Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01794, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01794
EGU General Assembly 2008

Distinguishing characteristics of primary and secondary organics in submicron marine aerosol particles

Maria Cristina Facchini (1) , Matteo Rinaldi (1), Stefano Decesari (1), Emanuela Finessi (1), Claudio Carbone (1), Sandro Fuzzi (1) , D. Ceburnis (2) and Colin. D. O'Dowd (2)

(1) Institute of Atmospheric Sciences and Climate, National Research Council, Bologna, Italy, (2) Department of Chemistry, University of Bologna, Bologna, Italy, (2) Department of Experimental Physics & Environmental Change Institute, National University of Ireland Galway, Galway, Ireland.

This work reports some very recent results obtained in the three experiments carried out during 2006 in the framework of the EC project MAP. We show the main features of the marine aerosol organic fraction and illustrate how primary and secondary components can be distinguished by means of chemical analysis. The results of bubble mediated experiments during phytoplankton bloom revealed that organic carbon is significantly enriched in the sub-micrometer size range, representing from 60 to 80 % of the total aerosol mass in the 0,05-0.5 um size range, and up to 20-30% in the 0.5-0.1 um size range. Organic carbon transferred into the particles by the bubble bursting process is mainly water insoluble, strongly surface active and HNMR spectra show similar features as organic aggregates from phytoplankton exudates spectra reported in literature. These results indicate that organic insoluble carbon in marine aerosol can mainly be associated to primary production mechanisms and, as a direct consequence of this observation, the water soluble fraction is mainly accounted for by secondary organic aerosol formation processes. This fact is also evident from the HNMR analysis of samples collected in clean sectors: the organic composition is always dominated by S-MSA signals and shows two main regimes , an organic N-dominated (mainly amines) and an O-dominated one. These findings also have potential implications for

the atmospheric chemistry of aerosol particles and clouds.