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Ocean Science
Discussions

Interactive comment on "Deep ocean exchange with west-European shelf seas" *by* J. M. Huthnance et al.

Anonymous Referee #3

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Review of Manuscript "Deep ocean exchange with west-European shelf seas" by J.M. Huthnance et al.

General comments: Huthnance and coauthors present a review of the processes affecting the deep ocean - shelf exchanges of water in the west European sector. Their main result is a budget of these exchanges, by region. Experimental and modelling results are used, some from the authors, others from the literature.

The physical processes involved in exchanges have already been described by the first author in a review paper (Huthnance, PO1995) and this paper is also a geographical extension of his work during the OMEX Project (Huthnance_et_al, JMS2002).

This study also touches upon nutrient and carbon fluxes, of great importance in present climate studies, as the role of shelves and coastal areas is now under intense scrutiny.

Overall, this discussion paper is correctly doing its assigned job, although perhaps there could be more new "substance" (there are only four figures, see below).

I was somehow pondering over the fact that the same authors have currently in press (Huthnance, 2009) or in preparation (Holt et al, in preparation, 2009) two papers about the same subject: I had not access to these two papers, and was wondering how much intersection there could be between the three papers.

I was also wondering if the review of physical processes was exhaustive enough: Could there be other mechanisms? Or could there be interactions between the various processes? Could seasonality be of importance in places other than off western Iberia? What about interannual variability? Can this be evaluated by some kind of indices? Could this be an avenue to give more "substance" to the manuscript?

Specific comments:

p.1062, l.4: "associated filaments off Portugal and north-west Spain": what about filaments in other regions?

p.1068, l.2: "Warm, saline North Atlantic Water (NAW) forms a poleward current": Is it always poleward? what about equatorward reversals?

p.1068, l.3: "The current is approximately barotropic": Is there experimental evidence to support this claim? Would you have references?

p.1070, l.1-3: "Large-amplitude (non-linear) internal tides can transport as much as 1m2/s...": Is this really substantiated by measurements? Would you have references?

p.1072, l.22-23: "These features are illustrated by tracer distributions in Fig.4": Some more comments on this figure perhaps?

p.1073, l.9: "in winter, (north-) westerly prevailing winds give mixing and downwelling":

What about south-westerlies? Do you get downwelling with "(north-) westerly" winds?

p.1079, l.3: "may not be continuous": Do you mean in space and/or time?

p.1079, l.6-7: "relatively small exchange in eddies": Is this really substantiated? Do we really have the experimental data supporting this claim? Could it be strongly intermittent?

Do you think it would be possible to put error bars on the figures given in Table 1?

Technical comments:

p.1067, l.4: "3-d physics-only model with $\sim$12 km resolution": Is 12 km resolution enough to correctly describe multiple physical processes at the shelf-slope-ocean transition, where topographical scales are O(few 10s km) or less?

p.1068, l.14 and Fig.2: Although there are only four figures in this manuscript, do the authors think that this Figure 2 is really necessary? Furthermore, this Figure is already in Huthnance, PO1995.

p.1069, l.26: Should it really be "cyclones"?

Interactive comment on Ocean Sci. Discuss., 6, 1061, 2009.