

bg-2014-462 response to the editor (08/07/15)

Dear Leticia Cotrim da Cunha,

We are very grateful for the time that you have taken to help us improve this manuscript. Below we detail how we have modified the manuscript in response to you 'last question'.

Editor's comment: 'I particularly appreciated putting the "numbers" in Sv for the advection and mixing in your reply. My last question to you is: wouldn't it be useful to use these numbers in a separate table, i.e. table 3 or a supplementary table?'

Author's response: We thank you for this suggestion, we agree that it is useful to display these values. Given that the values presented in our response to you were calculated for a representative MOC strength (because the strength of the MOC in practice varies between ensemble members and through time), we feel that it is most appropriate to present this new table in the supplementary materials. By including this in the supplementary materials rather than the main text we can clearly flag the table as illustrative only, and hopefully avoid confusing the reader, who seeing the table in the main text may get the impression that these values are constant across ensembles and time.

The new table (table S1) contains the following information:

Parameter set rank (as described in main manuscript table 2)	Horizontal advection (Sv)	Vertical mixing (Sv)
1	5.3	1.0
2	1.7	19.2
3	13.3	13.1
4	8.0	6.8
5	1.6	8.3
6	16.1	10.9

The table's caption reads:

'Illustrative values for the strength (Sv) of the different pathways through which water and therefore DIC can enter the surface subpolar North Atlantic box under each set of box model parameters. Horizontal advection refers to the top right horizontal red arrow, and vertical mixing the right vertical blue arrow in figure 3 (main manuscript). In the box model the horizontal advection examined here is calculated by multiplying the MOC strength by the sum of parameters 'a' and 'b', and the vertical mixing value is described by the parameter 'mix_{north}' (tables 1 and 2, main manuscript). To illustrate typical flux values in this table, calculations have been made assuming a constant MOC strength of 18Sv.'

This table is referenced in the final paragraph of section 3.3 of the revised main manuscript, where we discuss the alternative pathways through which DIC can enter the surface subpolar North Atlantic.

We thank you again for your thoughts and your time,

Paul Halloran (on behalf of the co-authors)