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Interactive comment on "Comparison of N. Atlantic heat storage estimates during the Argo period (1999–2010)" *by* N. C. Wells et al.

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Referee 1 7 January Specific comments: 1. My major concern is with the calculation of stat. significance and trend uncertainties. In particular, how were degrees of freedom for each dataset calculated, and how was temporal autocorrelation accounted for? This is not given in the Methods.

Reply: The problem of autocorrelation and how it is accounted for is explained in the methods section.

2. I would prefer that anomalies were calculated by removing each dataset's climatology, rather than the same dataset from both. 3.

Reply: The view we took was to reference it to a common climatology which was

WOA2001. This was the climatology used for TAMARA heat contents anomalies. The EN3 are total heat contents and much of the data set was in fact based on WOA2001 and therefore we thought that this was a reasonable approach. We have discussed more fully this in the methods section. Comparison of climatologies is another separate problem. We could have used WOA2005 or WOA 2009 but this is another major piece of work.

3. The correlations between the datasets are interesting and useful, if alarmingly low, Regressions between the datasets would add to this by including differences in the datasets' variances.

Reply: We didn't understand this point.

4. Clearly the EN3 has higher variance at high frequency, and it's possible the comparison is unfair if the TAMARA dataset can't represent those high-freq. signals. It might be fairer to compare the two datasets at the time-frequencies for which both time series can be reasonably expected to represent, using moving averages, autocorrelation functions or spectral analysis.

Reply: A fair point but the time series is not long enough to separate it out in this way. That's why we separate it into 2 periods to compare the two series. The data set is rather short at 12 years and therefore spectral analysis results were not presented in detail. The autocorrelation has been estimated and the statistical analysis has taken this into account (See point 1)

4. Too many figures and Tables.

Reply: Point taken and they have been considerably reduced.

The information in Table1 is mostly reproduced in Figure 3, so why not just have the Figure; similarly, the infoin Tables 2-5 is replicated in later figures. Figures 3 and 4 could be easily combined,as could Tables 6 and 7.

Reply: We have reduced the tables significantly, and mentioned more numbers in the

text.

I did not find reference to Figure 2 anywhere in the text. Reply: This has been corrected. .

Technical comments: 5. Page 2364, Line 7, typo: missing 'is' between 'One' and 'derived'

Reply: Correct.

6. What do TAMARA and EN3 stand for (I assume they're acronyms)?

Reply:They are acronyms

7. Lots of different superscript symbols occur for 'degrees' throughout the text, none of them correct.

Reply:They are now consistent.

8. Page 2366, Line 26, typo: missing 'the' before second 'Argo'

Reply: Correct.

9. Page 2367,line 12, grammar: 'data' is plural, so 'comes' should be 'come' and 'is' should be 'are'

Reply:The two verbs identified refer "majority" rather than "data"

10. Page 2367, line 24: why 4 standard deviations? Reply:We have added a reference which explains the method.

11. Page 2369. line 15: 'Of these Argo floats...' Of what Argo floats?

Reply: We have removed this phrase. Interactive comment on Ocean Sci. Discuss., 10, 2363, 2013 .

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