPEX and ERS-1) is used as a reference, as performed for the altimeter sea level (see the MSL section of the AVISO website for the description of the method). A description of this method used to determine the biases will be added in the paper.

Page 1622, line 6: "instruments on board satellite altimeters" will be used

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Interactive comment on Ocean Sci. Discuss., 11, 1613, 2014.