

Interactive comment on “Empirical correction of XBT fall rate and its impact on heat content analysis” by M. Hamon et al.

M. Hamon et al.

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Received and published: 30 March 2011

Dear reviewer,

There seems to be some misunderstanding in what is the primary goal of this paper: the correction of XBT data. The aim of this paper is to present a new XBT correction method based on collocated data, an update of earlier studies adopting a similar approach. These include especially the work of Wijffels et al (2008) which is now a reference for the correction of XBT biases. The analysis of the depth bias highlights the importance of proceeding by type of data, deep and shallow XBT (corresponding to T4/T6 and T7/Deep Blue) as stated in Wijffels et al (2008). We take into account the temperature of the sea water where the probe was deployed (Thadathil et al, 2002). Moreover, we specify a special case of probes launched in western Pacific basin as

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they show a different behavior compared to other XBTs. This somewhat unexpected regional characteristic is important to take into account to derive a proper correction of XBT biases. According to Gouretski and Reseghetti (2010) we find that it was necessary to apply first a pure thermal correction; we perform a thermal correction that is different from the one they used. For some years, the thermal bias is twice as small compared with their results. As mentioned in the paper, this difference can probably be explained by our more stringent criterion on collocated data.

At the end of the paper we present a figure showing the evolution of the global ocean heat content (OHC) using observations mapped on a latitude and longitude grid (XBT,MBT,CTD). This is however a minor part in our paper whose main object is to derive a new correction for XBT biases. We present the OHC calculated with raw XBT only, corrected XBT only, all raw database and all corrected database. This figure demonstrates that our correction allows the entire XBT database to fit the CTD/OSD database. This figure demonstrates the robustness of our correction based on collocated data (about 10% of entire database). We also confirm in the paper that the bump in the 70's was totally due to XBT biases but as you correctly pointed out we missed to reference important papers that deal with this subject (e.g. Domingues et al, 2008; Ishii and Kimoto, 2009). This will be corrected in a revised version of the manuscript.

Yours sincerely,

Mathieu Hamon

Interactive comment on Ocean Sci. Discuss., 8, 291, 2011.

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