Journal of Geophysical Research: Oceans

Supporting Information for

Aquatic Biogeochemical Eddy Covariance Fluxes in the Presence of Waves

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Additional Supporting Information (Files uploaded separately)

Text S1.

The attached Supplementary Table 1 (Characteristics of Field Studies using Eddy Covariance) shows all aquatic EC field studies that were reviewed for this study, with summary data shown in Figure 2. An example of response time tests for the Honeywell Durafet III pH sensor is shown in supplementary Figure S1, which was conducted by pumping pH buffer solutions through the microfluidic housing (Figure S2), with switching conducted manually using a valve. The construction and application of the microfluidic housing is shown in Figure S2. The difference between standard EC fluxes and those calculated by the accumulated CPSD (< 0.125 Hz) analyses are shown in Figure S3, where the residual differences are plotted versus the wave velocity.

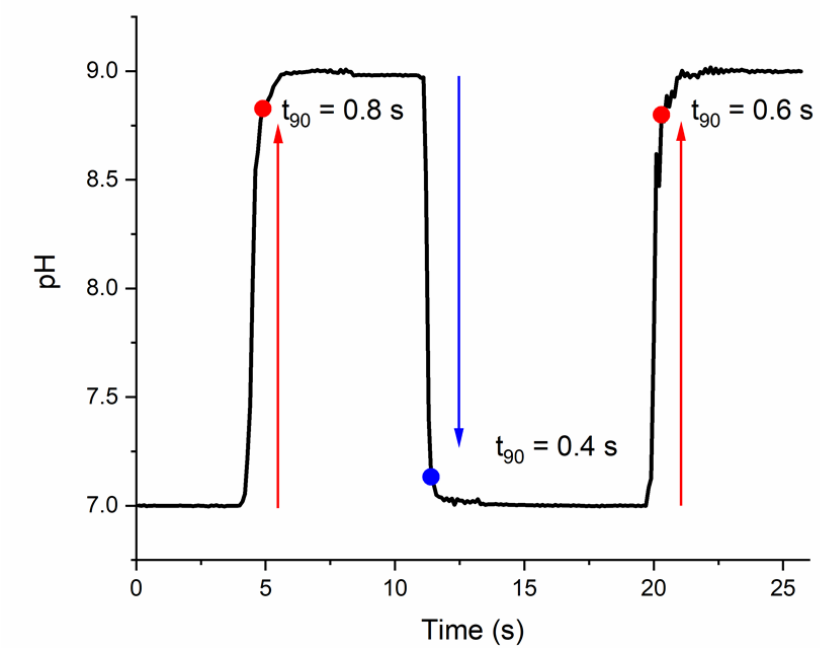

Figure S1. Example of repeated response time tests of a Honeywell Durafet pH sensor utilizing the microfluidic chamber (Figure S2), two pH buffers (7.0 and 9.0), a KNF10 micropump (100mL min^{-1}) and a simple Leur Lock valve to switch between the solutions. The 90% response time (t_{90}) is reported as the time needed to reach 90% of the total signal change (dots).

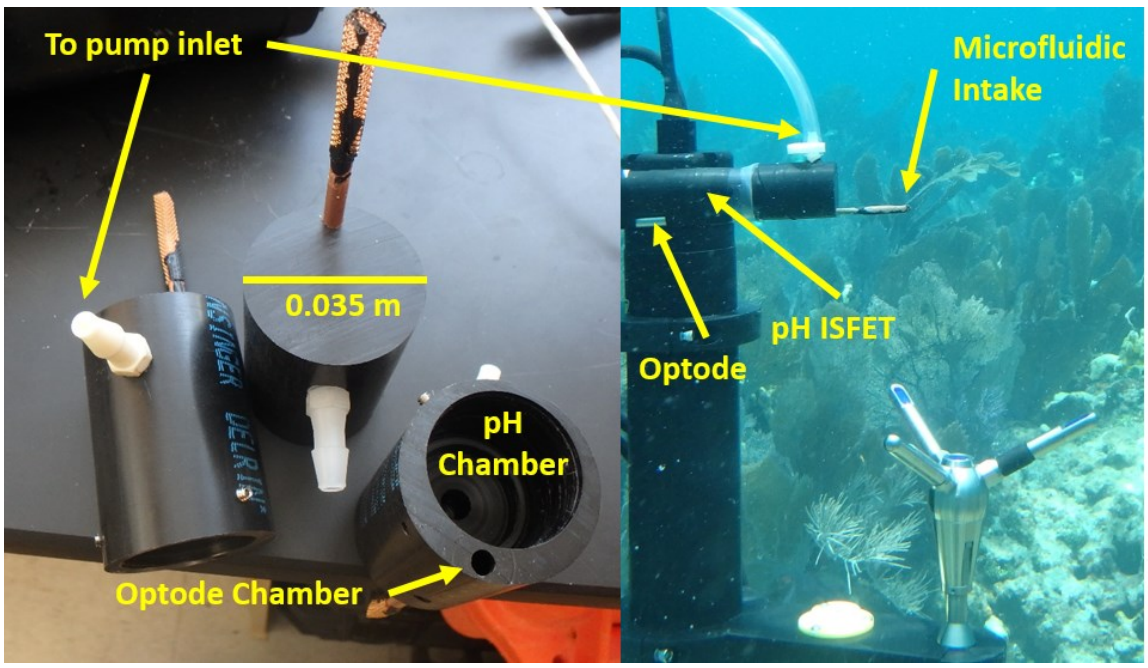

Figure S2. Construction (left) and application at the reef site (right) of the microfluidic chambers that houses the O2 optode and Honeywell Durafet sensors.

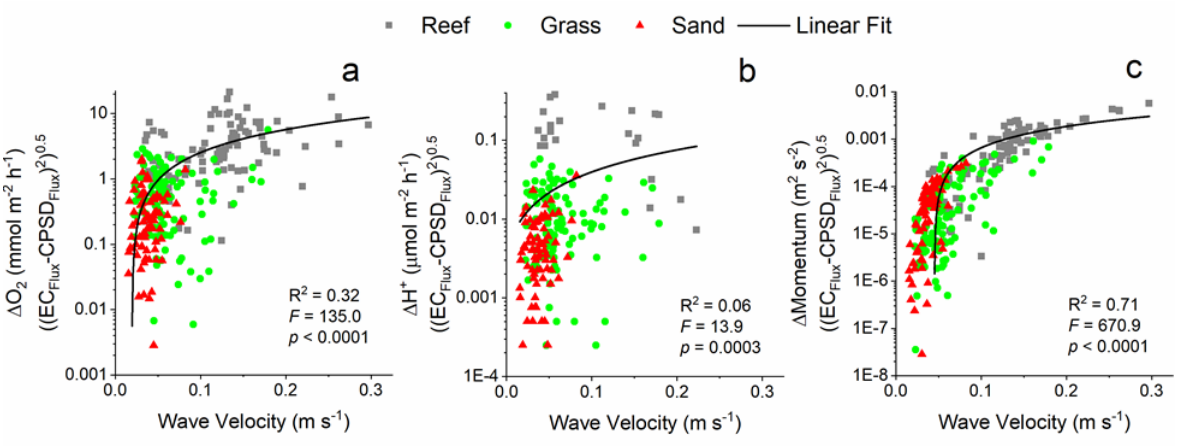

Figure S3. Absolute difference between the hourly eddy covariance and CPSD (< 0.125 Hz) fluxes compared to wave velocities. Linear fits are performed across all 3 sites. Statistics represent a difference compared to a zero-slope line.

Table S1. Field-based, biogeochemical, aquatic eddy covariance studies and the parameters and conditions of previous studies.