Supporting Information for: "Dissolved Inorganic Carbon budgets in the eastern Subpolar North Atlantic in the 2000s from *in situ* data"

Method for estimating the transport of DIC and C_{ant} across the OVIDE section

The transport of DIC (T_{DIC}) across the OVIDE section was computed as:

$$T_{DIC} = \int_{x1}^{x2} \int_{bottom}^{surface} \rho.[DIC].v.dxdz \qquad \text{Equation (S1)}$$

where *x*1 and *x*2 are the initial and final position of the transoceanic section. ρ, [DIC] and *v* stand for the *in situ* density, DIC concentration and velocity orthogonal to the section, respectively. The error of T_{DIC} depends chiefly on the error of the volume transport, so, it was calculated taking into account the co-variance matrix of errors obtained from the inverse model. The C_{ant} transport (T_{Cant}) was computed similarly to T_{DIC}, changing [DIC] by [C_{ant}]. The T_{DIC} and T_{Cant} were computed from 2002 to 2010 for each OVIDE cruise. The mean values of the 5 estimates of T_{DIC} or T_{Cant} were considered to estimate the DIC or C_{ant} lateral advection in the east-SPNA. The errors associated to the mean values of T_{DIC} and T_{Cant} are computed as the standard error of the mean.

Method for estimating the transport of DIC and C_{ant} across the Greenland-Scotland-Iceland Sills

Across the G-I-S sills, T_{DIC} and T_{Cant} were computed using the properties and transport of each water mass (Table S1) as:

$$T_{DIC}^{sills} = \sum_{i=1}^{n} \rho(i).[DIC](i).T_V(i) \qquad \text{Equation (S2)}$$

where *n* is the number of water masses (i). ρ(i), [DIC](i), and T_V(i) are the *in situ* density, DIC concentration and volume transport, respectively, of each water mass (Table S1). For the computation of T_{Cant}^{sills}, [DIC] in Equation S2 was changed to [C_{ant}]. Errors of T_{DIC} and T_{Cant} across the sills have been computed by random perturbation of water mass volume transports at the sills imposing a net volume transport of 0.8 ± 2 Sv (1 Sv=10^6 m^3 s^{-1}). This number was set equal to the mean net volume transport across the OVIDE section to conserve volume in the region; it is consistent with the literature [Hansen et al., 2008; Pérez et al., 2013].

Our objective is to provide mean DIC and C_{ant} budgets over 2002–2010, centered on 2006. The C_{ant} concentrations given in Jeansson et al., [2011] and summarized in Table S1 were measured in 2002/2003. Because C_{ant} concentration in the ocean is increasing at a rate of ~1.69% every year [Steinfeld et al., 2009], C_{ant} concentration of each water mass was rescaled to year 2006 using this rate of 1.69% [Table S1]. Note that this normalization is not necessary for the results at the OVIDE section because we computed a mean value from 5 cruises regularly repeated in time (biennially) between 2002 and 2010 and thus already centered on 2006.