

Interactive comment on “High resolution modelling of the North Icelandic Irminger Current(NIIC)” by K. Logemann and I. H. Harms

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Referee #1 provided valuable comments which helped to improve the discussion chapter and to increase the scientific meaning of our paper.

The referee criticises the comparison between model results and observations. He wants to see a more thorough discussion and in particular more explanations concerning the discrepancies between model and ‘reality’. He argues that otherwise the model could be seen as unrealistic. We basically agree on this criticism, however, we also see a problem with observations. Published estimated transport and heat flux rates are based on measurements at 5 distinct points (3 moorings and a quarter-yearly performed CTD section) on a section of around 100 km length. This method is not necessarily more accurate than a numerical model that solves the Navier-Stokes equations on a coarse grid. It is also of doubtful scientific benefit, if models are constrained

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too much and tuned to reproduce observations, in particular when they are scarce. Nevertheless, the new version will include a more detailed comparison and discussion between model results and observations. Beside Icelandic temperature recordings, we will consider in particular the measurements by Jónsson & Valdimarsson (2005) and focus on a detailed discussion of model results and observations. We discuss the possibility of a model underestimation of the NIIC volume and heat flux which could be caused by a overestimation of the eddy diffusivity and show the most probable reason for that (too high Smagorinsky constant).

The referee misses more information on the origin of strong high-frequency (wind) variability on section 7. This information will be given in the new version in chapter 3.3.1 and will be discussed in chapter 4.

The referee finds the discussion on the origin of heat flux variability in 3.3.1 obscure. We agree and we will explain the computation in more in detail.

Following the suggestion of the referee, we will reformulate chapter 3.3.2 so that it becomes more interesting and scientifically stronger. In the new version, the reason for the selected wind stress position is explained and also why we used the northern component. However, a detailed discussion why the north component is better correlated than the east component would be very complex and is beyond the scope of this paper. We will therefore neglect this point.

We agree on the suggested broadening of chapter 3.3.3 with respect to more observational data. We will present a 50 m temperature figure based on Icelandic data and we will refer to the possible underestimation of the 2002/2003 event (new figure 12). Through these measures, we are able to quantify the damping effect caused by data restoring and to explain in a more convincing way that high north Icelandic temperatures in 2002/2003 were caused by anomalous heat fluxes. Adding more observations in Fig. 10 and 11., as the referee suggested, means to include unpublished data. For several reasons, this was taken out of consideration.

We agree that a discussion on water mass characteristics, in particular with respect to overflow water masses being part of the NIIC, would increase the scientific meaning of our paper significantly. However, having in mind the general difficulty that models have with water mass characteristics, i.e. T,S data restoring and parameterised air/sea fluxes, we see no chances to include this topic without performing substantial additional work. We would like to focus on this topic in future publications.

All minor technical corrections suggested by the referee will be implemented in our new version.

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