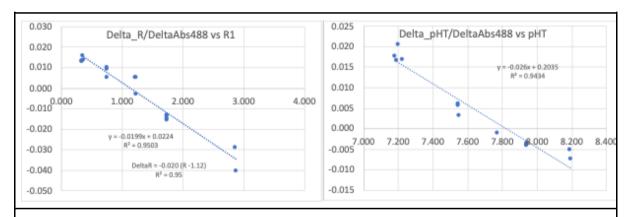
Supplementary Information for

Two decades of pH_T measurements along the GO-SHIP A25 section

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Supporting Information Figure 1. 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.

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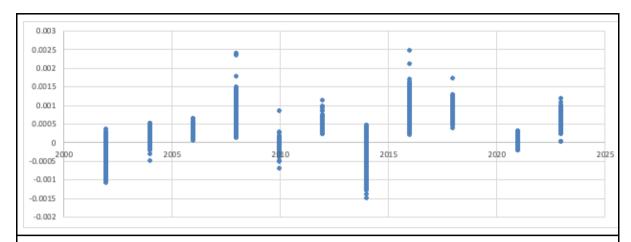
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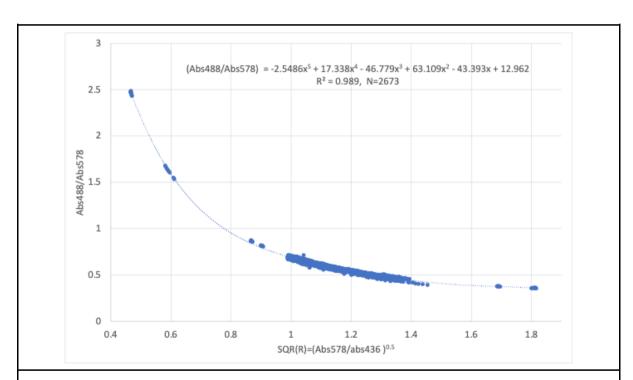
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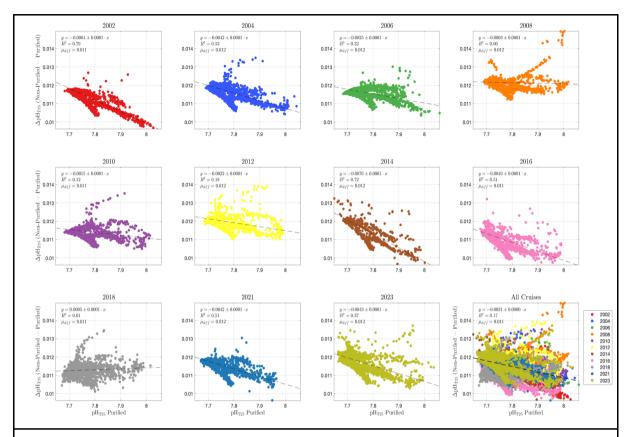
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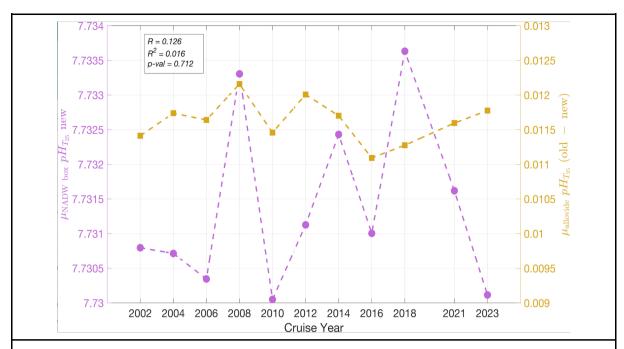
Supporting Information Figure 2. Difference in $pH_{T, \, corrected}$ using $\Delta R/\Delta_{488}A$ vs R_1 correction or $\Delta pH_T/\Delta_{488}A$ vs $pH_{T,1}$.



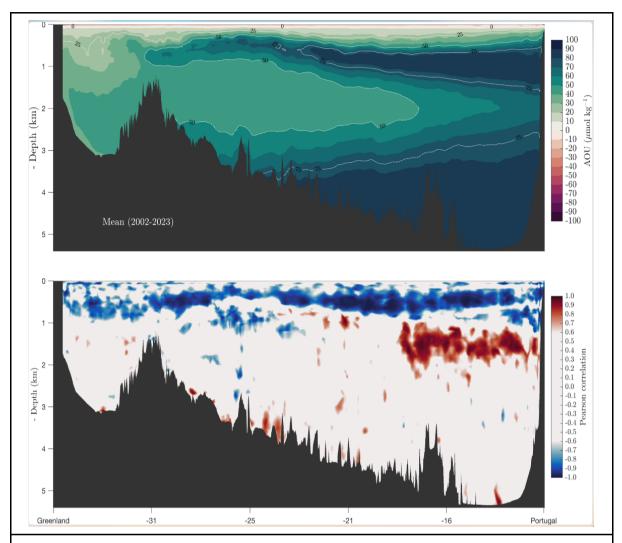
Supporting Information Figure 3. Polynomial fit of the $_{488}A$ / $_{578}A$ ratio to the square root of R.



Supporting Information Figure 4. 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.



Supporting Information Figure 5. 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}), R² and correlation significance among purple and yellow data is displayed in the textbox.



Supporting Information Figure 6. (a) Mean AOU (μ mol 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.