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

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Received and published: 24 August 2009

While we have substantial and improving quantitative knowledge of the way the deep ocean and shelf seas work, their mutual adjustment in the steep slope region is not well understood. In particular, the rates of exchange of properties across the slope remain largely undetermined, in spite of their critical importance and the fact that many of the mechanisms involved have long been known. This review by Huthnance and colleagues is a worthy attempt to summarise present knowledge for one of the better-studied regions of the shelf edge and to divine the way ahead..

A strength of the paper is that it is a comprehensive catalogue of all the work on the

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European Shelf edge with an extensive reference list. The observational material is presented under (i) a review of previous work, (ii) a section on exchange processes and (iii) another summarising the exchange in sub-regions of the European shelf. The result is slightly repetitive and makes for a rather heavy read with few diagrams. It seems to me closely related to the previous, thorough process summary in Huthnance 95 which, for my money had a better structure. It is interesting to compare Table 1 of the current paper with Table 5 of Huthnance95 – a similar selection of candidate mechanisms with contributions of Order $1\text{ m}^2/\text{s}$ but only marginally more evidence constraining numerical values.

The new feature of this paper which distinguishes it from the earlier one is the addition of the results of large scale modelling which seem to be the only way in which we might succeed in trying to quantify exchange. Unfortunately the modelling results are considered very briefly under “overall estimates” and are not directly compared with the inferences from observations. Table 1 gives transports m^2/s while the model results are shown in Sverdrups for sections of the shelf . It would be good to know the relative contributions of the different mechanisms if these can be teased out of the model results.

My main suggestions for improvement would be:

- i) one or more illustrative cartoons of processes
- ii) a revised structure with less repetition
- iii) more emphasis on the modelling results and what can be inferred from them and how they compare with the few quantitative estimates from observations

One small point that needs attention is the misleading statement at line 7 of p1068 that “Drifter observations . . . demonstrates its (the slope current’s) dispersion (Burrows et al.1999)” In fact these observations measured dispersion in and on either side of the current and demonstrated that there is dispersion minimum in the slope current which

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was manifest in the persistence of drifters in the slope current once placed there.

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

OSD

6, C381–C383, 2009

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