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Supplement of

Two decades of pH$_T$ measurements along the GO-SHIP A25 section in the North Atlantic

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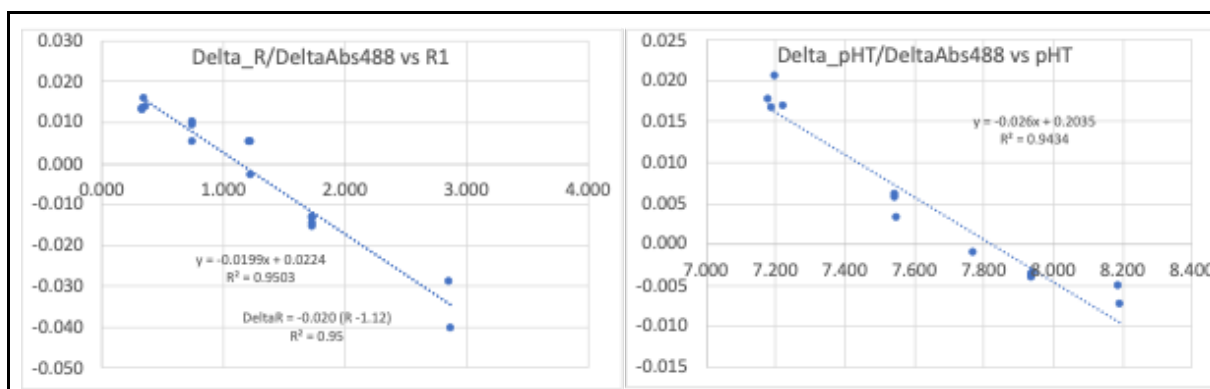
Figure S1. Examples of $\Delta R/\Delta_{488}A$ vs R_1 (left) and $\Delta pH_T/\Delta_{488}A$ vs $pH_{T,1}$ (right) based on the linear regressions obtained in 2023 cruise.
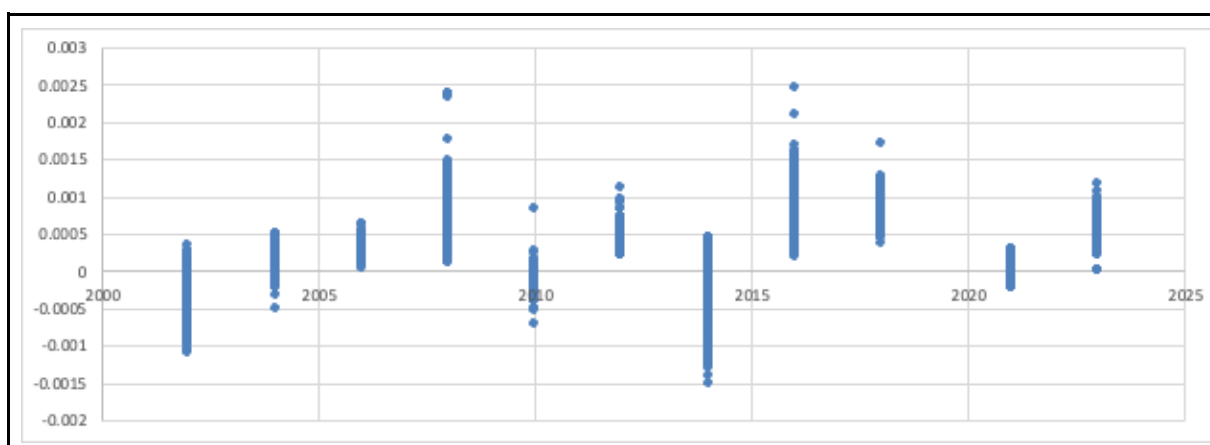

Figure S2. Difference in $pH_{T,\,corrected}$ using $\Delta R/\Delta_{488}A$ vs R_1 correction or $\Delta pH_T/\Delta_{488}A$ vs $pH_{T,1}$.
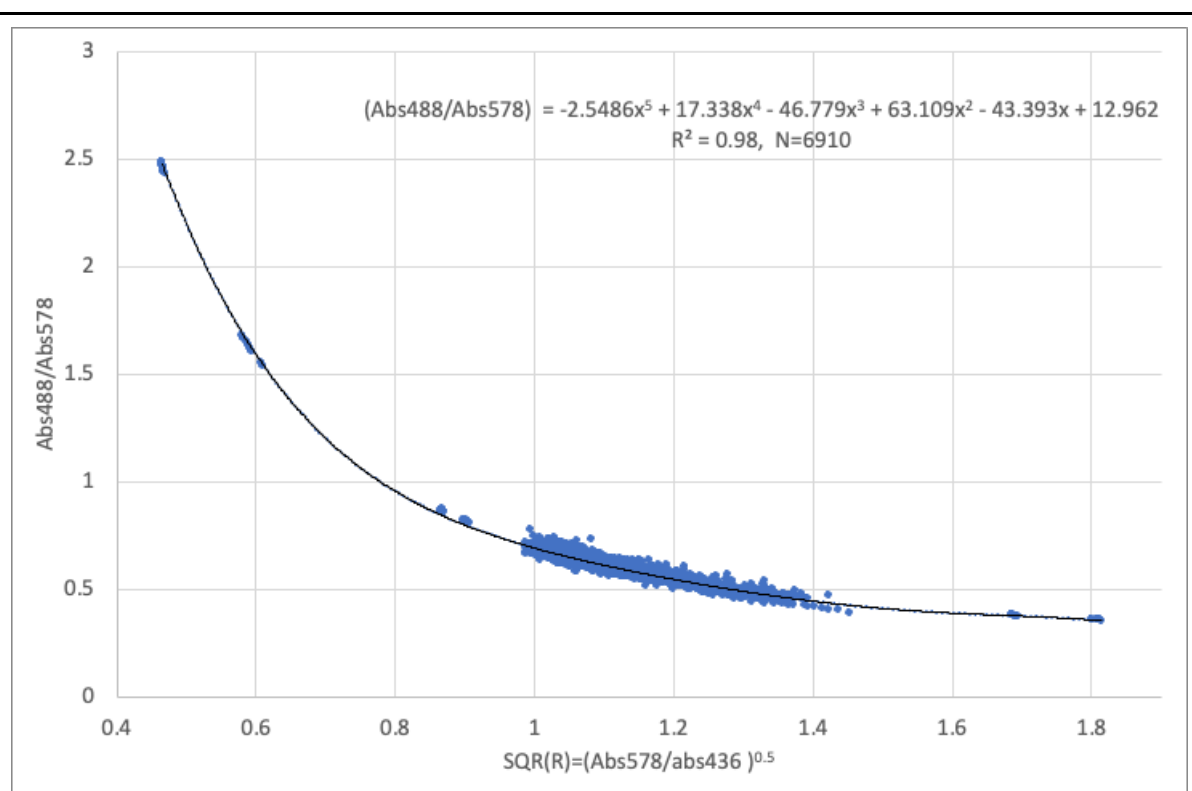
Figure S3. Polynomial fit of the $_{488}$A /$_{578}$A ratio to the square root of R.
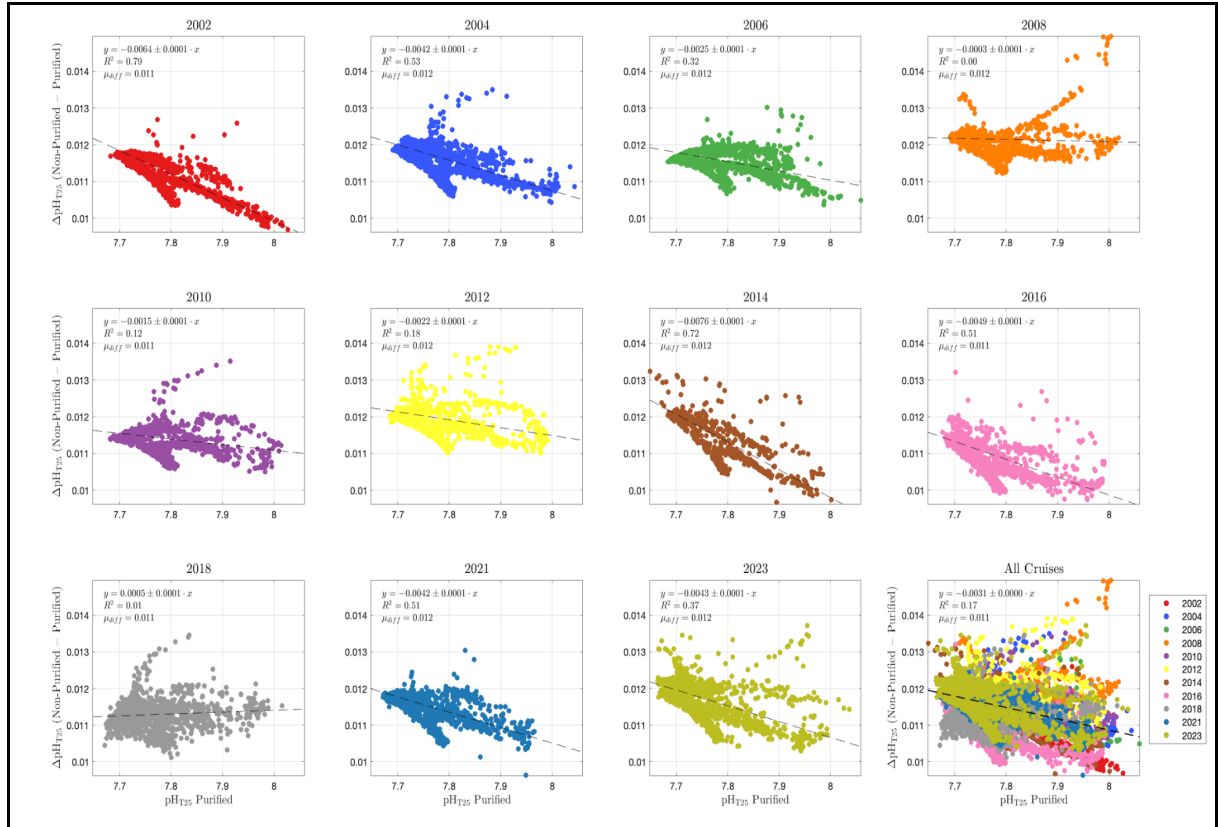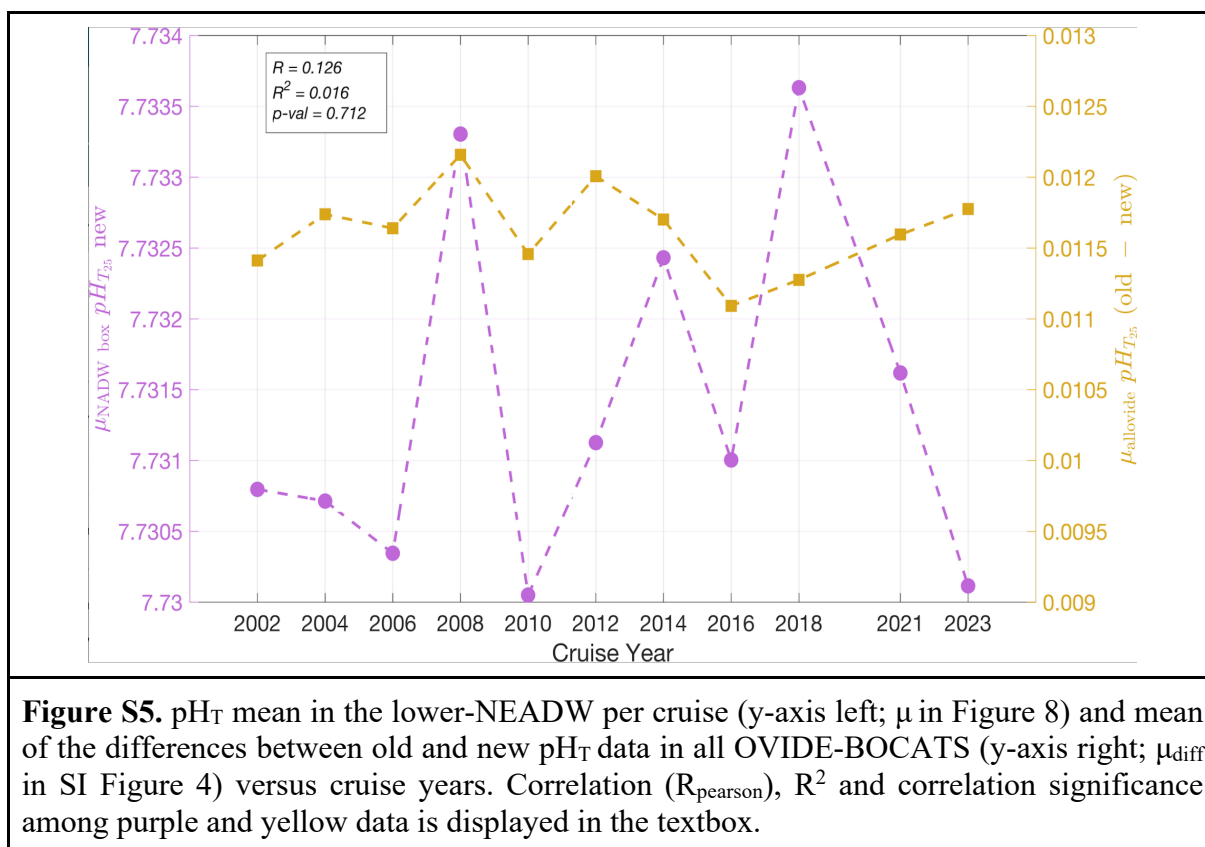
Figure S4. Linear regressions of the differences when applying CB'93 + DVD'98 (to R measured with unpurified dye) and the correction used in this study (see *Sect. 3.4*), versus pH$_T$ for each OVIDE-BOCATS cruise, and all cruises together (last panel). Regression equations are displayed in each panel, along with their R^2 and the mean difference.
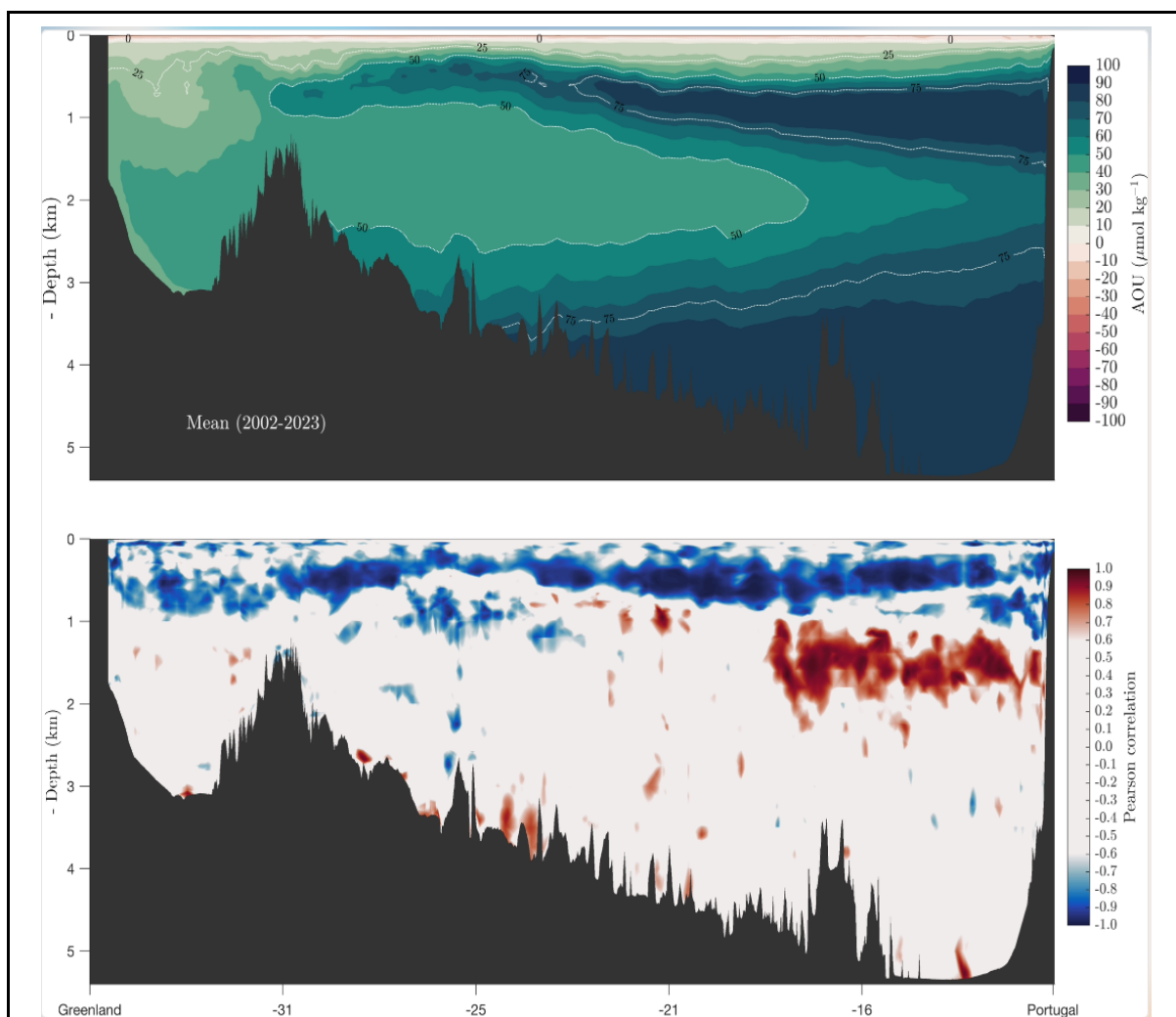
Figure S5. pH_T mean in the lower-NEADW per cruise (y-axis left; μ in Figure 8) and mean of the differences between old and new pH_T data in all OVIDE-BOCATS (y-axis right; μ_{diff} in SI Figure 4) versus cruise years. Correlation ($R_{pearson}$), R^2 and correlation significance among purple and yellow data is displayed in the textbox.

Figure S6. (a) Mean AOU (µmol kg⁻¹) from 11 cruises (2002 to 2023) along the OVIDE-BOCATS section. **(b)** Spatial correlation ($R_{pearson}$) from 2002 to 2023 between time-detrended pH_T and time-detrended AOU. Only significant correlations (p-value < 0.05) are shown.
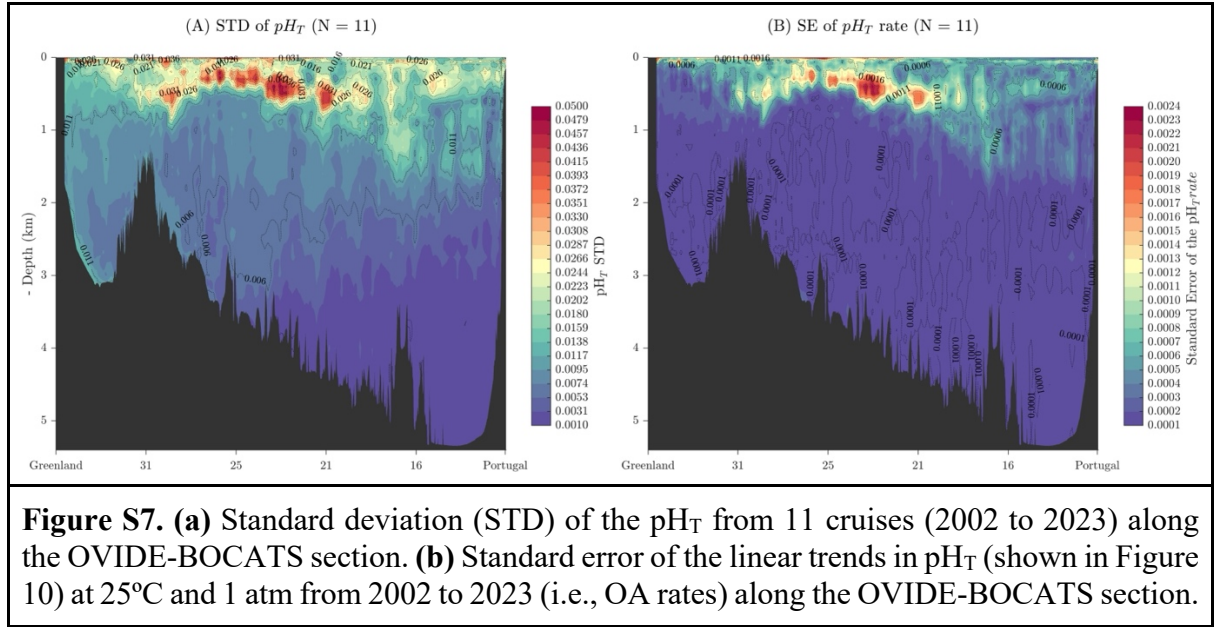
Figure S7. (a) Standard deviation (STD) of the pH$_T$ from 11 cruises (2002 to 2023) along the OVIDE-BOCATS section. **(b)** Standard error of the linear trends in pH$_T$ (shown in Figure 10) at 25ºC and 1 atm from 2002 to 2023 (i.e., OA rates) along the OVIDE-BOCATS section.