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Supplement of

A link between the ice nucleation activity and the biogeochemistry of seawater

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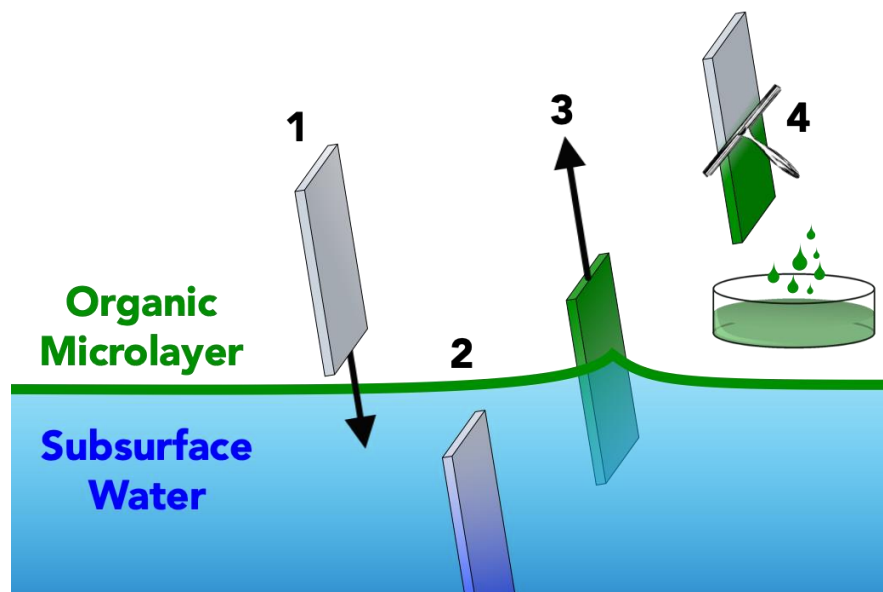


Figure S1. Sea Surface Microlayer Sampling. The plate is fully submerged below the ocean surface (1 – 2). The plate is then withdrawn at a slow rate (3) to allow the organically-enriched microlayer to adhere. The adhered material is scraped off (4) and the process is repeated until sufficient microlayer is collected.

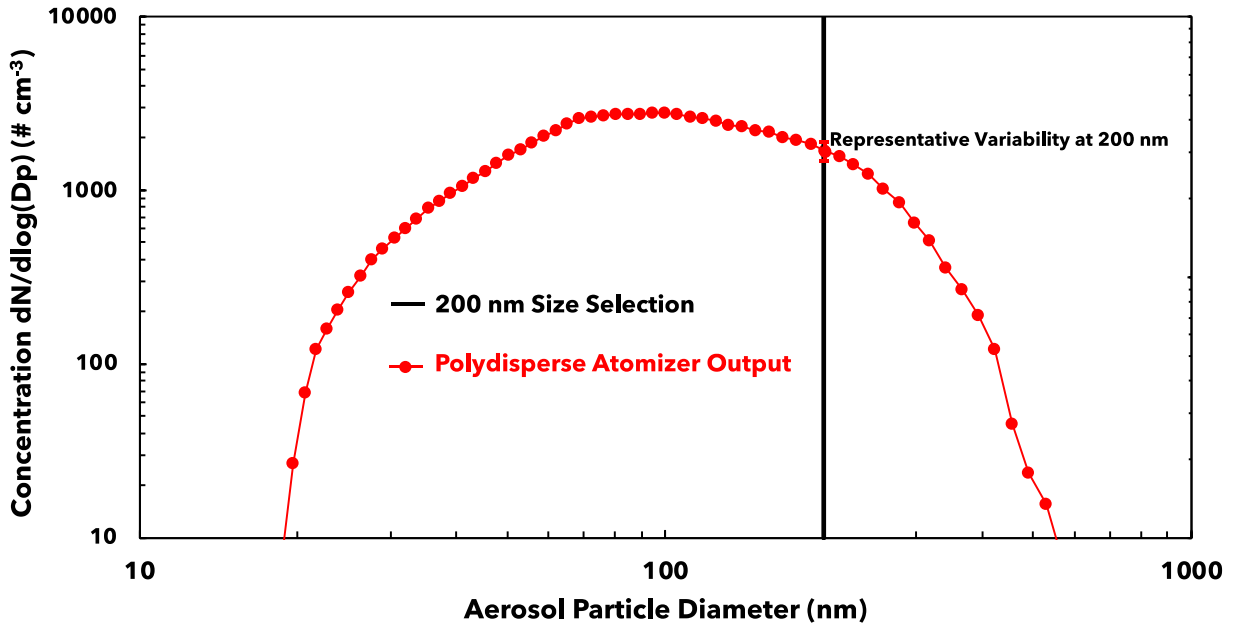


Figure S2. Atomizer size distribution and diameter of size selection. Illustrated is a typical polydisperse aerosol size distribution emanating from the atomizer prior to size selection. We size selected 200 nm diameter particles (indicated by the solid vertical black line) prior to all ice nucleation and compositional measurements. Also indicated is a standard deviation of variability in 200 nm particle concentration across all experiments.

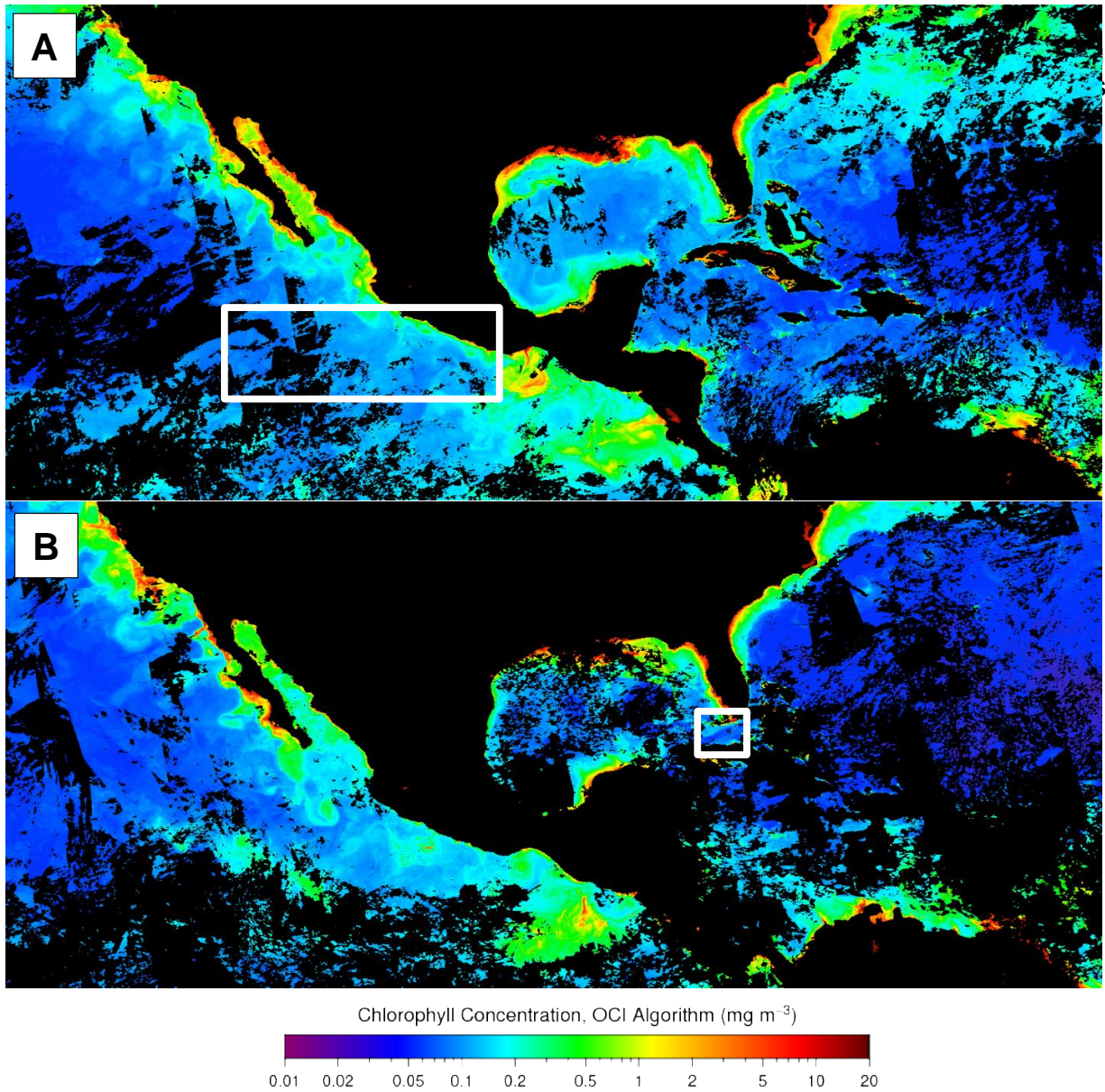


Figure S3. Regional chlorophyll a concentrations during sea water sampling, measured by MODIS-Aqua satellite. Maps illustrate the average of 8-day readings centered on sampling periods. (A) Concentrations during Florida Straits sampling, March 2018. (B) Concentrations during Eastern Tropical North Pacific Sampling, June – July 2018. White indicate the sampled regions.

Table S1 – Field Sample Locations and Dates

Sample ID	Latitude (°N)	Longitude (°W)	Date
Florida Straits 1	24.33	81.92	03/28/2018
Florida Straits 2	24.42	82.23	03/29/2018
Florida Straits 3	24.36	82.23	03/29/2018
Florida Straits 4	24.29	82.23	03/29/2018
Florida Straits 5	24.22	82.23	03/29/2018
Florida Straits 6	24.16	82.23	03/30/2018
Florida Straits 7	24.11	82.23	03/30/2018
Florida Straits 8	24.03	82.23	03/30/2018
Florida Straits 9	23.96	82.23	03/30/2018
Florida Straits 10	23.87	82.19	03/30/2018
Florida Straits 11	23.96	81.72	03/31/2018
ETNP 1	14.01	102.0	06/30/2018
ETNP 2	14.01	103.0	06/30/2018
ETNP 3	14.01	104.0	07/01/2018
ETNP 4	14.00	107.0	07/03/2018
ETNP 5	14.01	108.0	07/04/2018
ETNP 6	14.01	109.0	07/05/2018
ETNP 7	14.00	110.0	07/05/2018
ETNP 8	14.01	111.0	07/06/2018
ETNP 9	14.01	112.0	07/07/2018
ETNP 10	14.00	113.0	07/07/2018
ETNP 11	14.01	114.0	07/10/2018

Table S2 – Station Variables and INP Activity Correlation

Variable	Wind Speed	[NO₃⁻]	[PO₄³⁻]	pH	Surface [Chlorophyll-a]	Max Deep [Chlorophyll-a]
Atlantic Immersion Subsurface R ² (p value) with n _s	0.19 (0.58)	0.38 (0.41)	0.33 (0.60)	0.19 (0.54)	0.49 (0.17)	0.23 (0.47)
Atlantic Immersion Microlayer R ² (p value) with n _s	0.00 (0.89)	0.19 (0.36)	0.17 (0.27)	0.09 (0.44)	0.18 (0.40)	0.14 (0.45)
Pacific Immersion Subsurface R ² (p value) with n _s	0.13 (0.57)	0.14 (0.30)	0.13 (0.49)	0.18 (0.56)	0.02 (0.76)	0.08 (0.42)
Pacific Immersion Microlayer R ² (p value) with n _s	0.12 (0.42)	0.05 (0.59)	0.13 (0.63)	0.28 (0.31)	0.06 (0.56)	0.05 (0.67)
Atlantic Deposition Subsurface R ² (p value) with Crit. S _{ice}	0.17 (0.24)	0.26 (0.38)	0.15 (0.63)	0.33 (0.92)	0.25 (0.51)	0.20 (0.21)
Atlantic Deposition Microlayer R ² (p value) with Crit. S _{ice}	0.03 (0.70)	0.00 (0.86)	0.04 (0.56)	0.02 (0.77)	0.13 (0.60)	0.16 (0.23)
Pacific Deposition Subsurface R ² (p value) with Crit. S _{ice}	0.02 (0.69)	0.22 (0.14)	0.01 (0.83)	0.20 (0.28)	0.02 (0.75)	0.08 (0.49)
Pacific Deposition Microlayer R ² (p value) with Crit. S _{ice}	0.02 (0.75)	0.05 (0.61)	0.02 (0.72)	0.13 (0.40)	0.02 (0.76)	0.17 (0.24)