

THE COMPOSITION OF BLACK SEA PARTICULATES IN SUMMER 1996

Y. ÇOBAN*, S. TUĞRUL, A.F. GAINES, D. FABBRI,
G. CHIAVARI and G. GALLETTI**

* Middle East Technical University, Institute of Marine Sciences, PO Box 28, Erdemli, 33731, İçel, Turkey.

** University of Bologna, Dipartimento di Chimica "G. Ciamician" e Laboratorio Ambientale, 2 via G. Selmi, I-40126, Bologna, Italy.

Particulate and associated hydrological parameters obtained at two locations in the stratified Black Sea in June 1996 describe the abundance and elemental composition of the suspended organic matter (seston). Pyrolysis-gas chromatography/mass spectrometry (Py-GC/MS) extends this description by providing depth profiles of the relative concentrations of twenty three characteristic markers produced by the flash pyrolysis of seston. The stratified Black Sea may be regarded as a vertical succession of isopycnal surfaces (mixed surface layer, oxycline, suboxic and anoxic layers) each with its own ecosystem. Depth distribution of nutrient concentrations relative water density displayed nearly similar vertical features in the upper layer down to anoxic waters throughout the Black Sea. In this layer, not unexpectedly, the concentration and composition of POM show remarkable variations with depth. In June 1996, in the well-illuminated, nutrient-poor, mixed surface layer (15-20 m thick) bulk seston possessed relatively high C:N, C:P and C:CHL ratios. This indicates that the primary production was mainly sustained by the regenerated nutrients and the seston was detritus-dominated. At the base of the euphotic zone greatly reduced, light-limited productivity was due to phytoplankton with the Redfield C:N and C:P ratios and which possessed little carbohydrate but much chlorophyll in their cells. Below the euphotic zone, the particulate concentrations decreased markedly. The lower C:N ratio in the oxycline and suboxic zone may have originated from the chemo-autotrophic production in the open sea. The absence of intact phytoplankton cells and the presence of bacteria and fecal pellets was accompanied by a change in the protein composition of the POM as shown by the change in the ratio of pyrrole: indole markers. In the suboxic-anoxic interface the POM profiles display a coherent maximum, which was more pronounced for PP, especially in the coastal region. No markers characteristic of lignin or of terrestrial lipids were observed in seston retained on filters. The lipid composition, characteristic of marine vegetation remained constant, irrespective of depth.