

Multiphase Chemistry of Biogenic Marine Trace Gases

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Oceans cover 70% of the Earth surface, yet ocean emissions of organic carbon molecules (gas- and aerosol phase) are currently estimated to be 1-2 orders of magnitude smaller than the homologue emissions from land. The ocean is believed to be a net receptor for organic carbon that is emitted over land. Recent our observations of very short-lived and very water soluble oxygenated hydrocarbons -like glyoxal- in the remote marine boundary layer (Sinreich et al., 2010, ACP) remain unexplained by atmospheric models, and may challenge this view. Laboratory experiments show activity coefficients of 1/500 for Henry's law partitioning coefficients of glyoxal in concentrated aqueous aerosol- salt solutions. This salting-in mechanism is investigated in laboratory experiments, and shown to be a major driver in the rate of secondary organic aerosol (SOA) formation from the multiphase chemistry of soluble species like glyoxal. Organic carbon in the atmosphere is relevant to climate discussions, because it can modify hydroxyl, chlorine, and bromine radical abundances (OH, Cl remove heat trapping methane through atmospheric oxidation), and because organic carbon modifies aerosols that influence Earth albedo. We use data from the "Tropical Ocean tRoposphere Exchange of Reactive halogen species and Oxygenated VOC" (TORERO) experiment to assess the impact and source mechanism of small oxygenated VOC in the remote tropical atmosphere, where most of tropospheric ozone mass resides, 60-80% of the global methane destruction occurs, and mercury oxidation rates are accelerated at low temperatures.

Monday, October 28th

3:15 PM – Refreshments

3:30 PM – Seminar

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Large Auditorium