

## ***Interactive comment on “How well can we derive Global Ocean Indicators from Argo data?” by K. von Schuckmann and P.-Y. Le Traon***

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Dear Reviewer,

thank you very much for reviewing our paper which will help us to improve our manuscript. We have added responses to your comments below.

Yours sincerely,

Karina von Schuckmann and Pierre-Yves Le Traon

1. General comment: The purpose of the validation procedure of our method is to generally test the functioning of the procedure itself, and is not necessarily to specifically being applied for OHC and GSSL validation. It is difficult to use satellite altimetry for

C334

validation purposes of in situ data as still differences/discrepancies/relations between the steric component and total sea level are under debate (see third paragraph of the introduction). The use of satellite altimetry was only used to validate the box-averaging method as well as the effect of the Argo data sampling (changing with time). We have included the remark concerning the sensitivity of OFC calculations in the text: L.24, p. 1004 sentence is added: Especially computations of OFC is sensitive to the reference climatology (see Boyer et al. (2007) for more details on the freshwater calculation).

2. page 1000, ln 2: We have changed “Argo deployments began in the year 2000 and by November 2007 the array was 100% complete, covering the global ocean from the surface down to 2000m depth.” to “Argo deployments began in the year 2000 and by November 2007 the array reached its initial goal of 3000 floats operating worldwide.”

3. page 1000, ln 27: We add the reference: - Wong, A., R. Keeley, T. Carval, and the Argo Data Management Team, 2010: Argo quality control manual Version 2.6 , Argo data management (<http://www.argodatamgt.org/>).

4. page 1001, lns 9-13: In ln 11 we change the references “(Bindoff et al., 2007; Cazenave et al., 2009)” to “(Cazenave and Llovel, 2010; Churruarín and White, 2011)”. In ln 13 we add the reference “(Bindoff et al., 2007)”

5. page 1010, ln. 22-26: Thanks to your comment we have recognized that we had submitted an erroneous time series (bold line in Figure 4, Global mean SSH from the ARIVO grid, see added Figure). We change this:

Before: global mean SSH was based on the total ARIVO grid, and a mean seasonal cycle has been not removed before calculating the global average. The mean had been removed from the global mean time series.

Now: global mean SSH is based on AVISO grid where a mean seasonal cycle (AVISO 2004-2009) has been removed at every grid point. Then, the global average is evaluated. Hence, no differences in the slope are evident. We excuse this error.

C335

Additional references:

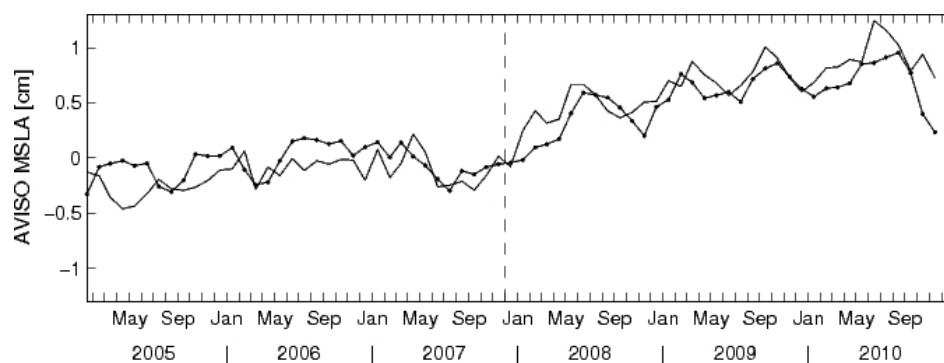
Boyer, T., S. Levitus, J. Antonov, R. Locarnini, A. Mishonov, H. Garcia and S. A. Josey, 2007: Changes in freshwater content in the North Atlantic Ocean 1955–2006, *Geophysical Research Letters*, 34, L16603, doi:10.1029/2007GL030126.

Cazenave, A. and W. Llovel, 2010: Contemporary sea level rise, *Annual Review of Marine Science*, 2, 145-173.

Church, J.A. And N.J. White, 2011: Sea-level rise from the late 19th to the early 21st century, *Surveys in Geophysics*, DOI 10.1007/s10712-011-9119-1.

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C336



**Fig. 1.** Figure4 corrected (see text for more details).

C337