

# ***Interactive comment on “Water mass transformation in the North Atlantic over 1985–2002 simulated in an eddy-permitting model” by R. Marsh et al.***

**R. Marsh et al.**

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We agree with the Editor that the comments of both referees are pertinent and we intend to take these fully into account in our revision of the paper.

In response to Referee 2, we have laid out the questions addressed in the study, and this will be made clear in the revised Introduction section. Our success in answering these questions, and some inherent difficulties encountered, will also be covered in the revised Discussion section.

We assume that by “horizontal mixing scheme” you refer in general to “diapycnal mixing schemes”. In any case, we agree to outline the mixing schemes in OCCAM, and the issues raised by use of these schemes (spurious diapycnal mixing, etc.).

On revision, we will emphasise more strongly our motivation for using the independent

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SOC fluxes, rather than the NCEP fluxes. Furthermore, we will discuss biases in the SOC fluxes only in the context of validating OCCAM, and remove this “result” from the paper as we agree that this is not new (being originally reported by Grist and Josey 2003).

We appreciate that the editor understands the difficulty of decomposing transformation rates due to inferred “total mixing” into various mixing components. Successful “online” computation of diapycnal density fluxes is very challenging. Having undertaken this task several years ago with a lower resolution Atlantic-only GCM (Nurser et al. 1999), we are reluctant to attempt this diagnosis with an eddy-permitting GCM of the global ocean. We do, however, appreciate the concerns and interests of Referee 1, and we agree to discuss issues such as: the balance between “surface” and “interior” mixing; lateral near-surface mixing by eddies (especially in the vicinity of the subpolar front); spurious diapycnal mixing in OCCAM.

We thank the editor for a clear summary of the most important points raised by the two referees, and we look forward to improving the paper accordingly.

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