THE "EGAMES" EXPEDITION IN THE EASTERN MEDITERRANEAN SEA

S. RAPSOMANIKIS[1], H. BANGE[1], V. ULSHOEFER[1], O. FLOECK[1], T. KENNTNER[1], D. AMOUROUX[2], O. F. X. DONARD[2], J. ENGLEZOU[3], V. TSELENTIS[4] and I. CIGLENECKI.

[1] Biogeochemistry Depart., Max Planck Inst. for Chemistry, 55020 Mainz, Germany
[2] Lab. de Photophysique et Photochimie Moléculaire, CNRS, Univ. de Bordeaux, 351 Cours de la Libération, 33405 Talence Cedex , France
[3] Depart. of Maritime Studies, Univ. of Piraeus, Karaoli & Dimitriou 40, 185 32, Greece
[4] Rudjer Boskovic Institute, Center for Marine Research, P.O. Box 1016, 41001 Zagreb, Croatia

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The expedition EGAMES (**E**vasion of **GA**ses from the **ME**diterranean **S**ea) took place in the eastern Mediterranean Sea during July 1993 with the aim to study fluxes of climatic relevant gases to the atmosphere, during a period of high insolation and to establish the region's contribution to the global budget of these gases. A number of physical and chemical parameters necessary for the calculation of these fluxes were also measured.

The continuous CTD recordings during the cruise track indicate that four distinct areas were studied. The northern Aegean, which is influenced by incoming Black Sea waters, the open Aegean and Ionian Seas, an upwelling area and an enclosed bay. The recorded meteorological data showed north westerly winds throughout the cruise.

Surface waters fluorescence recordings suggest generally photobleached Chromophoric Dissolved Organic Matter (exudates and humics). The CDOM stratification depends on the mixed layer depth. Humic material was observed mainly in the Black Sea influenced waters, whilst biogenic exudates were mainly observed in the eutrophic bay and the upwelling waters (DONARD *et al.*, 1989)

Results of the analyses of surface waters for H_2O_2 indicate high photochemical reactivity. The average [H_2O_2] was ca. 250 nmol/l, which suggests a high concentration of reactive oxygen species (AMOUROUX *et al.*, 1993)

Our measurements, of surface sea waters for carbonyl sulfide (COS) concentration and *in situ* production, show that they were always supersaturated with respect to the equilibrium concentration, based on the atmospheric COS mixing ratio. The mean saturation ratio was 3.2. Average COS water concentrations were 27 +/- 16 pmol/l and varied diurnally. With an atmospheric mixing ratio of 523 +/- 107 pptv a positive sea to air flux of 55 nmol/m^2/day could be estimated for the area studied. *In situ* production experiments using collected water samples indicate a photoproduction of COS with concurrent decline in [CH_3SH] (ULSHOEFER *et al.*, 1994).

High CH_4 saturation ratios were observed in the Black Sea influenced north Aegean and in the eutrophic bay waters (1.4 - 5.2). Saturation ratios of N_2O were uniform throughout the cruise at 1.05. Atmospheric concentrations of both CH_4 and N_2O remained practically constant during the course of the cruise (BANGE *et al.*, 1994).

A number of different Se species were identified in surface sea waters and in the atmosphere; namely $(CH_3)_2Se$, CH3SeH, and $(CH_3)_2Se_2$. Their concentrations were higher in the eutrophic bay than in the upwelling area which in turn were higher than in the oligotrophic waters. The degree of saturation was on the average higher than 10.0 , giving an estimated, positive, sea to air flux for the area, of 20 nmol Se /m^2/yr.

Sulphur dioxide atmospheric mixing ratios of eastern Mediterranean marine air, ranged between 10 - 200 pptv. Surface sea water concentrations of $(CH_3)_2S$ averaged at 3 nmol/l (RAPSOMANIKIS *et al.*, 1994)

Surface water samples were also analysed, using an electrochemical method, for surface active substances and their activity is expressed in units of "Triton-X-100" mg/l (PLAVSIC *et al.*, 1993). The mean surfactant activity for surface samples was 0.122 mg/l as T-X-100 which is comparable with Adriatic Sea values for the summer of 1992. The preliminary results show that more hydrophobic organic material was present in the Aegean Sea than in the turbulent waters of the Levantine or the open sea.

A number of other atmospheric and meteorological parameters were also measured, to help us in our biogenic fluxes estimations.

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