

Interactive comment on “Warming of waters in an East Greenland fjord prior to glacier retreat: mechanisms and connection to large-scale atmospheric conditions” by P. Christoffersen et al.

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We are very pleased with this positive review. The only issue raised is a need to show a direct comparison of temperature (T) and salinity (S) in the ocean reanalysis and those observed. This comparison has been made and is now included as a new figure.

Figure 6 (new) shows a very good agreement between modelled T, S for September 1993 and September 2004 and T, S observed during the same months at nearby stations. To be consistent, we made the comparison for the same outer continental shelf area used to show temporal T, S variability in Figures 5 and 7 and heat flow variability in Figure 7c.

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Due to the inclusion of a new figure, we have added the following text to section 3.2, which is now entitled ‘Shelf water exchange in the ocean reanalysis’ (as suggested by this referee):

“Temperature profiles for September 1993 and September 2004, as seen in the ocean reanalysis, are plotted in Figures 6a and 6b together with temperature profiles from station measurements taken in the same months at nearby locations. The comparison of reanalysis data and observations is favourable in that the former falls within the variability of the latter. The ocean reanalysis profiles are calculated for the box shown in Figure 6c, which is the same box used to illustrate temperature and salinity variations in Figures 5 and 7. When observations are averaged across the approximate same area, we find a very good fit between modelled and observed temperature and salinity (Fig. 6d).”

The minor points and typos identified by this referee were all corrected.

Interactive comment on The Cryosphere Discuss., 5, 1335, 2011.

C725

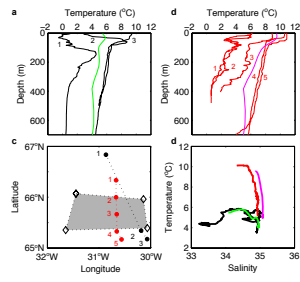


Figure 6. (a) Temperature profile for September 1993 as seen in ocean reanalysis (green) and observations (black) at the outer continental shelf and slope. Numbers refer to stations whose location is shown in (c). (b) Same as (a) but for September 2004. Ocean reanalysis data are shown by magenta line and red lines are observations. (c) Location diagram with black diamonds and grey shading illustrating area used derive modeled temperature profiles as shown in (a) and (b). The same area is used to derive the water mass properties shown in Figure 5. Black dots and dashed line show station transect and location of stations in 1993. Red dots and dashed line show station transect and location of stations in 2004. (d) Potential temperature and salinity for water masses as seen in ocean reanalysis for September 1993 (green) and September 2004 (magenta), and the mean of nearby observations from September 1993 (black) and September 2004 (red).

Fig. 1. See caption embedded in figure

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