Geophysical Research Abstracts,
Vol. 11, EGU2009-8395-1, 2009
EGU General Assembly 2009

Effect of phytoplackton-derived organic matter on the behavior of marine aerosols

E. Fuentes (1), H. Coe (1), G. McFiggans (1), and D. Green (2)

(1) Centre for Atmospheric Science, SEAES, University of Manchester, M13 9PL, Manchester, UK, (2) Scottish Association for Marine Science, Oban, Argyll, PA37 1QA, UK

The presence of significant concentrations of organic material in marine aerosols has been appreciated for several decades; however, only recently has significant progress been made towards demonstrating that this organic content is biogenically formed. Biogenic organics of placktonic life origin are incorporated in marine aerosol composition as a result of bubble bursting/breaking waves mechanisms that occur at the ocean surface. The presence of organic surfactants in the marine aerosol composition might have a significant impact on the properties of the generated aerosols by affecting the particles surface tension and solution balance properties. Nevertheless, it remains uncertain the role of such organics on the physical-chemical behavior of marine aerosols.

In this work an experimental study was performed in order to determine the influence of biogenic marine organic compounds on the size distribution, hygroscopicity and cloud-nucleating properties of marine aerosols. For the experimental study a laboratory water recirculation system (bubble tank), designed for the simulation of bubble-burst aerosol formation, was used as marine aerosol generator. The bubble spectra produced by such system was characterized by means of an optical bubble measuring device (BMS) and it was found to be consistent with oceanic bubble spectra properties. Seawater proxy solutions were prepared from laboratory biologically-synthesized exudates produced by oceanic representative algal species and introduced in the tank for the generation of marine aerosol by bubble bursting. Two experimental methods were employed for seawater proxies preparation: the formation of surface monolayers from the biogenic surfactants extracted by a solid phase extraction technique (monolayer method) and the mixing of the exudates in the sea salt water bulk (bulk mixing method). Particle size distribution, hygroscopicity and cloud condensation nuclei experiments for different monolayers, and exudate mixtures were performed. This contribution provides an overview of the experimental study conducted and the most relevant results found in this research work.