

Interactive comment on “Global representation of tropical cyclone-induced ocean thermal changes using Argo data – Part 1: Methods and results” by L. Cheng et al.

Anonymous Referee #1

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General comments:

This paper by Cheng et al. explores ocean thermal responses to tropical cyclones using data collected by Argo floats. The analysis shows interesting features, including differing ocean responses to tropical cyclones of different intensities. The paper is well written. The results presented in this paper (Part 1), however, mostly confirm findings from previous studies. In addition, it is not worth devoting so much space to the description of the footprint method and the estimation of background variability (sections 2.2 and 3). It may be better to put them in the appendix. After having a rough look at Part 2, I would like to suggest the authors combine the two parts into one paper. A combined paper would fit better within the scope of Ocean Science, and

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would present the interesting results in a concise way.

Some specific comments on the current paper (Part 1):

(1) Lines 20-21 on page 2836: They can also be affected by horizontal advection, see e.g. Huang et al. (2009).

(2) Line 15 on page 2848: Do the authors mean the turbulence that is generated via stirring but not related to shear instability? Please clarify.

(3) Lines 3-17 on page 2848: Please shorten this part, as it is not necessary to describe these well-known processes in detail.

(4) Lines 20-21 on page 2848: Please compare Fig. 10 with previous case studies, e.g. Fig. 1b shown in Price (1981).

(5) Line 10 on page 2849: I don't understand why geostrophic adjustment may be one physical mechanism. Please explain it.

(6) Lines 12-18 on page 2851: The authors' two explanations for the stronger warming seem unreasonable. Probably it is better to remove the climatological seasonal cycle first before any further analysis.

(7) Line 9 on page 2852: "observational" should be "modelling"?

References:

Huang, P., T. B. Sanford, and J. Imberger (2009), Heat and turbulent kinetic energy budgets for surface layer cooling induced by the passage of Hurricane Frances (2004), *J. Geophys. Res.*, 114, C12023, doi:10.1029/2009JC005603.

James F. Price, 1981: Upper Ocean Response to a Hurricane. *J. Phys. Oceanogr.*, 11, 153–175.

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