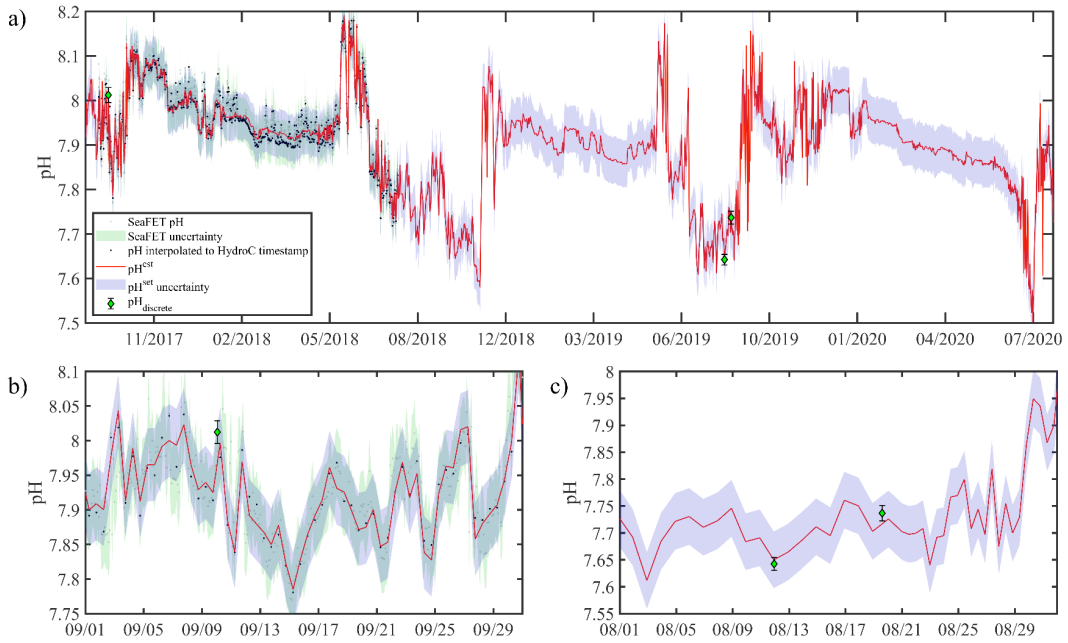

Figure S1. **Time series of pH with uncertainty estimates.** (a) Time series of pH^{est} (red line), pH_{SeaFET} (SeaFET timestamp gray dots, interpolated to HydroC timestamp black dots), and pH^{disc}_{calc} (green faced diamonds). pH uncertainty shown as green shading (pH_{SeaFET}), blue shading (pH^{est}), and as error bars (pH^{disc}_{calc}). (b) Zoomed in section to highlight $pH^{disc}_{calc} \pm u_c$ used as reference (01/09/2017 - 01/10/2017; Cross et al., 2020a). (c) Zoomed in section to highlight $pH^{disc}_{calc} \pm u_c$ used as references (01/08/2019 – 01/09/2019; Cross et al., 2021).

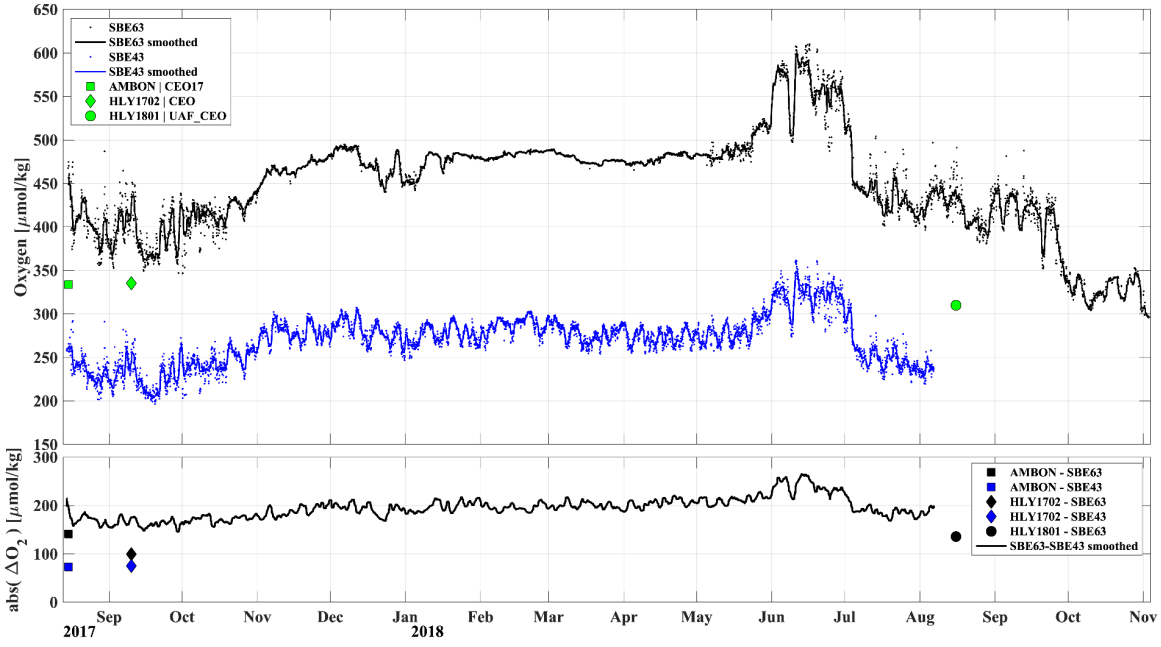

Figure S2. Evaluation of oxygen data. Top axes shows timeseries of oxygen from a) post-calibration corrected and pumped SBE63 from 2017-2018 and 2018-2019 deployments (2 h resolution black dots, 36 hour moving mean smoothed black line), unpumped SBE43 from 2017-2018 deployment (2 h resolution blue dots, 36 hour moving mean smoothed blue line), and oxygen interpolated to moored sensor depth from AMBON 2017 cruise (green square; Danielson, 2021), HLY1702 cruise (green diamond; Cross et al., 2020a), and HLY1801 cruise (green circle; McRaven and Pickart, 2021). Bottom axes show absolute differences in oxygen between discrete or cast oxygen interpolated to moored sensor depth (AMBON = square, HLY1702=diamond, HLY1801=circle), and absolute difference between smoothed moored sensors (black line).

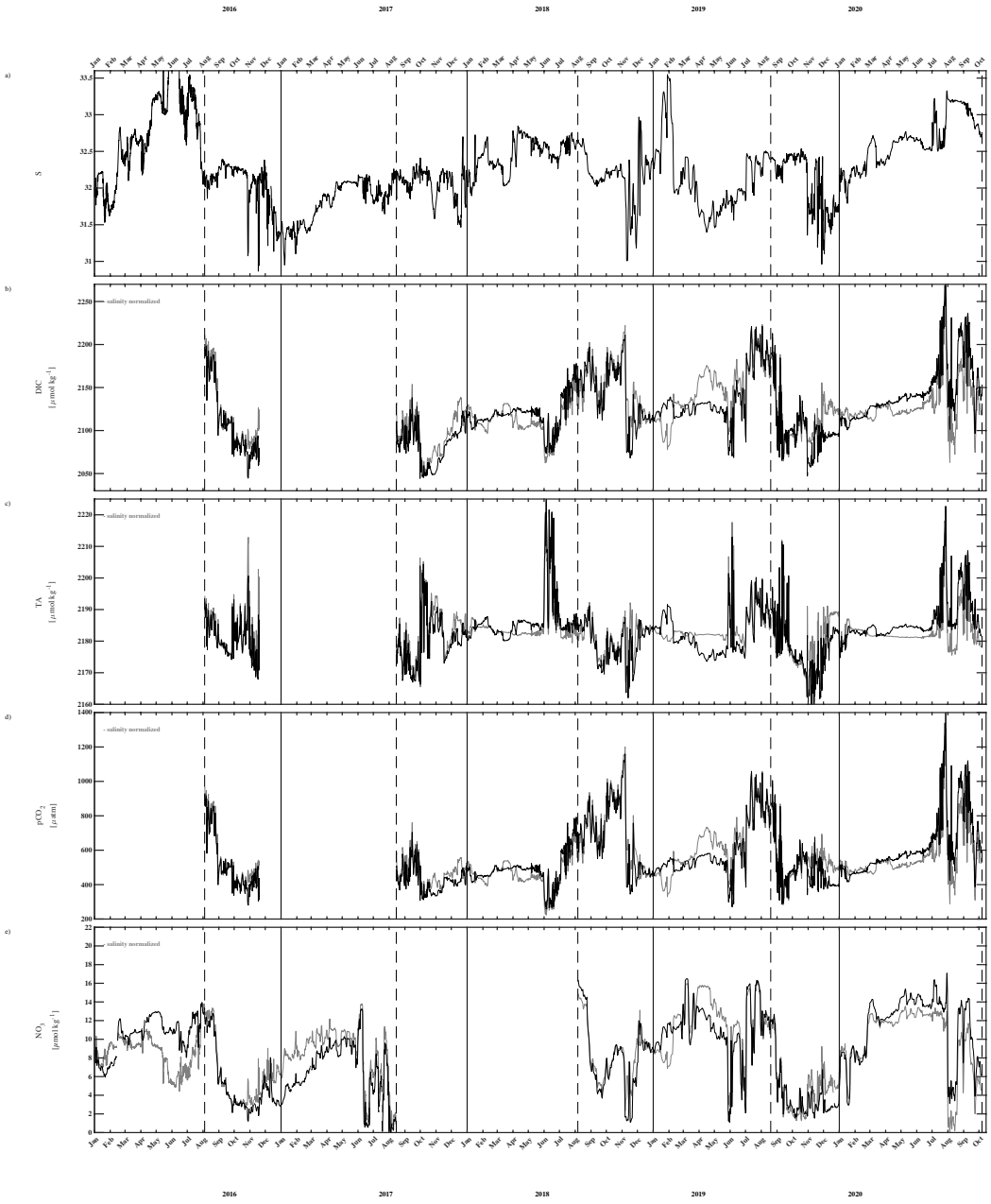

Figure S3. Salinity normalization. Timeseries of (a) salinity, (b) dissolved inorganic carbon (DIC, umol kg^{-1}), (c) total alkalinity (TA, umol kg^{-1}), (d) pCO_2 (uatm), and (e) NO_3 (umol kg^{-1}). Salinity normalized (Friis, 2003) parameters are shown in gray.

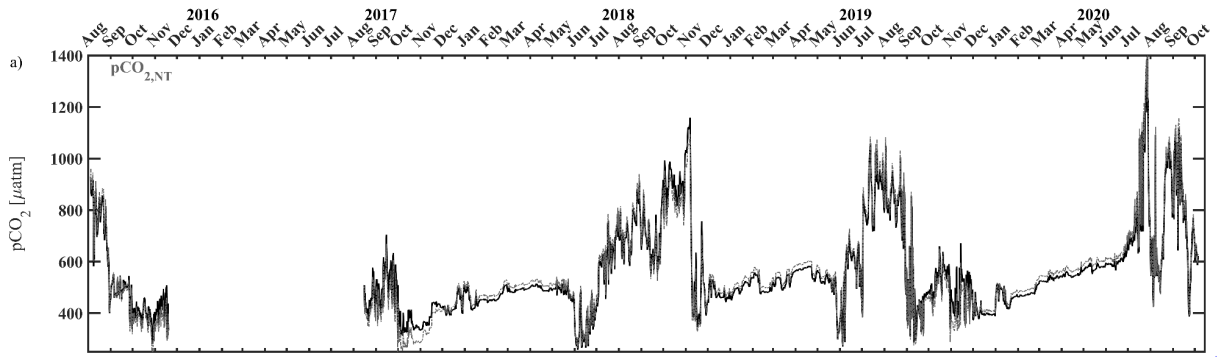

Figure S4. Temperature normalization. Timeseries of (a) pCO_2 (black, uatm) and temperature normalized pCO_2 (gray, $pCO_{2,NT}$).