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Interactive comment on "A comparison between vertical motions measured by ADCP and inferred from temperature data" *by* H. van Haren

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I thank the referee for the comments. The text and abstract will be clearer on the results, which are different for different sea and ocean areas. This may explain the referee’s confusion. Small-scale waves are reasonably represented by linear advection model (being mode-2 waves), whereas the most energetic near-buoyancy waves not. Sub-inertial motions are presented using the Bay of Biscay and North Sea data, as is better described now.

I disagree that the method is rather crude, because it can also be used with data from a highly instrumented thermistor string (as shown). This method provides a direct indication of the importance of non-linear terms in the heat equation. I am not sure that the displacement method gives better results than the 1-D advection model. As indicated by Pinkel (1981) the computation of displacement over any prolonged period

of time may give poor results when isotherms wander in-and out of the window (due to advection, heating/cooling). This is certainly the case here for INP and FSC data. Also, instabilities are not accounted for by the displacement method, which is ambiguous across instabilities and thus biases towards coherent structures.

Yes, w is difficult to measure using ADCP, but that should not hamper us in trying. An appropriate benchmark for testing the quality of w is by using the fourth redundant beam data in the form of the “error velocity”, which incorporates the effects of any beam misalignment and the current inhomogeneities across the beam spread. This is made more explicit now. It is noted that the present data do not suffer from a lack of scatterers as they are obtained from sites relatively close to topography and /or bottom boundary layers.

The reading has been improved now. As for the figures: -Figure 1: Panel b is replaced by b and c in the form of histograms, as suggested. -Figure 3: Colours now stated. -Figure 4: Legend is not given, but it is better indicated what lines represent what terms. In all later examples w is given. Here it is chosen to verify the terms in (1), which is somewhat more appropriate. There is another reason: the resolution of Aanderaa thermistor string data is too poor in the near-bottom layer, rendering regular zero vertical gradient. -Figure 6: There is a clear w-signal, please compare w with e, now given in an extra panel.Yes, the temperature data are much less noisy, just better sensors. Nonetheless, the final result is not too bad and genuine.

Interactive comment on Ocean Sci. Discuss., 5, 103, 2008.