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*Supplement of*

# Water mass distributions and transports for the 2014 GEOVIDE cruise in the North Atlantic

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**Text S1**

The standard deviations (STD) of the potential temperature and salinity that define the source water types (SWTs) were taken from other publications. For Central Waters and SPMWs, the STDs were set as ± 0.6ºC for temperature and ± 0.06 for salinity, according to the thermohaline variability reported by Robson et al. (2016) for the upper 700 m of the water column of the subpolar gyre. For LSW, the STDs were set as ± 0.4ºC for temperature and ± 0.01 for salinity, to include both the thermohaline properties used in García-Ibáñez et al. (2015) and those used in this work. For SAIW, the STDs were set as ± 0.5ºC for temperature and ± 0.03 for salinity, based on the thermohaline variability of its source waters, i.e., Central Waters and LSW (Iselin, 1936; Arhan, 1990; Read, 2000). For MW, the STDs were set as ± 0.2ºC for temperature and ± 0.07 for salinity, according to the work of Carracedo et al. (2016). For ISOW, the STDs were set as ± 0.1ºC for temperature and ± 0.02 for salinity, to include both the thermohaline properties used in García-Ibáñez et al. (2015) and those used in this work. For DSOW, the STDs were set as ± 0.16ºC for temperature and ± 0.008 for salinity, according to the work of Jochumsen et al. (2012). For PIW, the STDs were set as ± 0.2ºC for temperature and ± 0.03 for salinity, according to the work of Falina et al. (2012). For $NEADW_L$, the STDs were set as ± 0.03ºC for temperature and ± 0.003 for salinity, according to the work of García-Ibáñez et al. (2015). For $NEADW_U$, the STDs for potential temperature and salinity were calculated using the STDs of its components: MW, LSW, ISOW and $NEADW_L$ (Sect. 2.3 of the main text).

For oxygen, the STDs were set equal to 3% of the saturation value (Najjar and Keeling, 2000; Ito et al., 2004), whereas for nutrients they were obtained by one of the following methods:

a) For to LSW, ISOW and $NEADW_L$, the STDs for the nutrients were calculated using the STDs in the water samples with more than 95% of those SWTs, following Karstensen and Tomczak (1998). This method was used when the number of water samples for a SWT was greater than 50.
b) For the Central Waters, DSOW and SPMW, which are defined by more than one SWT (multi-SWTs), the multi-SWT contributions were obtained by adding the contributions of their respective components. Then, water samples with proportions of the multi-SWT greater than 95% were selected. The property values of each component of the multi-SWT were subtracted from the values of the water samples and linear regressions were performed between potential temperature and nutrients. The STDs of the multi-SWT nutrients were taken equal to the error of the intercept. We used the STDs of the properties of the multi-SWTs to each of their components.
c) A modification of the methodology (b) was applied to MW, where samples with proportions greater than 75% were selected to perform the linear regressions.

The STDs of the nutrients of SAIW were assigned equal to those of the Central Waters, because not enough water samples presented proportions greater than 95%. The STDs of the nutrients of $NEADW_U$ were calculated using the STDs of its components: MW, LSW, ISOW and $NEADW_L$ (Sect. 2.3 of the main text).

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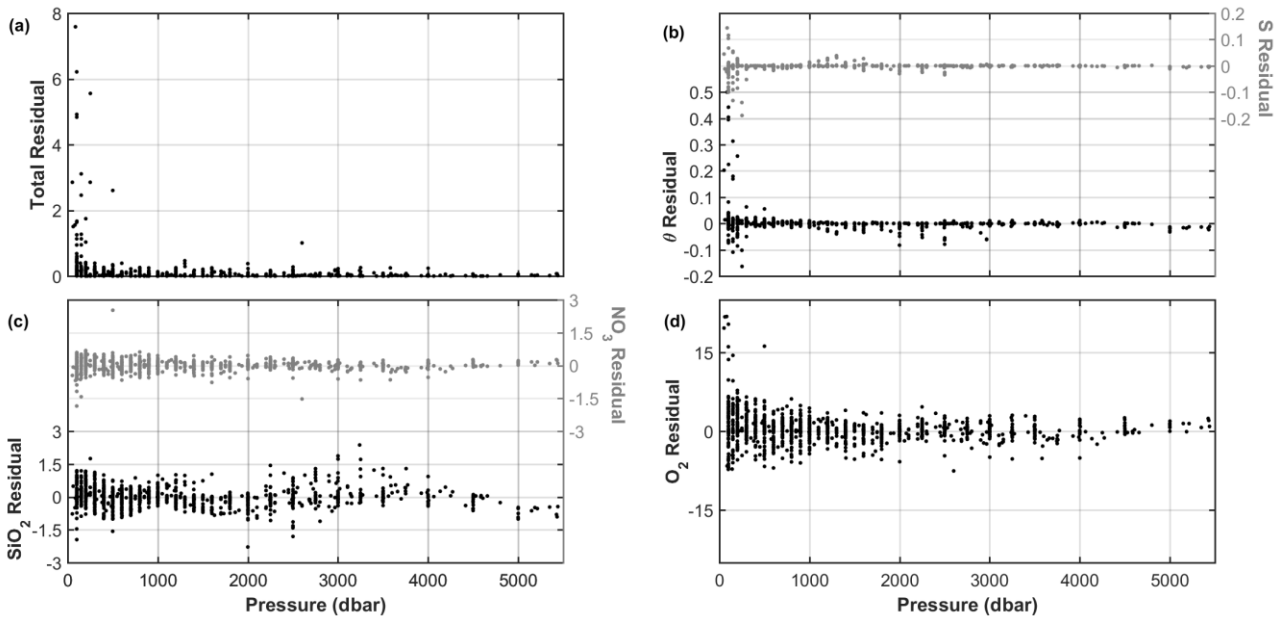


**Figure S1: (a) Total residual from the extended optimum multiparameter (eOMP) analysis and individual residuals from each eOMP parameter: (b) potential temperature (θ, in ºC, in black) and salinity (S, in grey); (c) silicic acid ($Si(OH)_4$, in black) and nitrate ($NO_3$, in grey) (both in µmol kg-1); and (d) oxygen ($O_2$) (in µmol $kg^{-1}$).**

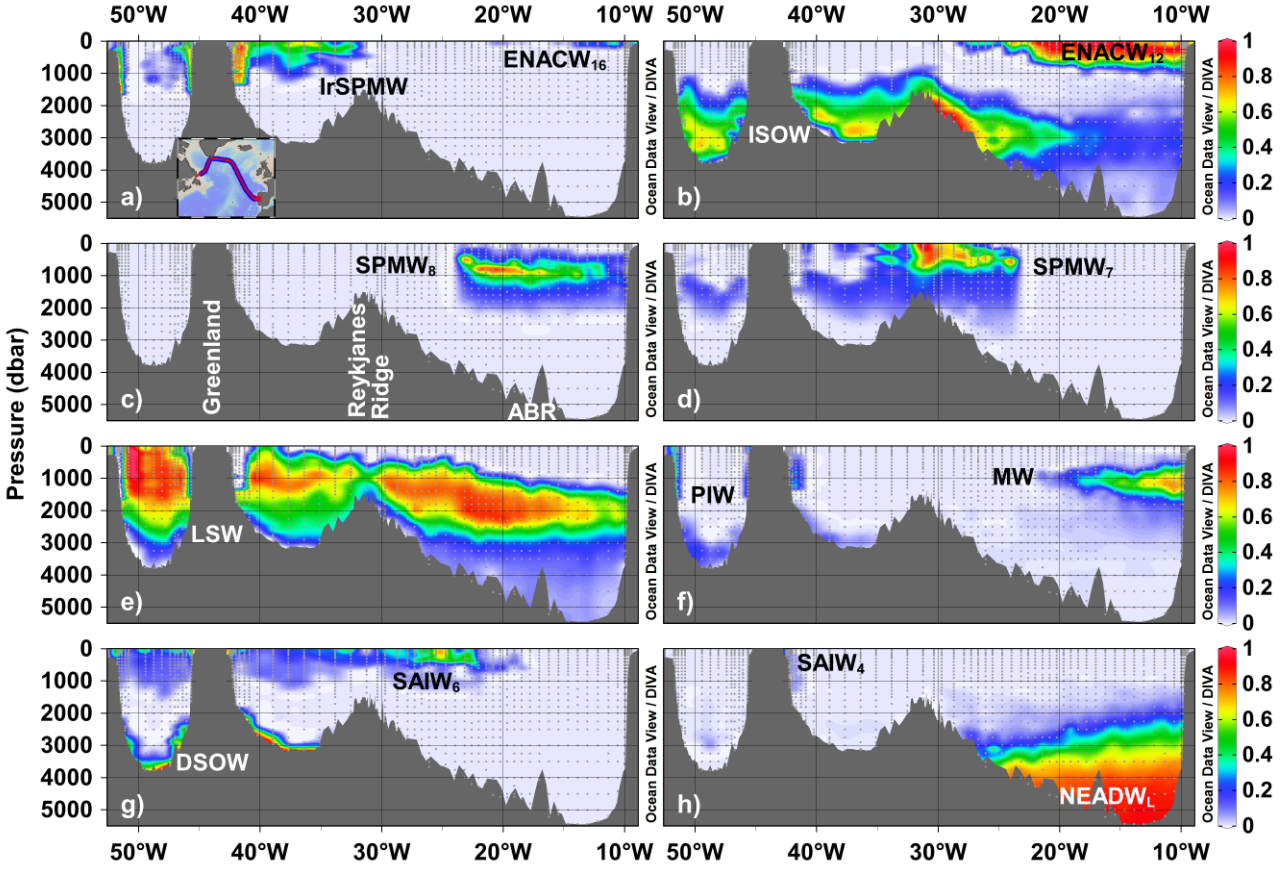


**Figure S2: Water mass distribution resulting from the eOMP analysis for the 2014 GEOVIDE cruise (GEOTRACES-GA01 section, inset in subplot a) using the same properties to define the Source Water Types (SWTs) as in García-Ibáñez et al. (2015). Sample locations appear as grey dots. ABR refers to Azores–Biscay Rise. Consult Table 1 for SWT acronyms.**

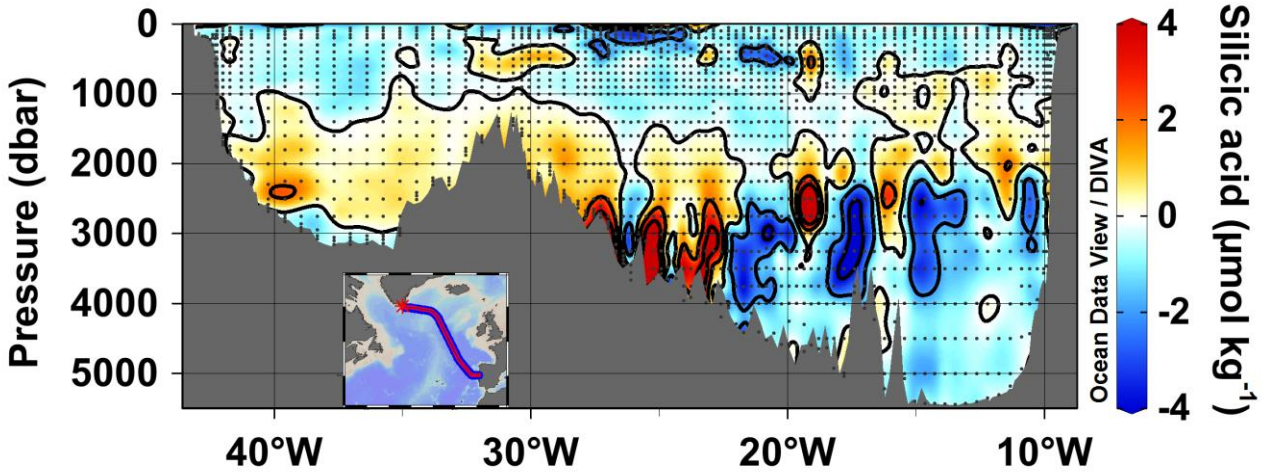


**Figure S3: Differences in the silicic acid concentration (in µmol kg$^{-1}$) along OVIDE line (inset) between 2014 and the average of 2002–2010, from Portugal (right) to Greenland (left). Sample locations appear as grey dots. Differences were calculated by subtracting the average silicic acid values for 2002–2010 to the values measured in 2014, all gridded to the sampling locations of OVIDE 2010 (see Section 4.1 of the main text).**

**Table S1: Standard deviations of the properties of the water samples (ε in Table 1) were obtained by considering both the accuracy of each measurement and the variability in the study region.**

| | **Θ** (°C) | **S** | **$Si(OH)_4^0$** (µmol $kg^{-1}$) | **$NO_3^0$** (µmol $kg^{-1}$) | **$O_2^0$** (µmol $kg^{-1}$) |
|---|---|---|---|---|---|
| ε | 0.005 | 0.002 | 0.3 | 0.2 | 1 |