

SOLAS Open Science Conference 2009
Discussion Session Report:
Ocean-Derived Aerosols: Production, evolution and impacts
Monday 16th November 2009

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The importance of marine aerosol in atmospheric chemistry, cloud formation and climate was highlighted in a brief introduction, and several high-priority research questions were identified. This was followed by six introductory presentations: (1) Global primary marine aerosol emissions (Monique Albert), (2) Primary production of sea spray aerosol (Gerrit de Leeuw), (3) Biogenic primary and secondary organic components in marine aerosol (Cristina Facchini), (4) Size-resolved production and composition of nascent marine aerosol (William Keene), (5) Scavenging by marine aerosol (Jacek Piskozub), and (6) Interactions between air pollutants and marine gases and aerosols (Timothy Bates). An open discussion ensued on the key questions outlined in the aerosol white paper (see mid-term strategy on SOLAS website). Much of this discussion focused on reported number distributions of size-resolved marine aerosol, since large differences have been observed below an ambient geometric mean radius of $\sim 0.2 \mu\text{m}$. Resolving these differences is critical to assessing the impact of submicron marine aerosol on atmospheric processes. Another discussion ensued on how the sea-spray aerosols with $r \sim < 0.1 \mu\text{m}$ are produced. In biologically active regions the submicron fraction contains increasingly more organics as their size decreases. A discussion followed regarding the nature and composition of the organic matter produced in marine aerosol and whether this organic matter originated primarily from the sea surface microlayer or from the underlying “bulk” seawater. Two other salient comments that were raised during the discussion session were (1) the SOLAS community should conduct fundamental studies to evaluate bubble plume dynamics and evolution and (2) we should not lose sight of or ignore the production and processing of supermicron size fractions that dominate the mass flux of marine aerosol. Finally, the importance of determining whether marine-derived organic matter associated with nascent marine aerosols scaled linearly or nonlinearly with surfactant organic carbon in seawater was addressed, since these functional relationships yield very different global-model flux estimates.