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

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## 1 Supplementary material

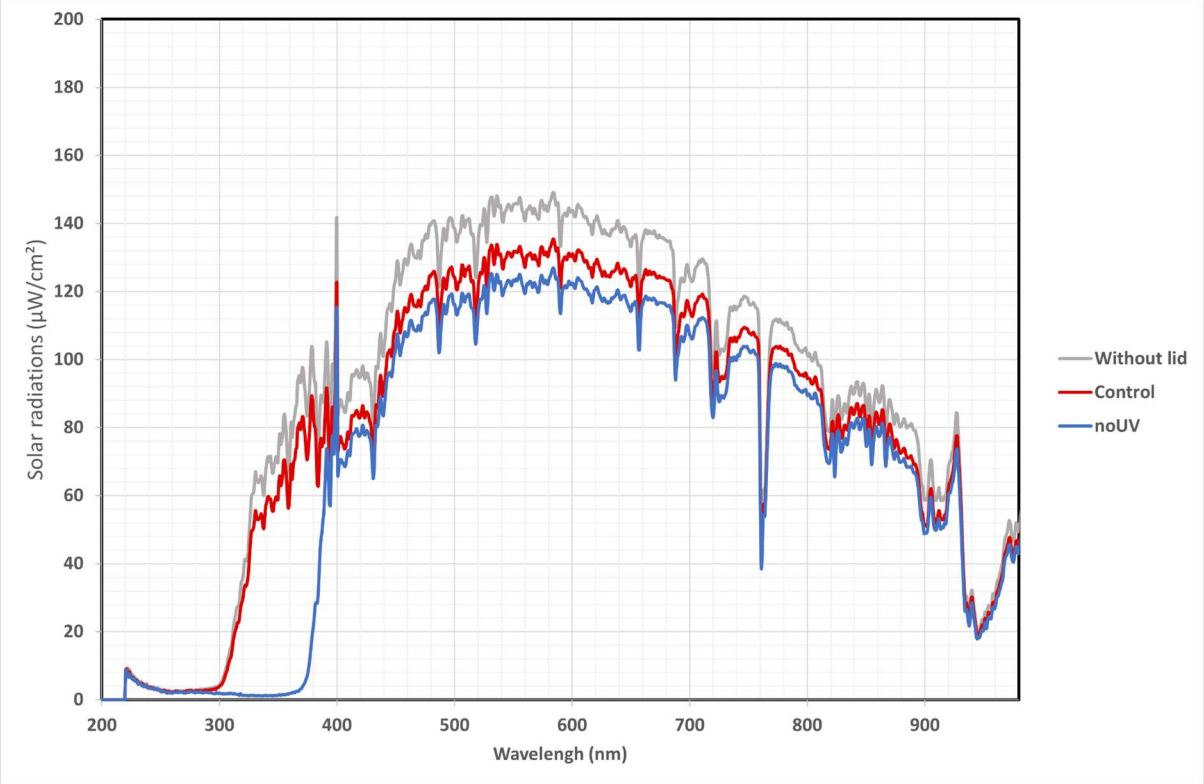



**Figure S.1: Solar radiation intensity exposure in the ASITs experiments: Control (without lids blocking UV wavelengths, below 375nm), noUV (with lid eliminating UV) and without lid (natural radiation measured at the same time and place).**

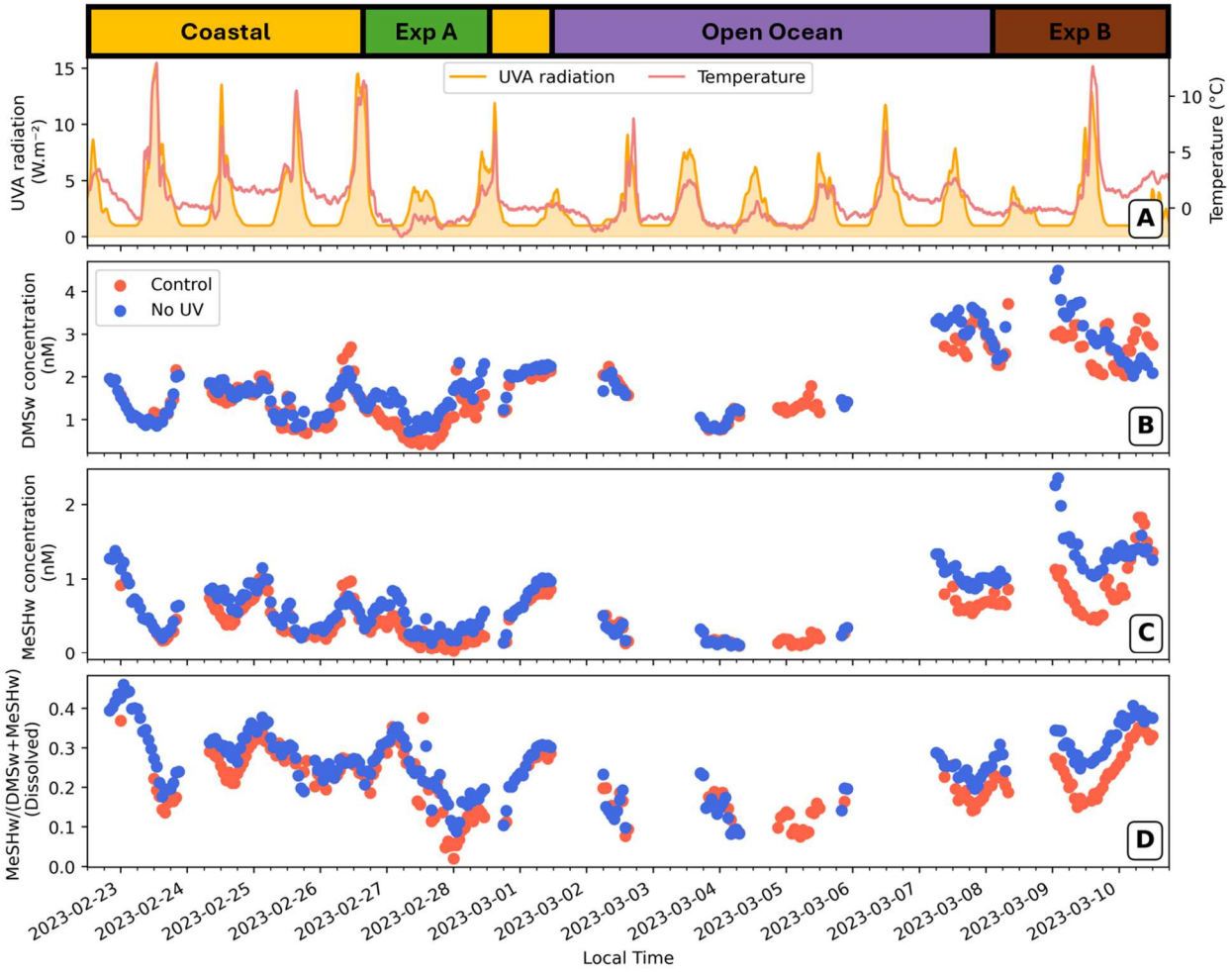



**Figure S.2: Time series of $DMS_w$ concentration (B), $MeSH_w$ concentration (C) and ratio of these compounds in the ASITs (D). Dissolved concentrations are calculated using equation 3.**

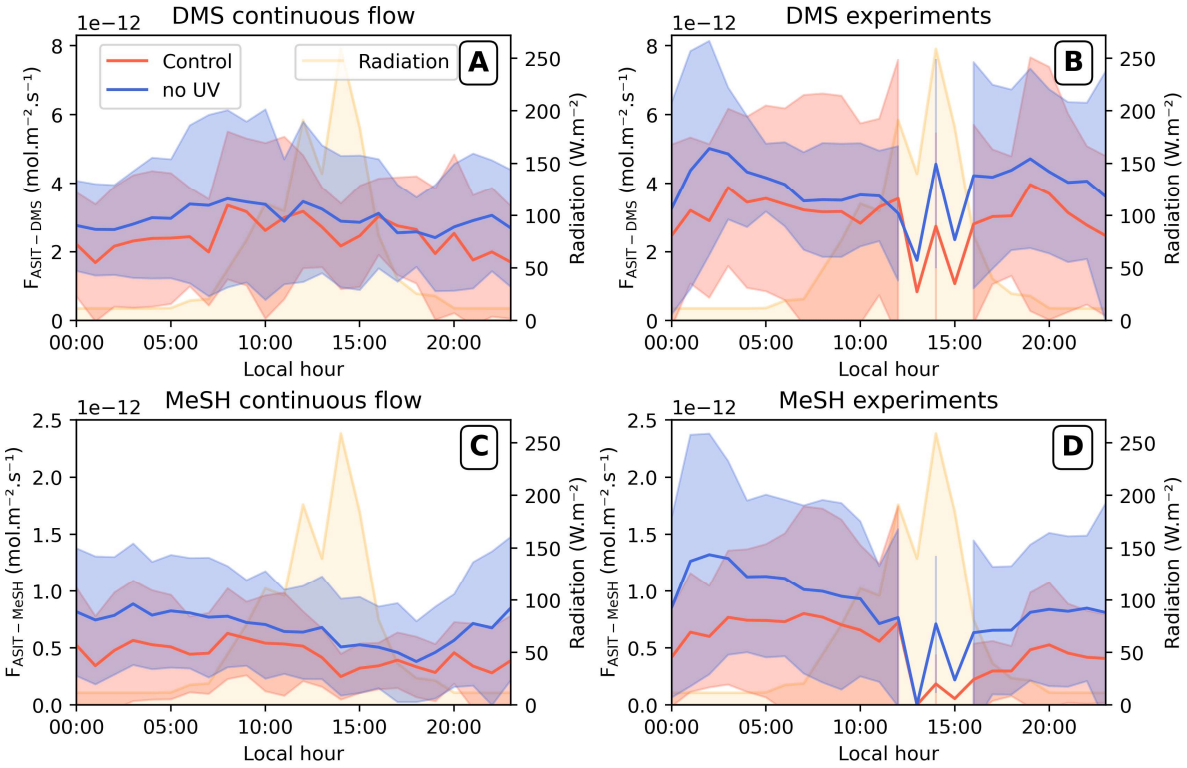
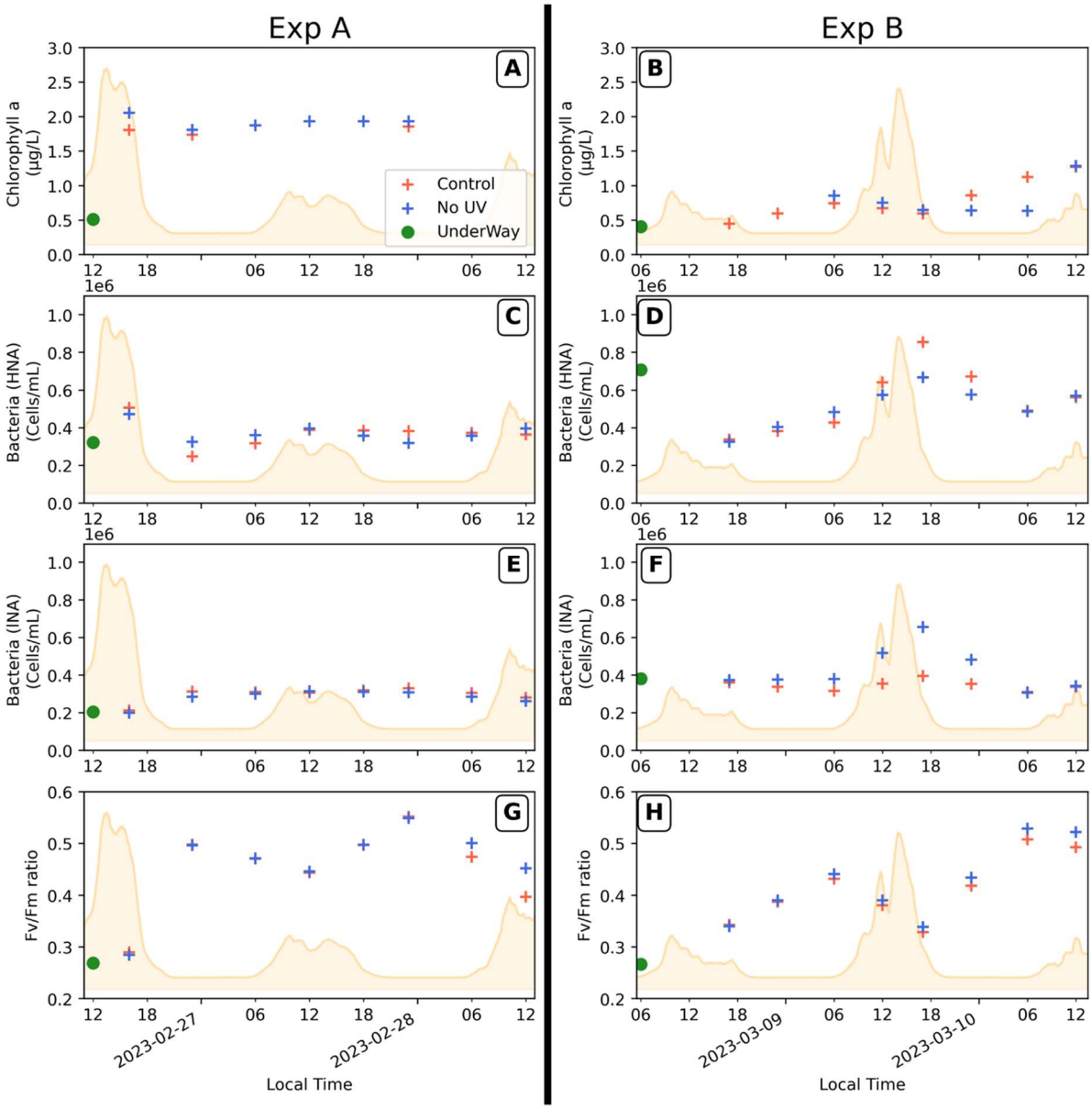



**Figure S.3: DMS (A; B) and MeSH (C; D) fluxes (Mean +/- standard deviation as n was too low to take median +/- 1st and 3rd quartile) daily variations in both ASITs during measurement periods in coastal and open ocean waters (merged data) using continuous flow mode and Experiments A and B (also merged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




35 **Figure S.4: Temporal variation of Chlorophyll a (A-B), bacteria cells concentrations (C-F), Fv/Fm ratio (G-H), calculated dissolved DMS and MeSH concentrations 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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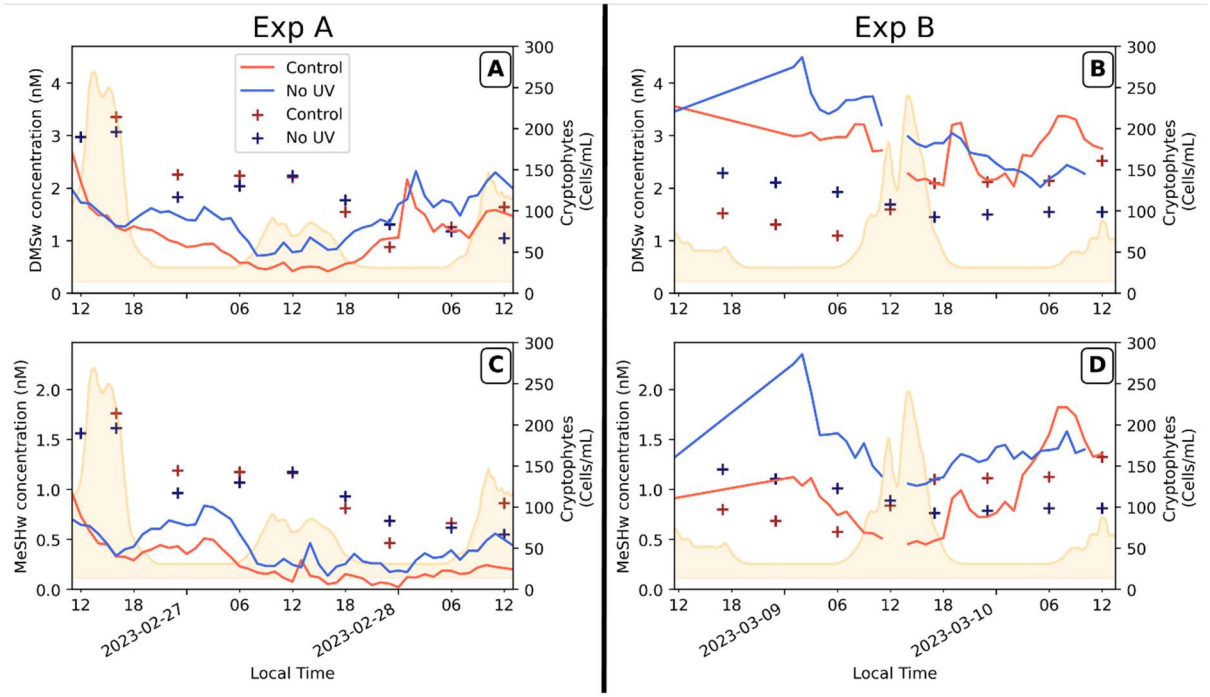


**Figure S.5: Temporal variation of cryptophyte cells concentration (crosses indicate the discrete samplings conducted in the ASITs) during Experiments A (left panels) and B (right panels) compared to $DMS_w$ concentration (A-B) and $MeSH_w$ concentration (C-D) (lines). Irradiation intensity is indicated by the yellow area.**

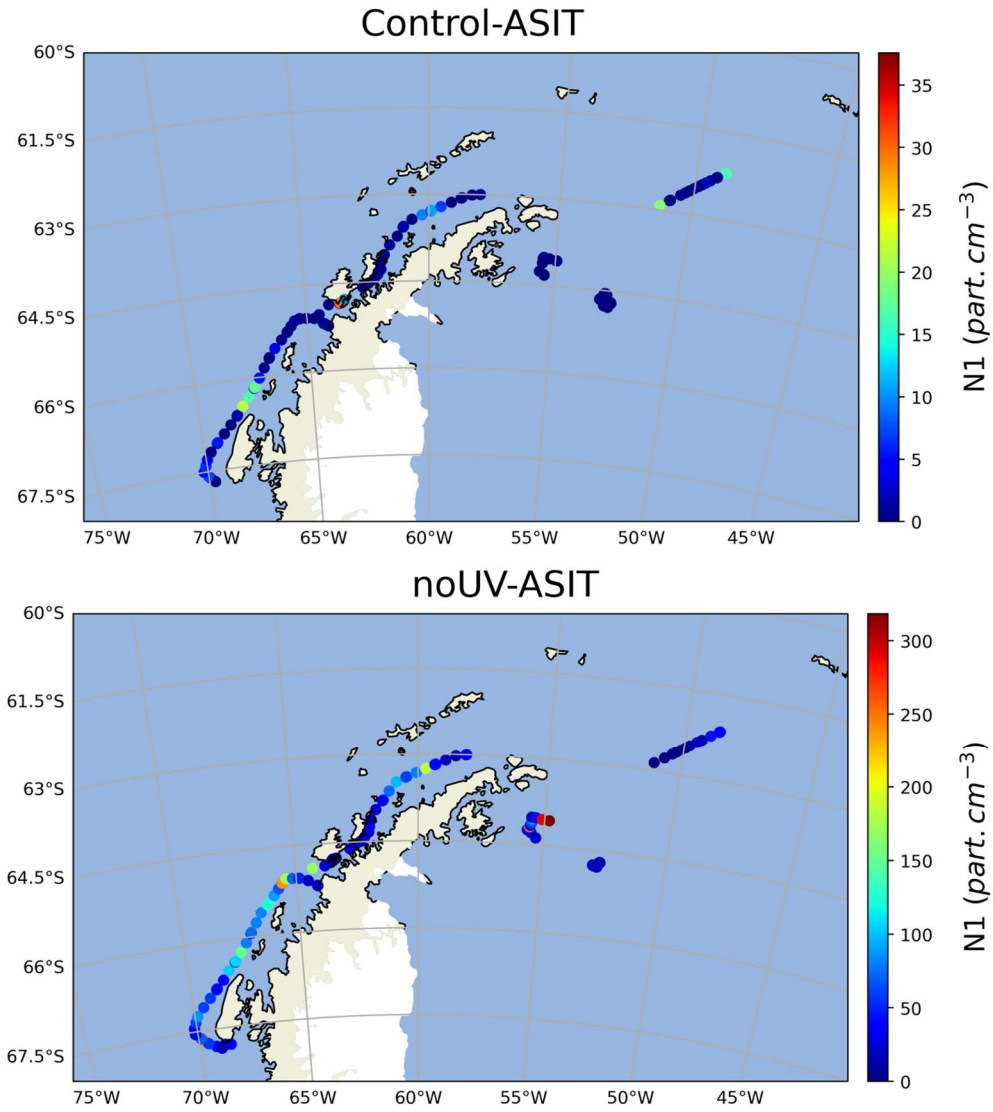


**Figure S.6: Map of $N_1$ particle concentrations in Control and noUV ASITs for continuous flow conditions. Experiments A and B are not shown.**

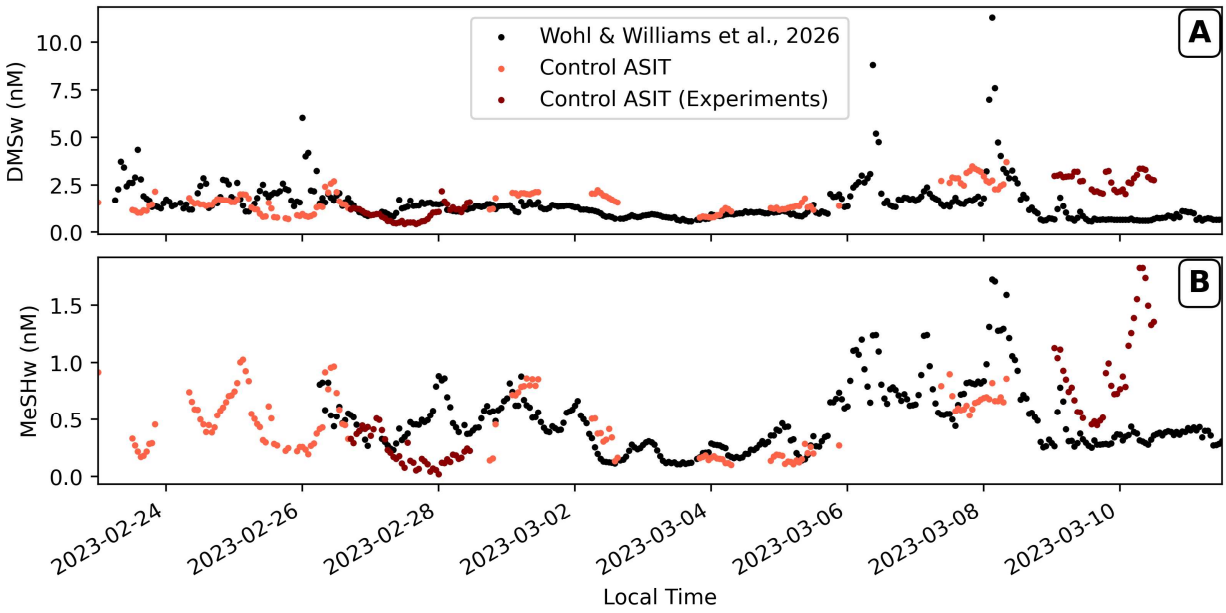


**Figure S.7: $DMS_w$ (A) and $MeSH_w$ (B) concentrations calculated for ASITs and compared to measurements from Wohl & Williams et al., (in review) performed in the underway outlet system in the same POLAR-CHANGE campaign.**

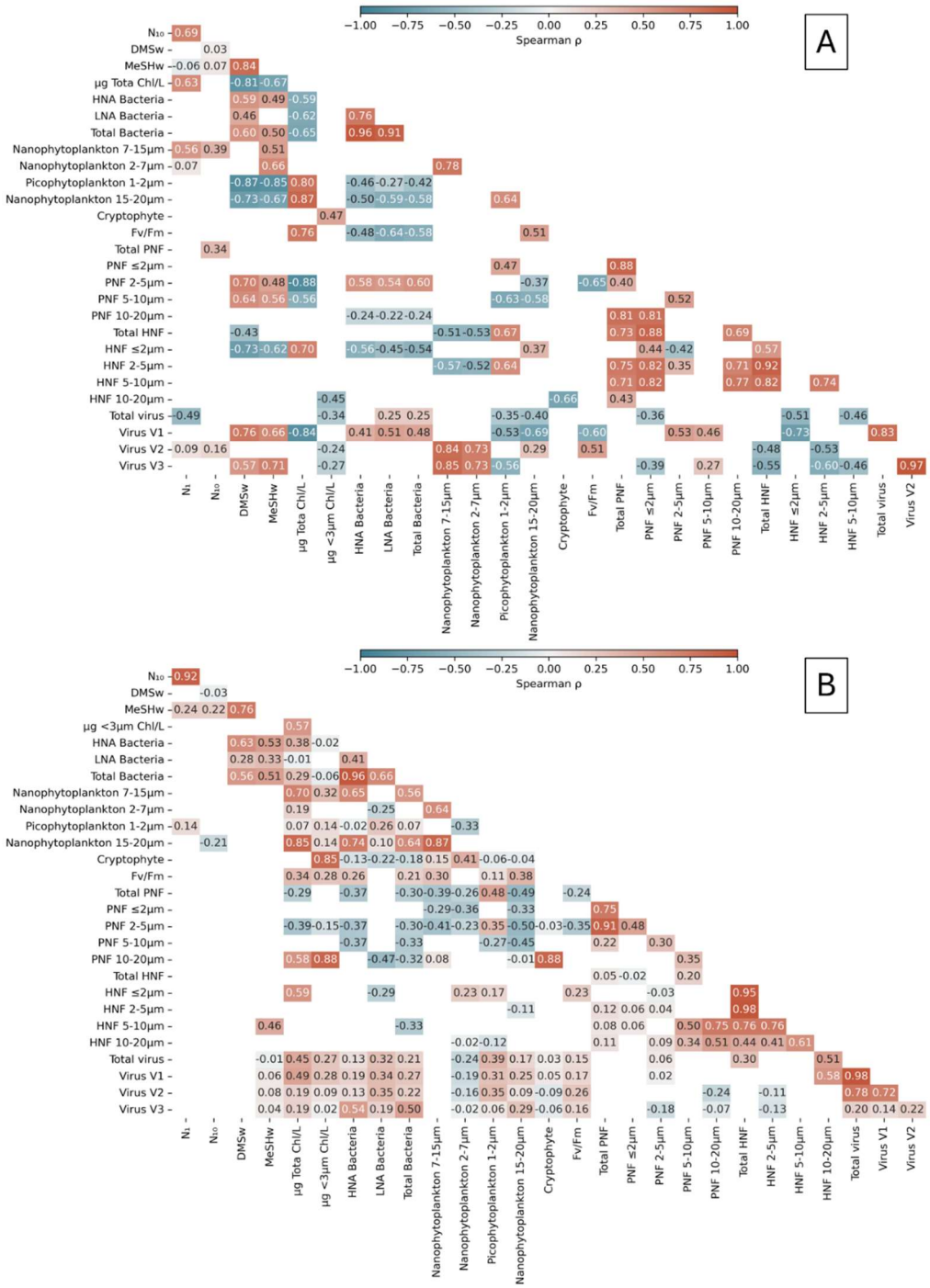


**Figure S.8: Correlation obtained in both ASITs during experiments (A) and continuous flow mode (B). All measurements presented are taken in the water except for $N_1$ and $N_{10}$ particles (measured in the ASIT headspace).**

| 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 S.1: Operating conditions of PTR-QMS during the POLAR-CHANGE Campaign.**

| *Compound* | *Formula* | *m/z* | *Dwell time (s)* | *Instrument sensitivity (ncps/ppb)* | *Concentration in standard gas NPL (ppb)* |
|---|---|---|---|---|---|
| *Proxy formaldehyde* | $(HCHO)H^+$ | *31* | *2* | *N/A* | */* |
| *Methanol* | $(CH4O)H^+$ | *33* | *2* | *12.7 ± 0.1* | *0.88 ± 0.09* |
| *Acetonitrile* | $(C2H3N)H^+$ | *42* | *2* | *24.9 ± 0.9* | *1.24 ± 0.13* |
| *Acetaldehyde* | $(C2H4O)H^+$ | *45* | *2* | *26.9 ± 6.2* | *1.04 ± 0.11* |
| *Ethanol* | $(C2H6O)H^+$ | *47* | *2* | *N/A* | *0.97 ± 0.10* |
| *Methanethiol (MeSH)* | $(CH4S)H^+$ | *49* | *2* | *11.9 ± 5.9* | */* |
| *Acetone* | $(C3H6O)H^+$ | *59* | *2* | *13.1* | *0.99 ± 0.05* |
| *Dimethylsulfide (DMS)* | $(C2H6S)H^+$ | *63* | *2* | *14.6 ± 0.8* | *0.80 ± 0.08* |
| *Isoprene* | $(C5H8)H^+$ | *69* | *2* | *11.6 ± 9.3* | *0.705 ± 0.036* |
| *Methacrolein* | $(C4H6O)H^+$ | *71* | *2* | *26.6 ± 6.2* | *1.03 ± 0.11* |
| *Methyl ethyl ketone (MEK)* | $(C4H8O)H^+$ | *73* | *2* | *27.8 ± 6.2* | *1.10 ± 0.06* |
| *Benzene* | $(C6H6)H^+$ | *79* | *2* | *15.7 ± 6.2* | *0.950 ± 0.048* |

**Table S.2: 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).**

**References**

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., Quéléver, L. L. J., Beddows, D. C. S., Stark, H., Pospisilova, V., Lopez-Hilfiker, F., 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, https://doi.org/10.5194/egusphere-2026-1472, 20 March 2026.