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Reply to Interactive Comment on "Freshwater components and transports in the Fram Strait: Recent observations and changes since the late 1990s" by Anonymous Referee 1

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The abbreviations IMW and IFW have been changed to SIM (Sea Ice Meltwater) and IFB (Ice Formation Brine-enriched water), respectively, to be more easily distinguishable and in accordance with previous work (see 1. below).

The suggestions made by the reviewer are dealt with here in the order they appear in the review.

1. The use of the term Ice Formation Brine-enriched water (IFB) has been clarified by adding the following sentence on Page 584, line 23: "Rather, the southward transport of IFB through the Fram Strait represents a removal of brine, formed due to ice formation, from the Arctic Ocean and hence the southward transport of a freshwater deficit."

2. Page 583, line 11: Gerdes et al. (2008) corrected.

3. Page 584, line 28: "Garabto" changed to "Garabato". The article by Dodd et al. (2009) has been re-submitted but is not yet accepted. Hence, no DOI or article number can be given. The guidelines for referencing in Ocean Science state that articles submitted but not yet published should appear in the reference list.

4. Page 587, line 25: "Aandera" changed to "Aanderaa"

5. Page 588, line 15: Added "for the data within each hour".

6. Page 588, line 20: Changed "it's" to "its".

7. Pages 588-589 (Section 2.3): The FEMSECT inverse model is fully described in Losch et al. (2005). It uses a least squares optimization that minimize the differences between the data con-

straints and the model fields subject to the thermal wind equation with a non-zero barotropic velocity. The differences are represented by an objective function that takes account of the data-data covariance within each profile. In addition, the model imposes a smoothness by setting a theoretical limit on the horizontal gradients of temperature, salinity and velocity. We added the following sentence on Page 588, line 24 to clarify the constraints and results of the model: "The model is constrained by observations of temperature, salinity and velocity. It recalculates each of these quantities on the model grid for each iteration, minimizing an objective function that represents the model-data differences in a least squares sense." Further on Page 588, line 26 the following was inserted between "FEMSECT" and "Losch et al. (2005).": ". For further details we refer the reader to"

8. Page 591, line 12: Superscript changed to "18".

Additional alterations have been made as follows:

Page 601, line 26: "17to" changed to "17 to".

Page 604, line 30: "freat" changed to "great" in Haak et al. (2003).

Page , line 32 : Added "J. Climate" to Häkkinen (1999).

Table 1, caption: "7^{o}W and 4.0" changed to "7^{o}W and 4^{o}E".

References

Dodd, P., Heywood, K. J., Meredith, M. P., Naveira-Garabto, A. C., Marca, A. D., and Falkner, K. K.: The Sources and Fate of Freshwater Exported in the East Greenland Current, submitted to Geophys. Res. Lett., 2009.

Gerdes, R., Karcher, M., Köberle, C., and Fieg, K.: Simulating the long term variability of liquid freshwater export from the Arctic Ocean, in: Arctic-Subarctic Ocean Fluxes: Defining the role of the Northern Seas in climate, edited by Dickson, R. R., Meincke, J., and Rhines, P., chap. 17, pp. 405–425, Springer Science and Business Media, 2008.

Haak, H., Jungclaus, U., Mikolajewicz, U., and Latif, M.: Formation and propagation of great salinity anomalies, Geophys. Res. Lett., 30, 1473, doi:10.1029/2003GL01765, 2003.

Häkkinen, S.: A simulation of the thermohaline effects of a great salinity anomaly, J. Climate, 12, 1781–1795, 1999.

Losch, M., Sidorenko, D., and Beszczynska-Möller, A.: FEMSECT: An inverse section model based on the finite element method, J. Geophys. Res., 110, doi:10.1029/2005JC002910, 2005.