



Determination of VOCs in Pelagic Ecosystem CO₂ Enrichment (PeECE-III) experiment conducted in mesocosms

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Volatile organic compounds (VOCs) were determined in Pelagic Ecosystem CO₂ Enrichment (PeECE-III) experiment conducted in the Large Scale Mesocosm Facilities of the University of Bergen, Norway, during the period May 10-June 12, 2005. Triplicate mesocosms were maintained at present-day, future and far future CO₂ levels (pCO₂ (ppmv) = 375, 750 and 1150, respectively). Purge and trap gas chromatography/mass spectrometry (P&T/GC/MS) and headspace solid phase microextraction GC/MS (HS-SPME/GC/MS) were employed to measure VOC in seawater and in the headspace of seawater of each mesocosm, respectively. In addition, proton transfer reactivity and mass spectrometry (PTR-MS) and canister sampling and GC/MS were used to measure VOCs in the headspace of each mesocosm. A plankton bloom was investigated and the temporal trends of VOCs including: dimethylsulphide (DMS), halogenated compounds, methanol, acetone, isoprene, and monoterpenes were obtained. Among these species, DMS was well correlated with chlorophyll_a. The highest levels of isoprene and CHBr₃ were recorded in the bloom peak. Except DMS, no significant difference in the absolute concentrations of some organic species was observed with the enhancement of CO₂ levels. Diurnal profiles of some organic compounds were also recorded showing that some species are uptaken from the atmosphere while other species are produced in the seawater and emitted to the atmosphere.