

Interactive comment on “The vertical structure of oceanic Rossby waves: a comparison of high-resolution model data to theoretical vertical structures” by F. K. Hunt et al.

Anonymous Referee #1

Received and published: 8 July 2011

The authors study the vertical structure of the oceanic Rossby waves. In particular, they evaluate the accuracy of 4 theoretical models by comparing them with the structure computed from a high resolution Ocean GCM (namely the Clipper model).

Given the importance of Rossby wave to adjust the ocean dynamics, this work is an crucial topic of investigation. Overall, this work is well explained and especially easy to read and follow.

My main concern is the use of numerical results to assess the validity of the theoretical models. However the author clearly explained why the observational data coverage remains currently inadequate to test the theoretical models.

C389

I recommend this work for publication after considering the following comments.

Specific comments:

*) In the discussion, the authors referred several time to other studies in the North Atlantic (Lecointre et al., 2008; Chu et al., 2007; and Hagen, 2005). I wonder how some of the differences between these studies and the manuscript could be explain by the location. Actually, the authors clearly show that the longitude could change the behavior. So what about the latitude?

*) In Fig.5d, there is an inversion of the slope at the surface (roughly between 0 and 200 m). This behavior only appears for U BPD. How do the author explain that? Is it a well known behavior of this particular theory (as compared to the 3 others). This inversion is also visible in Fig.7d, is there anyway to test that in observational data to validate or invalidate U BPD as compared to the other?

*) I feel that adding a figure summarizing the RMSE as a function of depth could be useful (equivalent to Fig.9 but as function of depth). It will help following the discussion of the authors on which level is better from one theory to another.

Minor comments:

p.1102 - l.16&22: I guess that the "three" referred to the mean, mean+STD, and mean-STD. Please, clarify this in the text.

p.1103 - l.14&16: Please, replace BPC by BPD.

Interactive comment on Ocean Sci. Discuss., 8, 1089, 2011.