



Supplement of

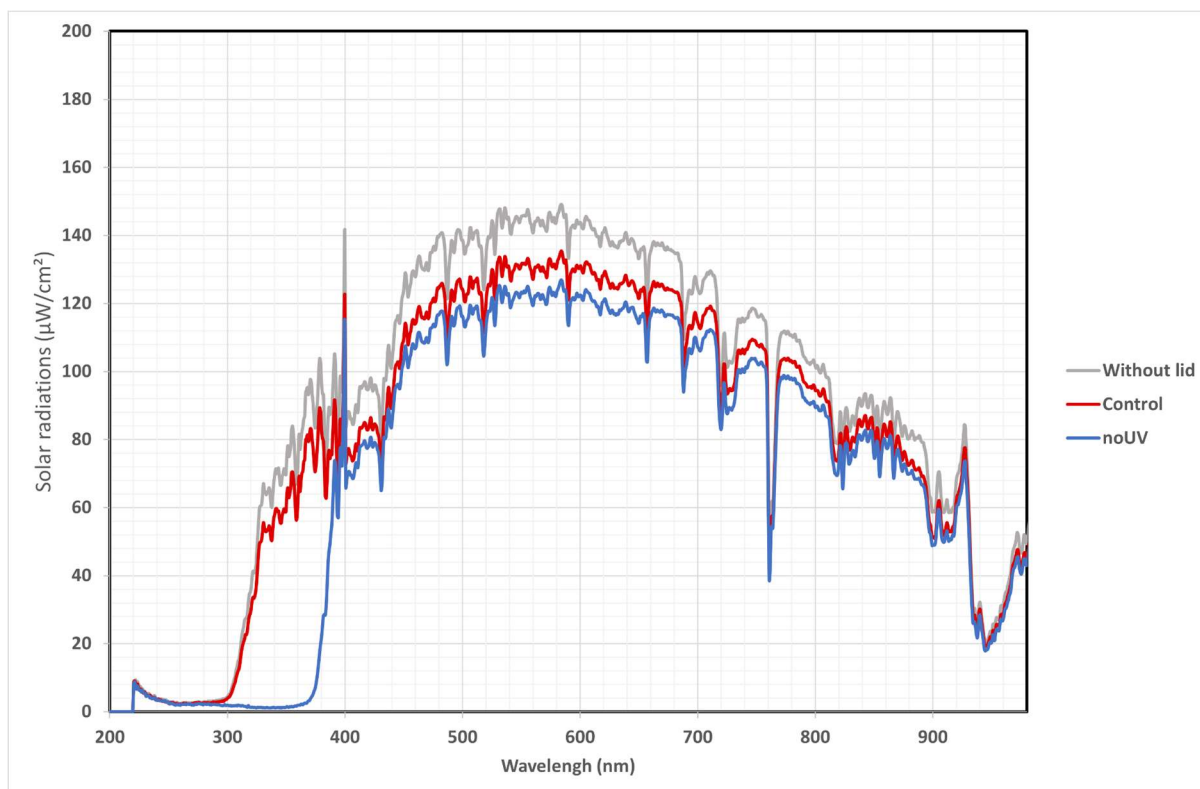
DMS, MeSH and nanoparticles in semi-controlled deck-borne experiments using Antarctic seawater: on the effect of UV light

Guillaume Chamba et al.

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1 Supplementary material



20 **Figure S1: Solar radiation intensity exposure in the ASITs experiments: Control (without lids blocking UV wavelengths, below 375nm), noUV (with lid eliminating UV) and without lid (natural radiation measured at the same time and place).**

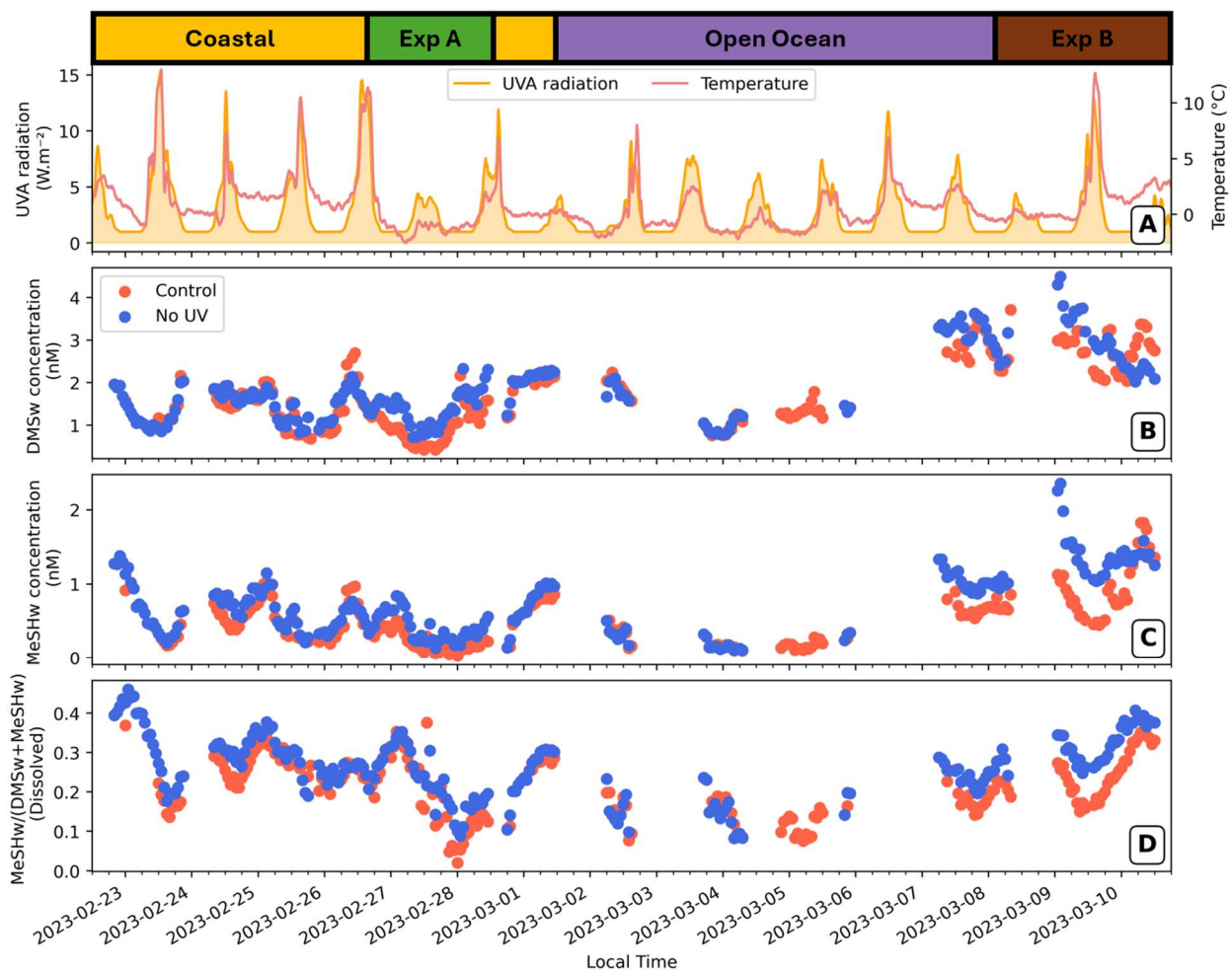


Figure S2: Time series of DMS_w concentration (B), MeSH_w concentration (C) and ratio of these compounds in the ASITs (D).

25 Dissolved concentrations are calculated using equation 3.

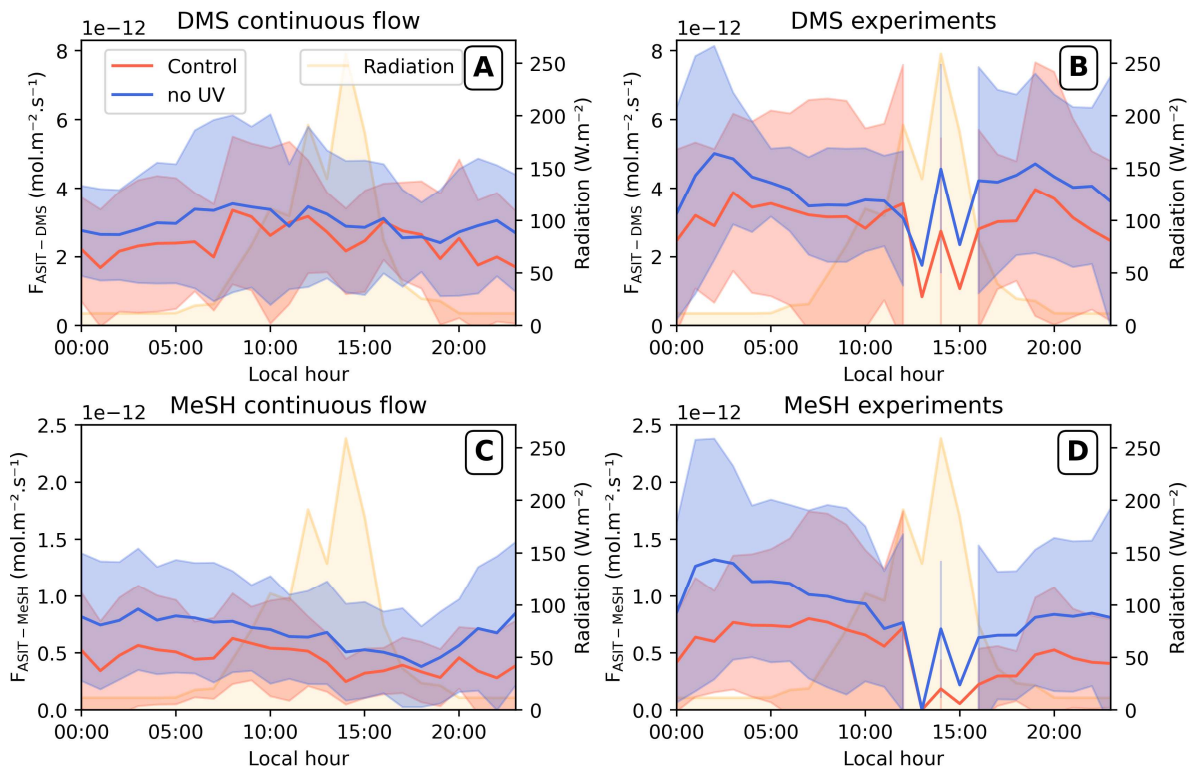
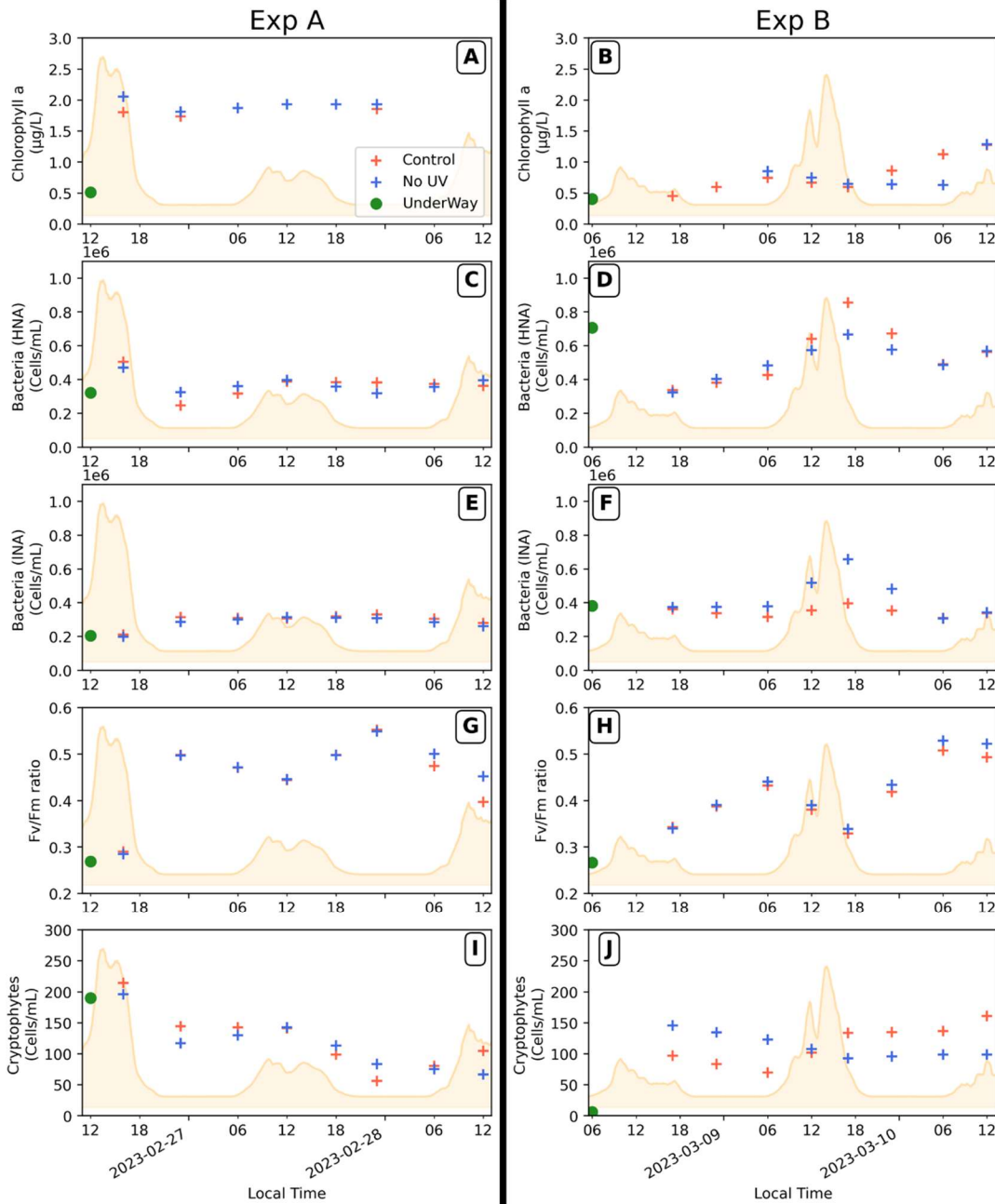


Figure S3: DMS (A; B) and MeSH (C; D) fluxes (Mean $\pm$ standard deviation as n was too low to take median $\pm$ 1st and 3rd quartile) daily variations in both ASITs during measurement periods in coastal and open ocean waters (merged data) using continuous flow mode and Experiments A and B (also merged data).



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Figure S4: Temporal variation of Chlorophyll-a (A-B), bacteria cell concentrations (C-F), Fv/Fm ratio (G-H) and cryptophyte concentration (I-J) in both ASITs during Experiments A (left panels) and B (right panels). Crosses indicate the discrete samplings conducted in the ASITs (Control, red; noUV, blue). The initial conditions of the experiments (green dot) correspond to the measurements from the underway inlet water collected concurrently to the beginning of the experiments, and may not exactly reflect the water composition inside the ASITs at that time. Irradiation intensity along the experiments is indicated by the yellow.

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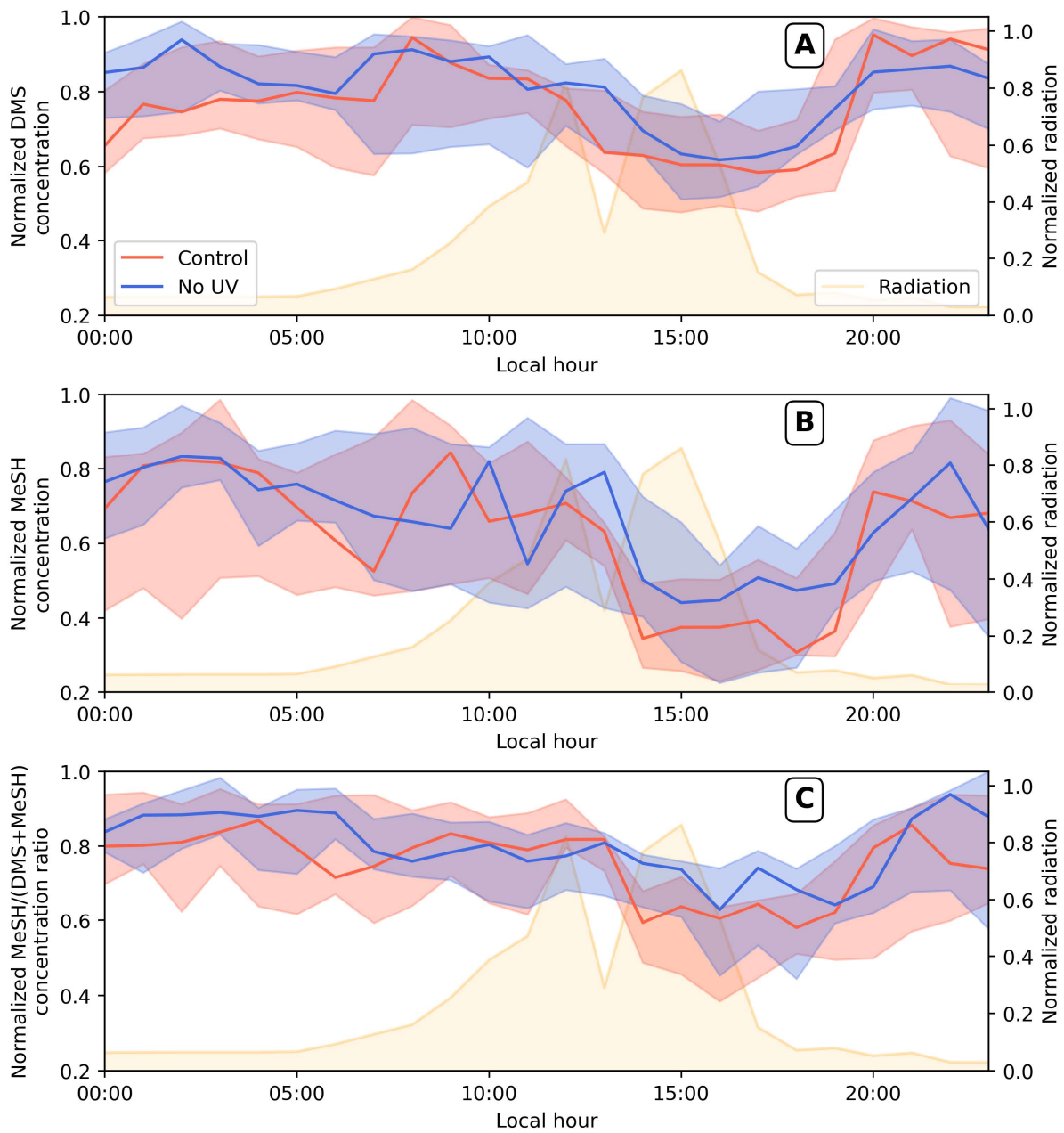
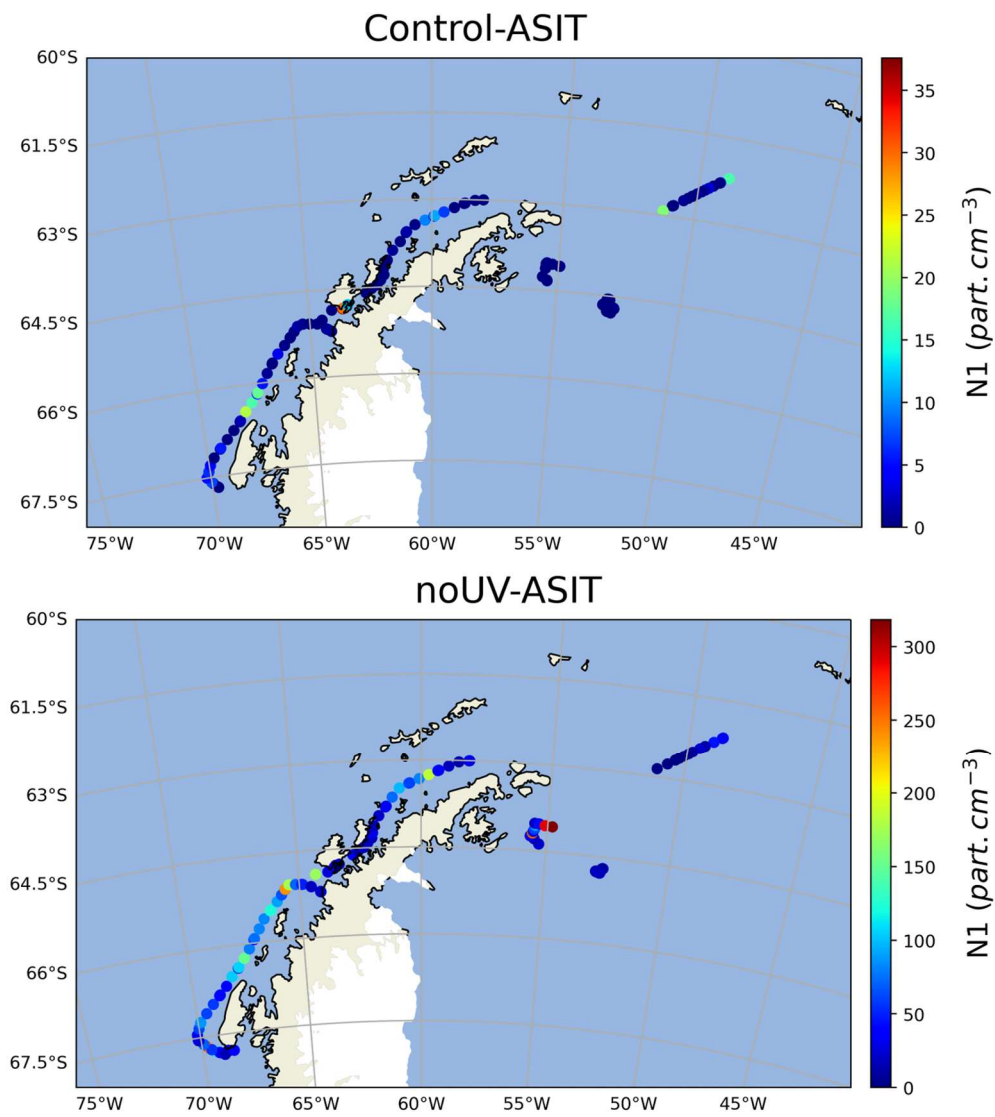


Figure S5: Median $\pm$ 1st and 3rd quartiles of the normalized diel pattern of the gaseous DMS (A) and MeSH (B) concentrations and their ratio (C) in both ASITs (Control, red; noUV, blue) considering all data over the entire cruise (i.e. from the measurement periods, including coastal, open ocean and Experiments A and B). Data are normalized for each ASIT individually by the maximal concentration for each day. Normalized irradiation daily variation is indicated by the yellow area.



50 **Figure S6: Map of N_1 particle concentrations in Control and noUV ASITs for continuous flow conditions. Experiments A and B are not shown.**

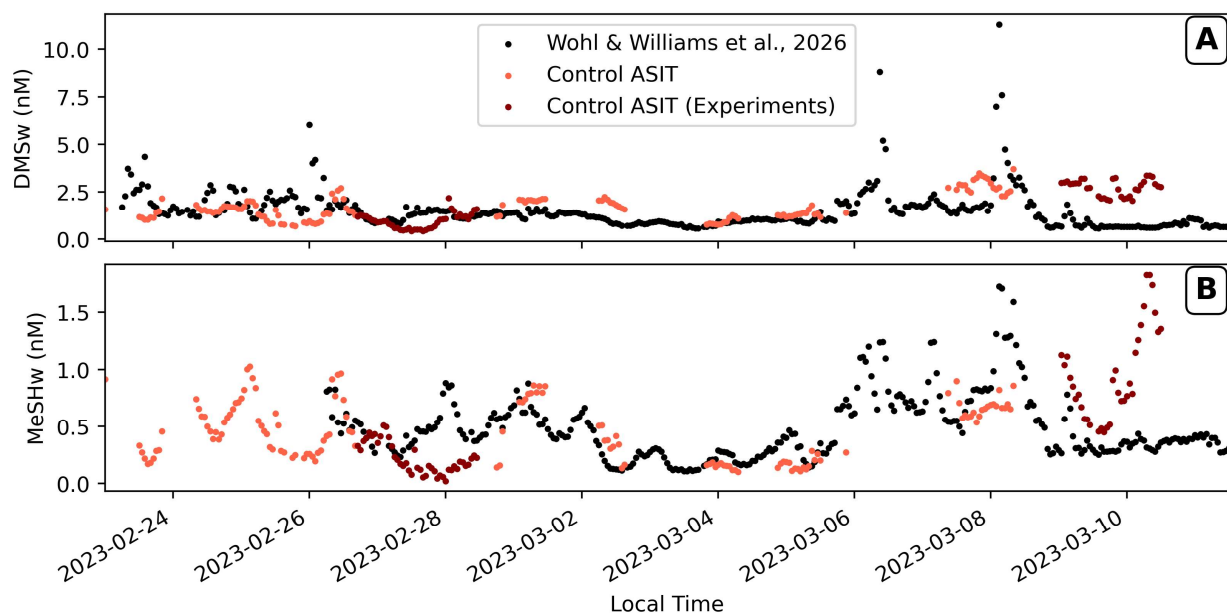


Figure S7: DMS_w (A) and MeSH_w (B) concentrations calculated for ASITs and compared to measurements from Wohl et al. (2026) performed in the underway outlet system in the same POLAR-CHANGE campaign.

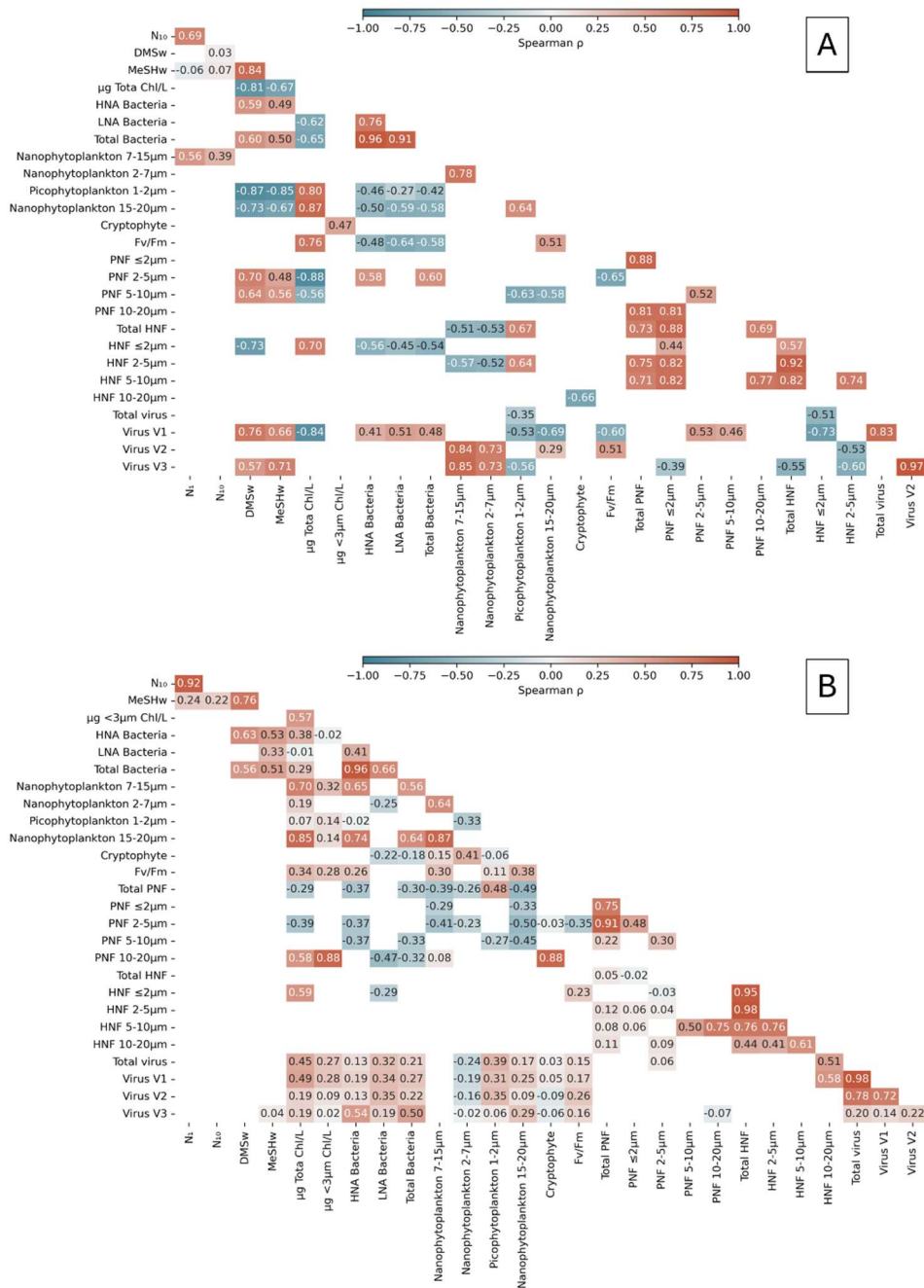


Figure S8: Spearman's rank correlation coefficient matrix obtained in both ASITs during experiments (A) and continuous flow mode (B). All measurements presented are taken in the water except for N1 and N10 particles (measured in the ASIT headspace). Cells are shown in white when the p-value is greater than 0.05 after correction for multiple comparisons using the Benjamini-Hochberg false discovery rate procedure (Benjamini and Hochberg, 1995).

Operating conditions	PC (mbar)	U drift (V)	Drift Tube pressure (mbar)	Source Current (mA)	Source opening valve (%)	Water flow (sccm)	T inlet/ Tdrift (°C)
Mean ± std	489.6 ± 2.3	596.9 ± 1.4	2.20 ± 0.01	4.04 ± 0.15	31.02 ± 0.15	6.19 ± 0.03	60 ± 0

Table S1: Operating conditions of PTR-QMS during the POLAR-CHANGE Campaign.

<i>Compound</i>	<i>Formula</i>	<i>m/z</i>	<i>Dwell time (s)</i>	<i>Instrument sensitivity (ncps/ppb)</i>	<i>Concentration in standard gas NPL (ppb)</i>
<i>Proxy formaldehyde</i>	$(\text{HCHO})\text{H}^+$	31	2	N/A	/
<i>Methanol</i>	$(\text{CH}_4\text{O})\text{H}^+$	33	2	12.7 ± 0.1	0.88 ± 0.09
<i>Acetonitrile</i>	$(\text{C}_2\text{H}_3\text{N})\text{H}^+$	42	2	24.9 ± 0.9	1.24 ± 0.13
<i>Acetaldehyde</i>	$(\text{C}_2\text{H}_4\text{O})\text{H}^+$	45	2	26.9 ± 6.2	1.04 ± 0.11
<i>Ethanol</i>	$(\text{C}_2\text{H}_6\text{O})\text{H}^+$	47	2	N/A	0.97 ± 0.10
<i>Methanethiol (MeSH)</i>	$(\text{CH}_4\text{S})\text{H}^+$	49	2	11.9 ± 5.9	/
<i>Acetone</i>	$(\text{C}_3\text{H}_6\text{O})\text{H}^+$	59	2	13.1	0.99 ± 0.05
<i>Dimethylsulfide (DMS)</i>	$(\text{C}_2\text{H}_6\text{S})\text{H}^+$	63	2	14.6 ± 0.8	0.80 ± 0.08
<i>Isoprene</i>	$(\text{C}_5\text{H}_8)\text{H}^+$	69	2	11.6 ± 9.3	0.705 ± 0.036
<i>Methacrolein</i>	$(\text{C}_4\text{H}_6\text{O})\text{H}^+$	71	2	26.6 ± 6.2	1.03 ± 0.11
<i>Methyl ethyl ketone (MEK)</i>	$(\text{C}_4\text{H}_8\text{O})\text{H}^+$	73	2	27.8 ± 6.2	1.10 ± 0.06
<i>Benzene</i>	$(\text{C}_6\text{H}_6)\text{H}^+$	79	2	15.7 ± 6.2	0.950 ± 0.048

Table S2: PTR-QMS sensitivity to various compounds as operated during the POLAR-CHANGE campaign. Compounds not present in standard gas (including MeSH) were calibrated based on “neighbouring” compounds (as presented in Gros et al., 2023).

- Benjamini, Y. and Hochberg, Y.: Controlling the False Discovery Rate: A Practical and Powerful Approach to Multiple Testing, *Journal of the Royal Statistical Society Series B: Statistical Methodology*, 57, 289–300, <https://doi.org/10.1111/j.2517-6161.1995.tb02031.x>, 1995.
- 75 Gros, V., Bonsang, B., Sarda-Estève, R., Nikolopoulos, A., Metfies, K., Wietz, M., and Peeken, I.: Concentrations of dissolved dimethyl sulfide (DMS), methanethiol and other trace gases in context of microbial communities from the temperate Atlantic to the Arctic Ocean, *Biogeosciences*, 20, 851–867, <https://doi.org/10.5194/bg-20-851-2023>, 2023.
- Wohl, C., Williams, L. R., Deschaseaux, E. S. M., Quéléver, L. L. J., Beddows, D. C. S., Stark, H., Pospisilova, V., Lopez-
80 Hilfiker, F. D., Chamba, G., Sellegri, K., Sà, E. L., Güell-Bujons, Q., Vila, M., Castillo, Y. M., Rocchi, A., Sotomayor, A., Vaqué, D., Dall'Osto, M., Berdalet, E., and Simó, R.: Methanethiol and dimethyl sulfide measurements in seawater and the atmosphere around the Antarctic Peninsula and in the Weddell Sea, *Atmos. Chem. Phys.*, 26, 10149–10165, <https://doi.org/10.5194/acp-26-10149-2026>, 2026.