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Ocean Science Discussions

Interactive comment on "Technical Note: Is radiation important for the high amplitude variability of the MOC in the North Atlantic?" *by* D. Nof and L. Yu

Anonymous Referee #2

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General comments

In their technical note "Is radiation important for the high amplitude variability of the MOC in the North Atlantic?" the authors answer this question with "No". Their argument is based on the difference between spatial patterns of radiative fluxes and sensible/latent heat fluxes, in particular on their differences between the Atlantic and the Pacific. I found the logic of the authors' arguments to be flawed many a time and can therefore not recommend the paper for publication in its current form.

Specific comments

1) The authors claim that it is "inevitable" to conclude that radiation is unimportant to the MOC if one accepts that its collapse is responsible for Heinrich events and that present estimates of radiation terms are correct. I do not understand how they come to this conclusion and what the question whether or not an MOC-collapse causes Heinrich events has to do with the impact of radiation on the MOC.

2) The authors claim that the importance of radiation on MOC variability can be estimated simply by comparing average radiation fluxes with average sensible+latent heat fluxes. The argument is apparently that radiation can't be responsible for driving the MOC since net radiation is about the same in the Atlantic and the Pacific, with only the former having a significant MOC. Hence, the MOC must be driven by latent+sensible heat fluxes. However, I fail to see the logic of this argument. Why should, for example, a certain change in radiation pattern not lead to changes in the MOC? And why is it surprising that the sensible heat fluxes in the Atlantic differ from those in the Pacific, given that the SST in the former is at the same latitude usually higher than that in the latter? The question as to what is cause and what is effect in the system remains unanswered in the paper.

3) The authors claim that radiation is independent of air temperature. This is not correct.

4) I fail to understand how the authors come to the conclusion that "a reduced MOC will warm Europe". Given that this is in contrast to everything we know about the impact of the North-Atlantic current on Europe's climate, I'd be very interested in seeing a more conclusive argument of this claim than that given in the paper.

Given that it is impossible to follow much of the paper's logic, I cannot recommend it for publication in its current form. If, however, the authors would manage to present a logically more stringent argument of their claims I'd be interested to see them, given that much of the paper's conclusions are quite revolutionary.

Interactive comment on Ocean Sci. Discuss., 4, 699, 2007.

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Interactive Comment