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Identification of alkyl-aminium salts in North Atlantic marine aerosol samples

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Size-segregated marine aerosol samples collected during several field experiments at Mace Head and in the open ocean (North Atlantic) during periods of high biological activity (HBA) exhibited relevant concentrations of dimethyl- and diethyl-aminium salts (DMA+ and DEA+). The identification of DEA+ and DMA+ was carried out by NMR which is able to discriminate between aminium salts and the corresponding neutral amines. DEA+ concentration ranged from 3.2 to 31.0 ng m-3 and DMA+ from 2.3 to 30.8 ng m-3 during HBA. Aminium salts contributed to a relevant part of WSOC, ranging from 3 to 18% in carbon. DMA+ and DEA+ concentrations peaked in the submicron size range. Only trace concentrations have been measured in the coarse size range. During HBA periods DMA+ and DEA+ were strongly correlated and their concentrations co-vary with MSA concentration. The one-year long sampling campaign performed at the Mace Head field station in the frame of the EC Project MAP highlighted a clear seasonal trend for aminium salts: maximum concentrations were measured from June to September, while lower concentrations were detected in the fall-winter period. The observation of comparable or even higher concentrations of DEA+ and DMA+ in open the ocean samples as compared to coastal samples point to an oceanic source for these compounds. DEA+ and DMA+ are the most important individual compounds in the North Atlantic marine aerosol, apart from MSA and they

are also the main organic nitrogen species ever detected in marine aerosol samples.