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Supplement of

Upper-ocean changes with hurricane-strength wind events: a study using Argo profiles and an ocean reanalysis

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Figures S1 to S5.

Introduction

Figures S1-S5 in the following provide additional context for our analysis and discussion.

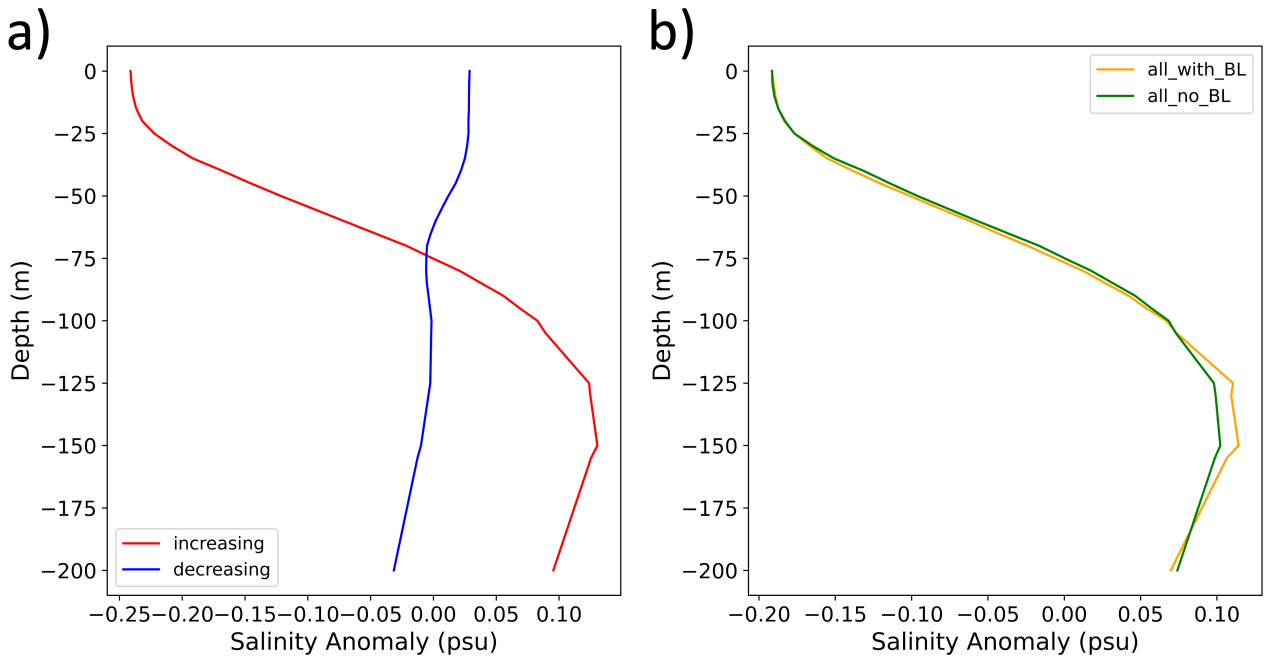

Figure S1. Composite vertical structure of pre-event salinity profiles from the HYCOM ocean reanalysis (a) with salinity increasing (red line) versus decreasing (blue) with depth, and (b) with BL (orange) versus without BL (green). While the vertical average has been removed from each profile before calculating composite vertical structures, the details of how salinity increases or decreases with depth for individual profiles in each group are different as these profiles are from different regions of the ocean and different months of the year. Hence, examples in Figure 1b, c may be more helpful than panel (a) here, to visualize differences between the "increasing" versus "decreasing" case.

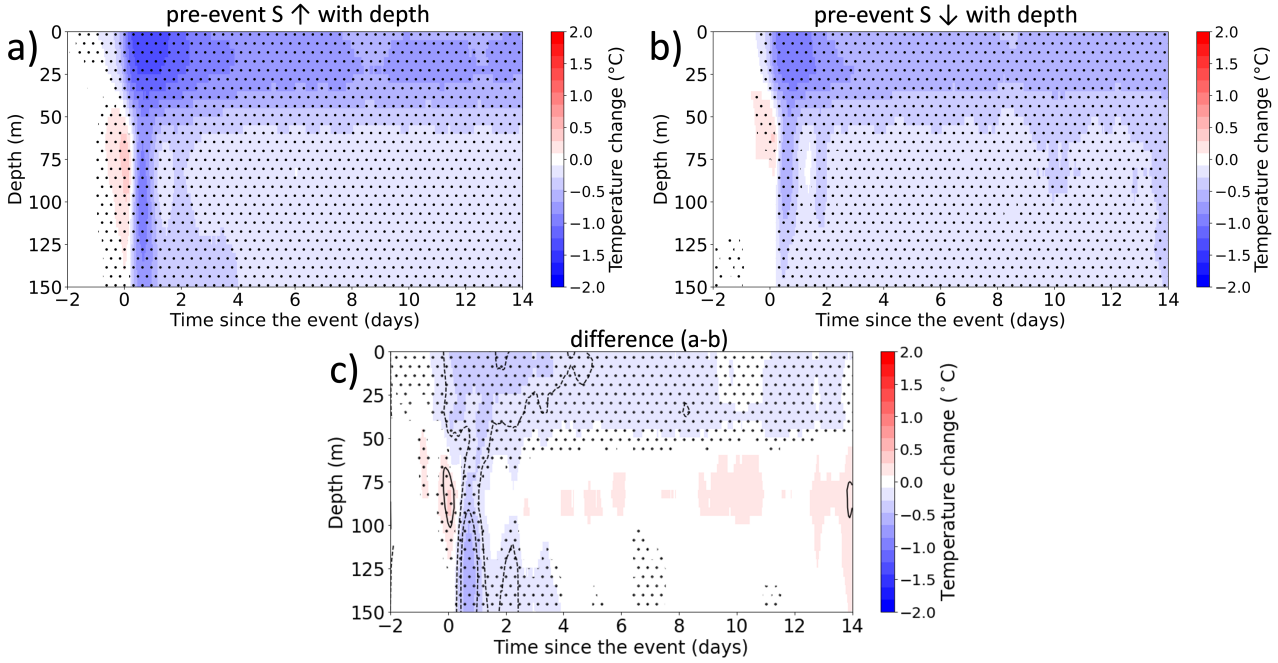

Figure S2. Upper ocean temperature changes during hurricane-strength wind events, based on the HYCOM reanalysis. Composite changes are shown for regions where pre-event upper ocean salinity increases (a) vs decreases (b) with depth. Panel (c) shows the difference between the "increasing" case (i.e., panel a) and the "decreasing" case (i.e., panel b). Dots indicate statistically significant values (95% confidence limit).

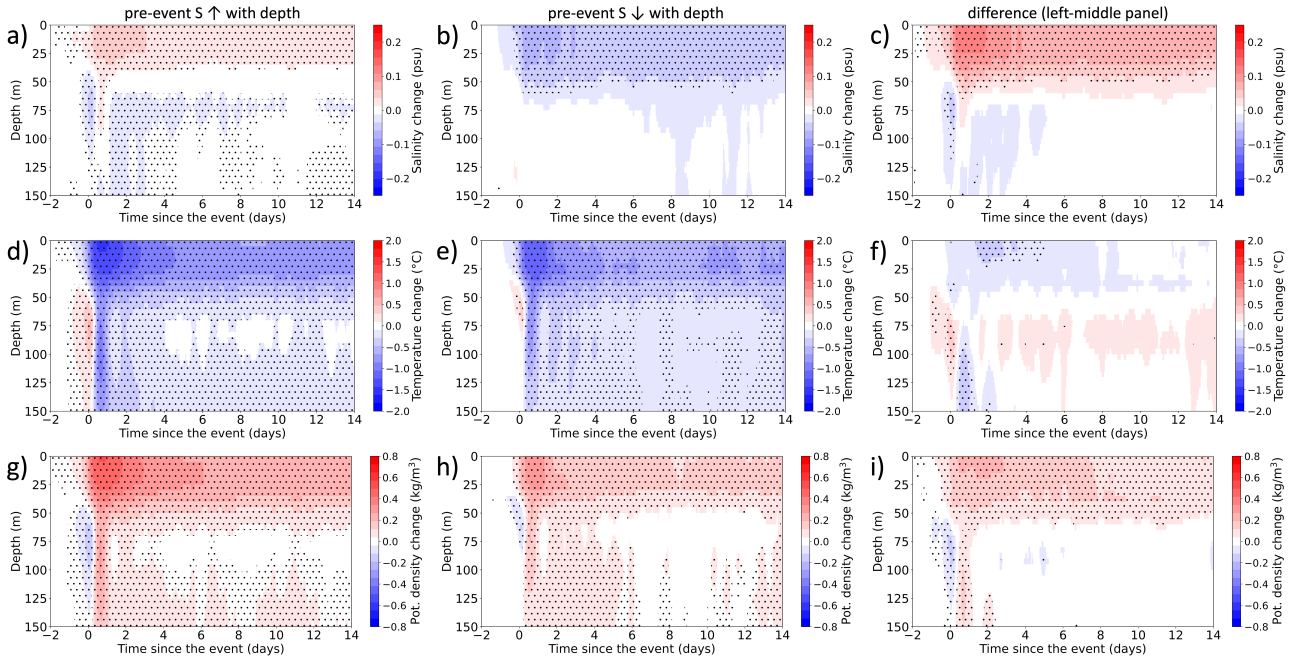

Figure S3. Upper ocean salinity (a, b, c), temperature (d, e, f) and potential density (g, h, i) changes during hurricane-strength wind events where a pre-event barrier layer is not present. Composite changes are shown based on the HYCOM reanalysis for regions where pre-event upper ocean salinity increases (a, d, g) vs decreases (b, e, h) with depth. Panels (c, f, i) show the difference between the "increasing" case (i.e., panel a, d, g) and the "decreasing" case (i.e., panel b, e, h). Dots indicate statistically significant values (95% confidence limit).

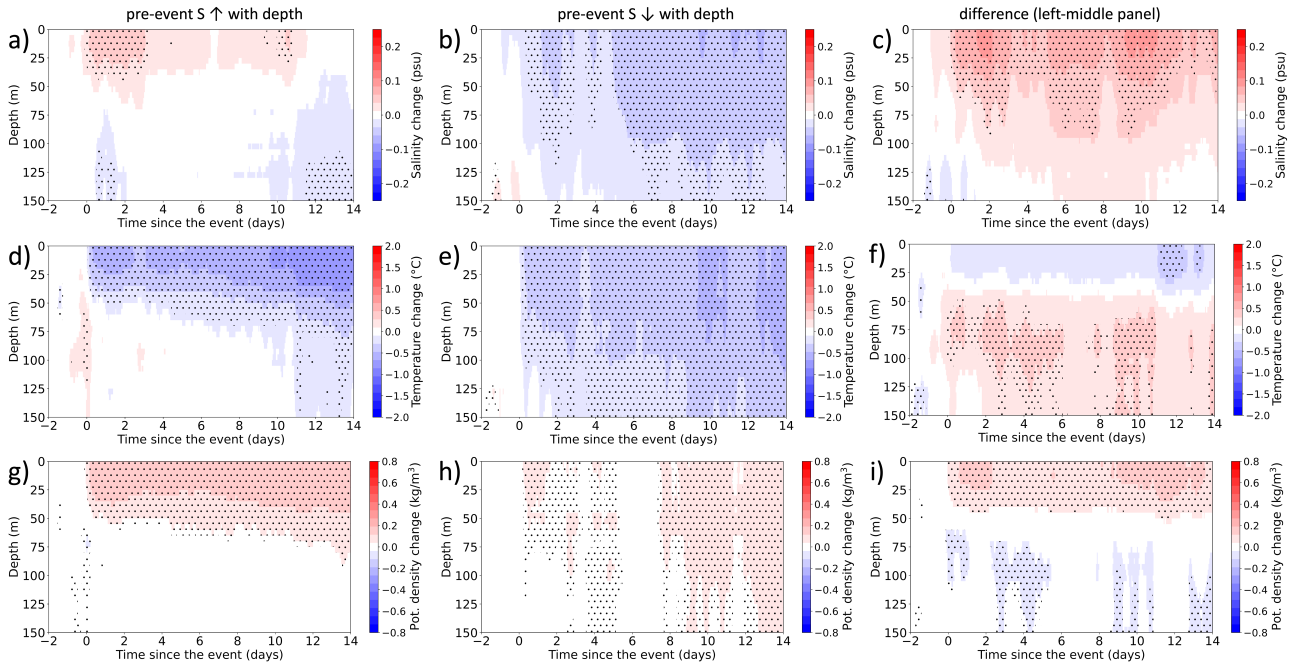

Figure S4. Upper ocean salinity (a, b, c), temperature (d, e, f) and potential density (g, h, i) changes during hurricane-strength wind events that are NOT co-located with observed tropical cyclones. Composite changes are shown based on the HYCOM reanalysis for regions where pre-event upper ocean salinity increases (a, d, g) vs decreases (b, e, h) with depth. Panels (c, f, i) show the difference between the "increasing" case (i.e., panel a, d, g) and the "decreasing" case (i.e., panel b, e, h). Dots indicate statistically significant values (95% confidence limit).

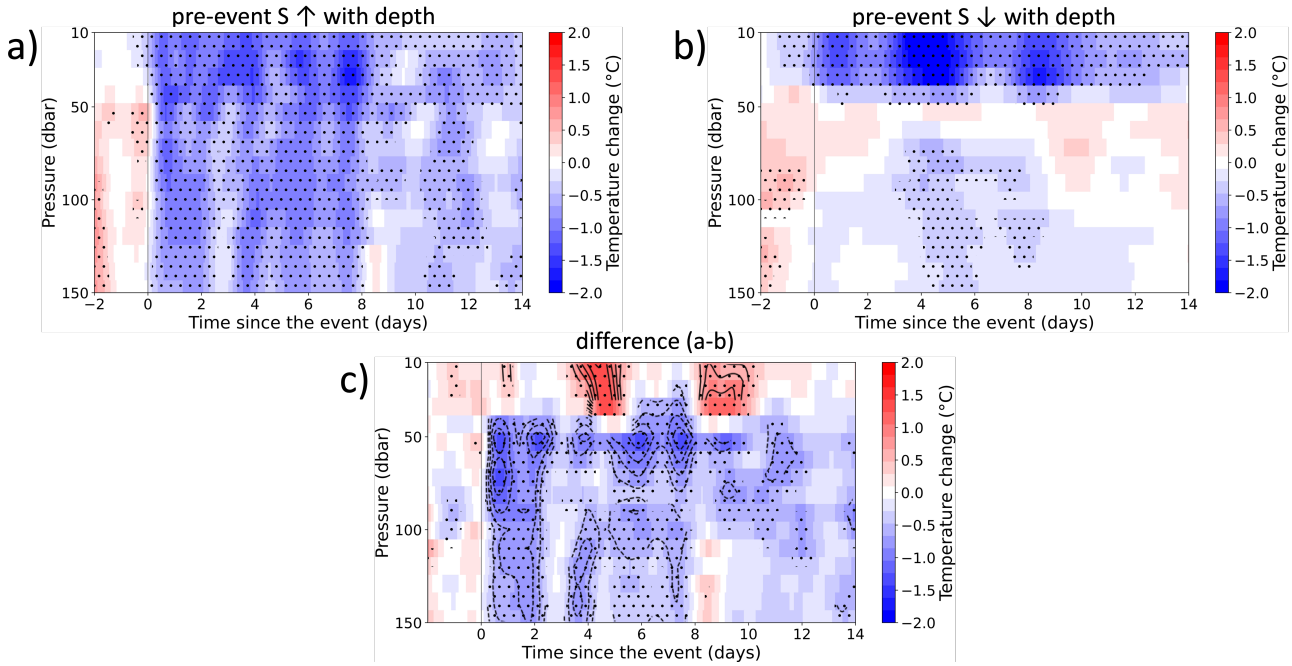

Figure S5. Upper ocean temperature changes within 0.5 degrees in cross track angle from the TC track during hurricane-strength TCs, based on Argo observations. Changes are shown for regions where pre-event upper ocean salinity increases (a) vs decreases (b) with depth. Panel (c) shows the difference between the "increasing" case (i.e., panel a) and the "decreasing" case (i.e., panel b). In all panels, a point-wise $\alpha = 0.05$ hypothesis test is performed and used to indicate (with dots) where the null hypothesis is rejected.