

THE LINK BETWEEN AEOLIAN MATERIAL AND GLACIATION

A.C. SAYDAM, (Center for Remote Sensing, METU, Ankara, Turkey)
N. KUBILAY and E. OZSOY (Ins. of Mar. Sci. METU Erdemli, Turkey)

The results of the ice cores from both poles have clearly shown that during glacial periods the air probably was substantially more dustier and later dropped to a minimum when the near-glacial conditions ended. Evidence of elevated Methanesulfonic acid (MSA) in ice cores during the last glaciation suggests the presence of coccolithophores during the same period. A series of dust storms during 1994 and 1995 and subsequent satellite (AVHRR Ch-1) observations of high reflectance patches over contrasting marine regions, shown to be due to *E. Huxleyi* known as major producers of DMSP suggests a possible link among aeolian material and MSA. The diel variations in the iron speciation during deposition on the sea surface, combined with the dust transport, sunlight and humidity patterns of a moving storm have further been shown by NMC Eta model results incorporating iron speciation to be the possible mechanism of the observed distribution of bloom of *E. Huxleyi*. DMSP released during the bloom oxidizes to DMS and released to atmosphere where it further oxidized to MSA and eventually to SO_4 which is a major contributor of cloud condensation nuclei, leading to an increase in cloud albedo, and thereby counteracting the greenhouse effect.

AEROSOL INPUTS TO THE ARCTIC SEAS

V.P. Shevchenko, A.P. Lisitzin, (P.P. Shirshov Institute of Oceanology, Moscow, Russia), G.I. Ivanov (Institute VNIIOKEANGELOGIA, St. Petersburg, Russia), V.N. Lukashin (P.P. Shirshov Institute of Oceanology, Moscow, Russia)

Atmospheric inputs of particulate matter play an important role in the oceanic cycling of many chemical elements. In this report we compare results of our studies of composition of aerosols collected in 6 expeditions on board R/V "Jakov Smirnovsky", "Dmitry Mendeleev", "Akademik Mstislav Keldysh", "Professor Logachev" in the Laptev, Kara, Barents, Greenland and Norwegian seas in 1991-1995 with data of western and Russian colleagues. For many chemical elements riverine input prevails but for Pb atmospheric input is of the same order as riverine. Aerosols are important source of spores, pollens and vegetation fibers in the arctic marine environment.

PROJECT MEDUSE - THE MEDITERRANEAN DUST PROJECT

J K Daniel Soderman (Mediterranean Research Centre, Via Guarnotta 26, I-91016 Erice, Italy)

Project MEDUSE is a two year project funded by the European Commission and scheduled to start in spring 1996. The overall objective of the project is to develop and implement a prototype system for routine monitoring and prediction of desert dust in the Mediterranean region, based on a numerical weather prediction model enhanced by a module for the simulation of the dust uptake, transport and deposition (wet, dry and total). The dust simulations will be validated by means of an extensive measurement program. In addition to simulations of past events and episodes, the dust monitoring and prediction system will be used for the production on a daily basis of regional atmospheric forecasts, which will form the basis for desert dust alerts. The forecasts will also be made available to interested scientists. Project MEDUSE is a collaborative venture involving scientists in France, Germany, Greece, Iceland and Italy. The cooperation of other scientists in the Mediterranean region and outside is being sought. The project is expected to result in improved environmental monitoring in the Mediterranean area. It is an innovative effort to coordinate multi-disciplinary contributions of a number of European groups, in order to develop an integrated system capable of measuring and modelling the pollution of the Mediterranean atmosphere due to desert dust under operational conditions.

RELEVANCE OF ATMOSPHERIC INPUT TO THE GERMAN BIGHT/ NORTH SEA SEAWATER CONCENTRATIONS OF TRACE METALS AND NUTRIENTS

M. Schulz, A. Rebers, T. Stahlschmidt, T. Raabe, W. Dannecker
(Institut für Anorganische und Angewandte Chemie, Universität Hamburg, D-20146 Hamburg, Germany)

Wet deposition of trace metals, nitrate and ammonium has been measured by our group in the German Bight of the North Sea since 1988 at the research platform "Nordsee" and at a coastal station on the peninsula Eiderstedt. Trace element size distributions have been measured during several intensive campaigns in the same area to estimate dry deposition. This paper will present the data set and derive characteristics of the atmospheric input for this region with respect to frequency, maxima and time trends. Available data of sea water concentration in the area are compared to evaluate the significance of the aerosol input on different time scales. For ammonium the data suggest that 30% of the wet deposition input events might significantly increase surface sea water concentrations within a few hours.

ATMOSPHERIC CONTINENTAL ORGANIC MATTER OVER THE W MEDITERRANEAN: SOURCES, TRANSFORMATIONS AND DEPOSITION

R. Simó, J. O. Grimalt and J. Albaladejo (Department of Environmental Chemistry, CID-CSIC, Jordi Girona, 18-26, 08034-Barcelona, Catalonia, Spain)

The Western Mediterranean Sea constitutes a semi-enclosed basin which currently receives air particulates originating from the surrounding landmasses. In the last decade, evidence for the importance of eolian inputs to the whole Mediterranean environment has been provided by the analysis of remote aerosols and sediments. A study of this atmospheric contribution is essential for the assessment of the carbon budget in the basin as well as for the understanding of the mechanisms of matter exchange between continent and sea. A set of 36 aerosol samples, belonging to different source areas and seasons, has been collected at a land-based sampling station located in Mallorca Island. A broad qualitative and quantitative characterization of extractable organic compounds has shown that n -alkanes, n -alkenes, fatty acids, sterols, and polycyclic aromatic hydrocarbons constitute the major lipid groups. Both natural and anthropogenic aerosol sources (terrestrial higher plants, microbes, combustion processes) have been inferred from lipid distributions and particle observations. Factors influencing each of these contributions have been evaluated. Furthermore, an investigation into the transformations undergone by lipids during their atmospheric transport has been conducted, so that information on exposure to weathering for each class of compounds has been obtained. Finally, the fate of the organic substances floating over the Mediterranean has been investigated by means of roughly estimating their dry plus wet deposition fluxes.

MODEL EVALUATION OF THE AIRBORNE NITROGEN AEROSOL POLLUTION OF THE OCEAN IN THE NORTHERN HEMISPHERE

M.A. Sofiev, Meteorological Synthesizing Centre - East of Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (MSC-E of EMEP), Kedrova str. 8 k.1, Moscow 117292, Russia

The modelling results of airborne nitrogen aerosol distribution are considered. The operational acid model of MSC-E was applied to long-term calculations of anthropogenic acid compounds (SO_4 , NO_3 , NH_4) distribution in the Northern Hemisphere. 3-D Eulerian model operates with actual meteorological data with 6-hour temporal resolution which enables to consider several dynamic processes, e.g. the increase of the dry deposition velocity to the sea surface with wind increase and wave crashing. Chemical scheme of the model consists from about 20 reactions including 3 ones of second order. One of the peculiarities of considered problem is the hydrophobic character of NO_3 . Its impact to the total oxidized nitrogen deposition is much less than that of nitrate aerosol. At the same time the emission is mostly in this particular form. So correct chemistry transformation description (including non-linear features) is of crucial importance for the estimating of aerosol distribution and deposition. On the contrary dry deposition of NH_4 is much more intensive than that for ammonium sulphate or nitrate. The model unit for source-receiver relationship evaluation was used for discovering the impact from different sources in the Northern Hemisphere to the deposition onto different parts of the Ocean.



EUROPEAN
GEOPHYSICAL
SOCIETY

European Geophysical Society

Annales Geophysicae

Part II

Hydrology, Oceans, Atmosphere
& Nonlinear Geophysics

Supplement II to Volume 14