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Interactive comment on “Energetics of the layer-thickness form drag based on an integral identity” by H. Aiki and T. Yamagata

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It is a very well written and important paper. I do not have much to add to the comments by Richard Greatbatch. So just a couple of comments.

The fifth line of section 2 should be “expressions in rho-coordinates” not “expressions in z-coordinates”

Just before equation (1), replace “are described by (1), (2)” with “can be derived from (1), (2)”.

Five lines before equation (21) you refer to both the bolus velocity and the isopycnal mean velocity being three-dimensionally divergent. When Peter McIntosh and I pointed this out in the TRM manuscript, we had a huge fight with a referee and with the editor

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of JPO. In fact that second TRM paper was rejected by JPO and I had to appeal to the chief editor to get it published; more than 3 years after it should have been published! I insisted that this aspect of the paper remain, and so it did. Since it was very controversial, perhaps a reference here to that prior publication of the divergent nature of the velocities may be warranted.

I really liked your section 3.5.

Your equation (24) seems to be like two orders of vertical integration different to the usual down-gradient thickness idea for the bolus velocity. That is, your baroclinic velocity scales as the vertical integral of the slope of isopycnals (ie the vertical integral of thermal wind), whereas the usual down-thickness-gradient assumption has the bolus velocity proportional to the vertical derivative of the isopycnal slope. This difference, by two orders of vertical differentiation, might be worth pointing out.

In closing, I really enjoyed the paper (once I eventually cleared my desk to read it). And I apologize for my tardiness.

With best wishes,

Trevor

Interactive comment on Ocean Sci. Discuss., 3, 541, 2006.

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