
 [JJ] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-CG Complex & General

[A-CG41]Biogeochemical linkages between the ocean and the atmosphere during phytoplankton blooms

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Multi-scale vertical and horizontal ocean mixing processes can strongly influence the distribution of dissolved and suspended substances including macro- and micro-nutrients, and may impact on phytoplankton bloom formation. The changes in nutrient dynamics generally affect the abundance, composition and metabolic activity of marine organisms such as phytoplankton and bacteria during the bloom. Marine phytoplankton can produce volatile organic compounds (VOCs) and marine atmospheric aerosols, which strongly influence on atmospheric chemistry. Primary and secondary organic and inorganic components produced via marine phytoplankton activity can contribute to the Earth's radiative forcing, and in turn marine ecosystems including biogeochemical processes directly or indirectly. Therefore, the biogeochemical cycles have a tight linkage between the ocean and the atmosphere. In order to understand physical, chemical and biological processes relevant to phytoplankton bloom formation in the ocean, dynamics of VOCs and marine aerosols in the atmosphere, and the biogeochemical linkage between the ocean and the atmosphere, we welcome new interdisciplinary presentations and active discussions on physical, chemical, and biological sciences both from ocean and atmospheric fields in this session. Studies linked to the Surface Ocean-Lower Atmosphere Study (SOLAS) project are good examples, but other related studies are also invited.

[ACG41-P02]Development of measurement system for dissolved isoprene using curie point pyrolyzer

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Keywords:isoprene, curie point pyrolyzer, secondary organic aerosol

Isoprene (2-methyl-1,3-butadiene; C_5H_8) is one of the dominant and highly reactive non-methane hydrocarbons and is rapidly oxidized in the atmosphere, contributing to secondary organic aerosol (SOA) formation. Although terrestrial vegetation is the main source of atmospheric isoprene emissions, isoprene is also produced by marine organisms such as phytoplankton, seaweeds and bacteria. Globally, emission of isoprene to the atmosphere is substantially lower from marine systems ($0.1\text{--}1.9\text{ Tg C yr}^{-1}$) than from terrestrial systems ($400\text{--}750\text{ Tg C yr}^{-1}$). However, the large input from terrestrial sources has no impact on remote ocean regions because of the short atmospheric lifetime of isoprene ($1\text{--}5\text{ h}$). Data coverage of isoprene in seawater is still limited to understand its production factors in seawater while the contribution of isoprene to in-situ atmospheric chemistry such as SOA production is considered to be important. The usual method for oceanic isoprene measurements involves discrete sampling and analysis by gas chromatography (GC) on board, however, we need the large space and expendables such as refrigerant to maintain GC measurements. To improve the data coverage of isoprene in seawater, we tried to develop a new conceptual measurement system using a curie point pyrolyzer. This measurement system is characterized by the simpler composition than the conventional purge & trap extraction-GC detection. Extracted isoprene from seawater sample was trapped on Carboxen absorbent filled in a small tube called mini-PAT in room temperature, and then trapped isoprene was desorbed and introduced to GC by rapid heating up to 358°C on the basis of

pulse heating method. This method doesn't require both refrigerant and large space for the extraction. If the mini-PAT can preserve isoprene for a while, we can separately measure isoprene on land after the cruise. The simpler extraction and preservation and the smaller space on board will realize the improvement data coverage of dissolved isoprene. In this presentation, we will show the performance of the system such as detection limit, extraction and trapping efficiency, preservation period, and its dependence in filled absorbents.