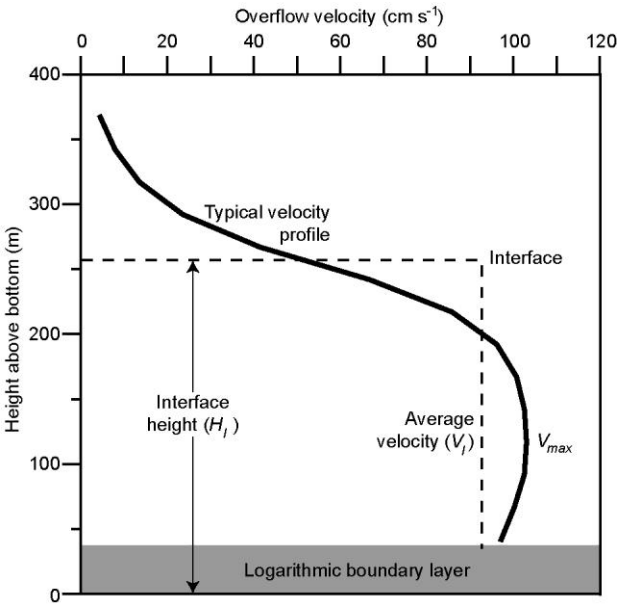

Figure S1. A typical velocity (towards 304°) profile at site FB. The interface at each instant is defined to be at the height where the velocity has decreased to 50 % of the core velocity (V_{max}).

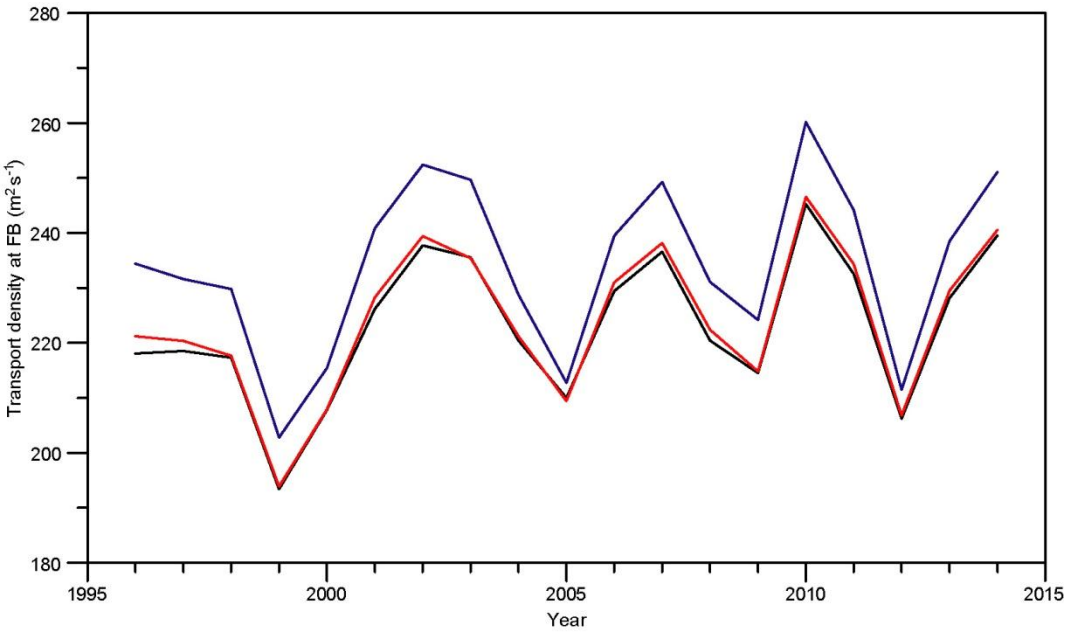

Figure S2. Annually averaged (excluding the period from day 136 to day 195) transport density at ADCP site FB, defined as the vertically integrated velocity from the deepest measurement (bin 1) up to the interface, with the interface defined in three different ways: the *standard* interface (black curve), the *baroclinic* interface (red curve), and the *fixed* interface (blue curve). See the last paragraph of Sect. 2.3 in the main manuscript for definitions of these three interfaces.

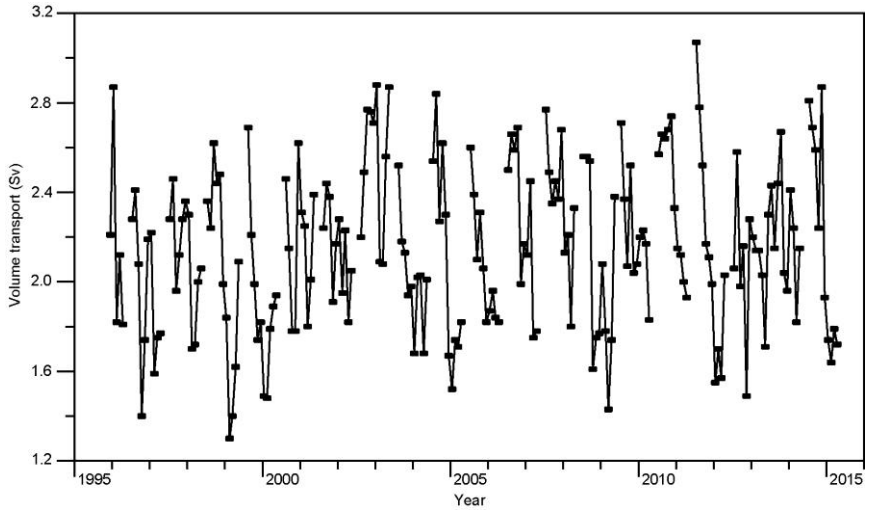

Figure S3. Monthly averaged kinematic overflow through the FBC for months with at least 28 days of observations at site FB.

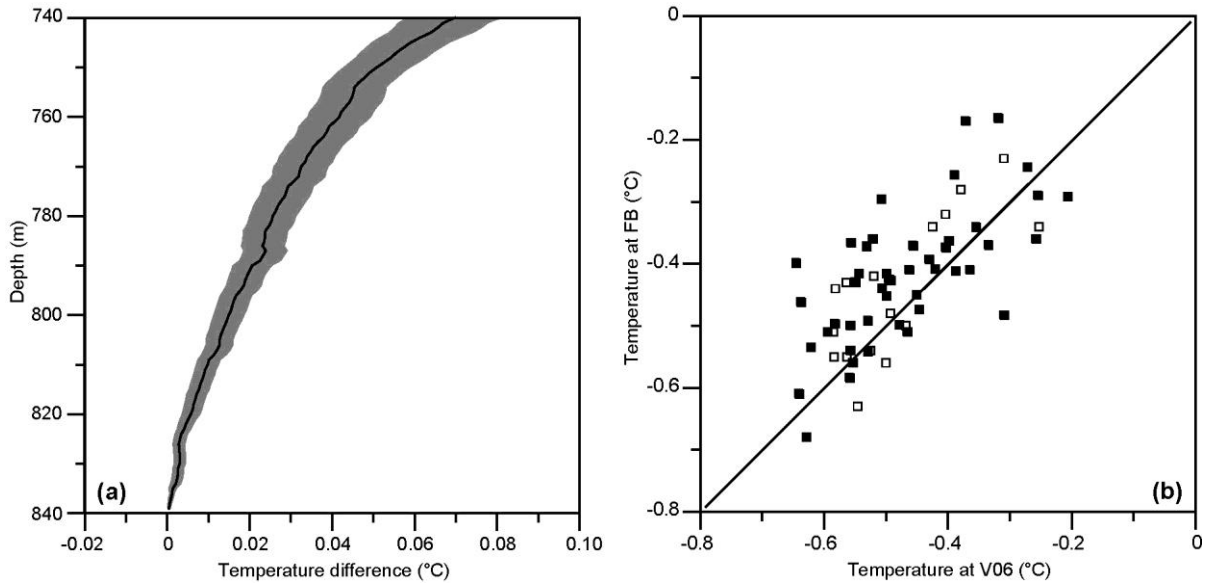

Figure S4. (a) Vertical temperature variation at CTD station V06 close to the sill depth. The black line shows the average difference between temperature at a given depth and simultaneous temperature at 840 m depth. Shaded area indicates ± 1 standard error. Based on 68 CTD profiles at V06. **(b)** The bottom temperature at FB plotted against simultaneous temperature at 810 m depth at V06. Open squares are from the period before the use of Microcats at FB in 2001. The diagonal line indicates equality.

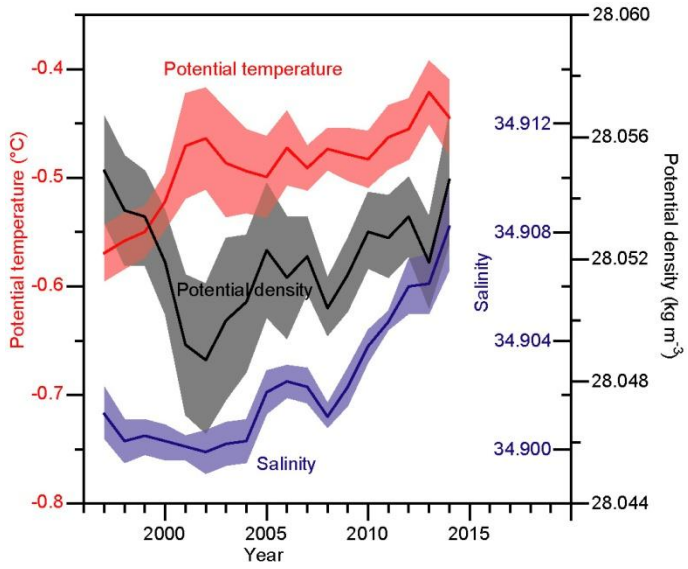

Figure S5. Temporal variations of potential temperature (red), salinity (blue), and potential density (black) at 800 m depth at station S08, which is the deepest station on section S. Each parameter is shown by a curve following the 3-year running mean surrounded by a shaded area in the same colour representing ± 1 standard error.

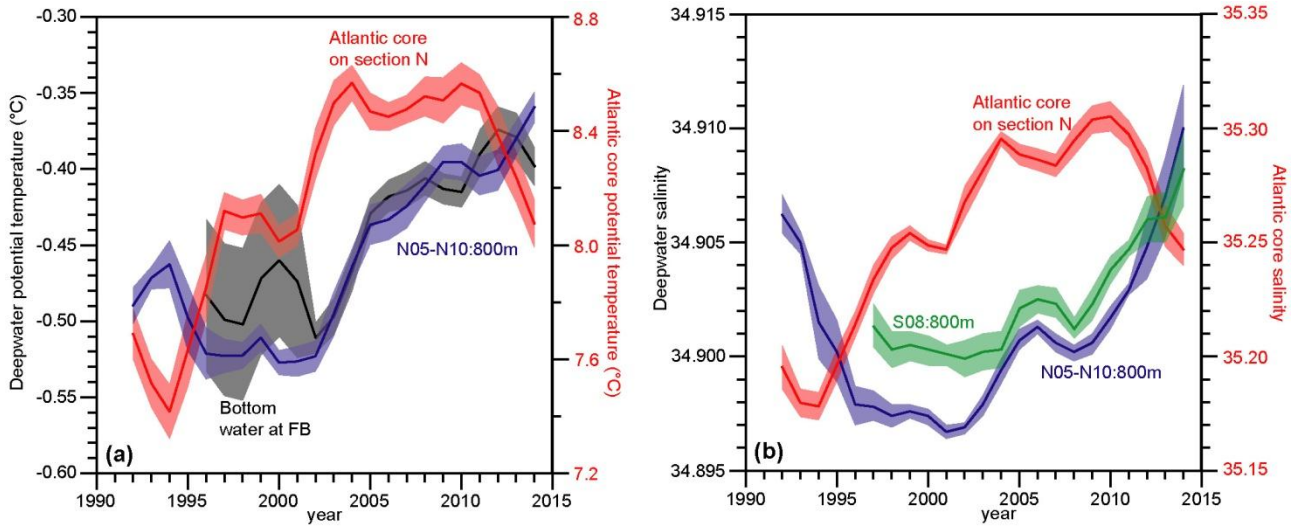

Figure S6. (a) Potential temperature close to the bottom at site FB (black, left axis), at 800 m on section N (blue, left axis), and of the Atlantic water core on section N (red, right axis). **(b)** Salinity at 800 m on section N (blue, left axis), at 800 m at S08 (green, left axis), and of the Atlantic core on section N (red, right axis). Each parameter is shown by a curve following the 3-year running mean surrounded by a shaded area in the same colour representing ± 1 standard error (over 3 years). For the potential bottom temperature at FB, the shaded area includes the instrumental uncertainty. Potential temperature and salinity at 800 m on section N are calculated as the average of six stations (N05 to N10) on 91 cruises from 1991 to 2015 (blue).

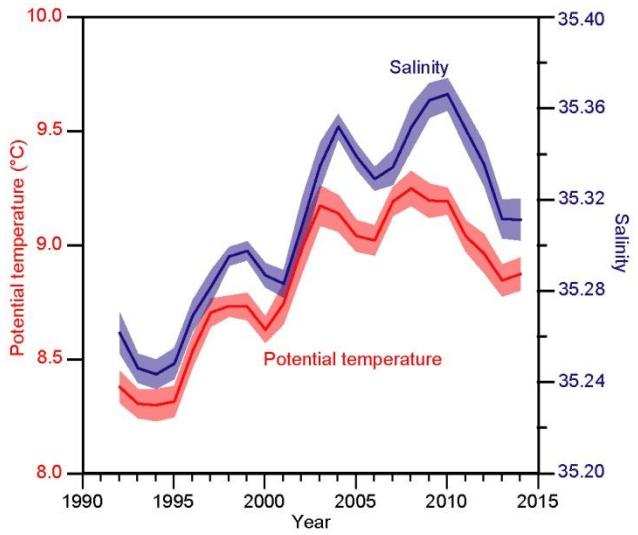

Figure S7. Potential temperature (red) and salinity (blue) of the Atlantic water core on section V. Each parameter is shown by a curve following the 3-year running mean surrounded by a shaded area in the same colour representing ± 1 standard error.

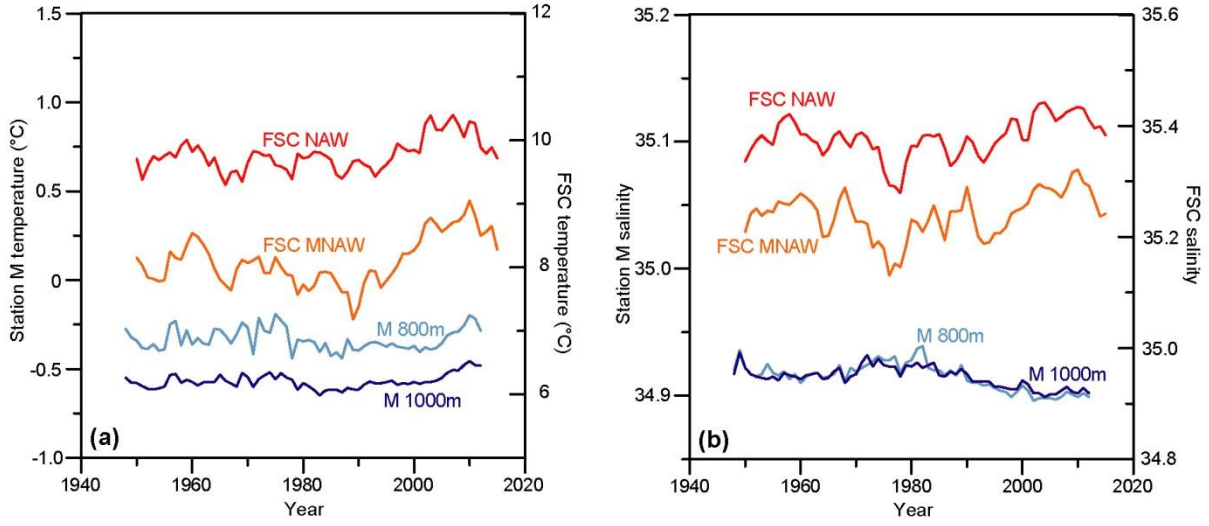

Figure S8. Comparison of long time series for Atlantic water properties in the FSC and deep water properties at station M. Temperature **(a)** and salinity **(b)** of NAW and MNAW in the FSC and at two depths at station M. Data from the FSC have been downloaded from www.ices.dk. Data from station M are available at the Norwegian Marine Data Centre (www.nmdc.no).

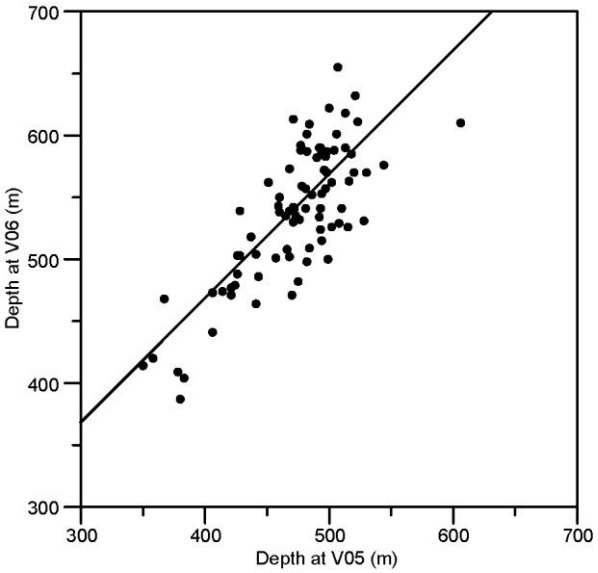

Figure S9. Depth of the σ_θ = 27.8 kg m^{-3} isopycnal at station V06 plotted against the depth of the same isopycnal at V05 from 85 cruises where the two stations have been occupied within a day from one another. The regression line shown had a correlation coefficient of 0.78.

Table S1. Correlation between the depth of the interface at FB and bottom temperature at FG from June 2008 to May 2009 after averaging over three different periods.

Averaging period:	1 day	7 days	31 days
Number of values:	343	49	11
Correlation coeff.:	0.42	0.43	0.64

Table S2. Correlation coefficient (R) between the depth of the interface at FB and the depth of the σ_θ = 27.8 kg m^{-3} isopycnal at V05 or V06 either on the same day (Lag = 0) or lagged by one day. N is the number of values.

CTD station	Lag	N	R
V05	0	73	0.42
V05	1 day	75	0.43
V06	0	70	0.57
V06	1 day	73	0.73