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Seasonal variation of nutrients, dissolved Oxygen, pH, temperature, transparency and salinity in Thermaikos Bay (1984-1987)

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The Bay of Thessaloniki and the greater Thermaikos coastal area are considered very important assets of this part of the Mediterranean Sea. Located in the North-West corner of the Aegean Sea, the Bay of Thessaloniki is actually used for various activities of economic and social interest such as shipping, fishing and recreation. The population of the metropolitan area of Thessaloniki is estimated to be about 1.000.000. The harbour of Thessaloniki is steadily growing many projects for extention are under study Various tourist resorts have been developed along the coast of the Bay.

The Bay is the final receiver of the total amount of wastes from various sources of domestic and industrial origin, so it is ivenitable that it is polluted. Various chemical and microniological analyses conducted during the last years in a number of locations in the Bay have indicated that in a distance of 4-5 km from the city the water was heavily polluted.

The seasonal variations of the distribution of temperature, pH, transparency, dissolved oxygen, phosphates, nitrates, nitrites, ammonia, silicates and salinity have been studied in the Thermaikos bay at nine stations and at various depths in the water column during the period September 1984 - July 1987. Studies of the above-mentioned parameters have been made in the Thermaikos bay by Friligos ten years ago.

Seawater samples were collected from surface, mid-depth and bottom with a Nansen sampler of 1,5 l capacity.

Temperature were obtained with a thermometer attached to the Nansen sampler. The fixation of the dissolved oxygen was made on board as rapidly as possible after the sampler had been recovered. The determination was made later in the laboratory using the Winkler method as modified by Grasshoff (1983). A Secchi disc was used for tramsparency measurements. The Salinity and Conductivity measurements were made on board using a WTW Mod. LF 191 salinity meter equipped with a measuring cell LT 1/T (cable length 50 m). The water samples for nutrient analyses were collected in 100 ml glass bottles (Si - samples in PVC bottles) and kept under deep freeze. After thawing they were analysed as described by Gasshoff (1983). A Perkin Elmer Mod. lamda 3 spectrophotometer was used for the measurements.

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Hydrographic and chemical properties of Middle and South Adriatic Sea water

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During 1986-1987 investigations of physical and chemical properties of waters of the middle and south Adriatic sea were carried out, on 19 stations divided into four characteristic areas.

On the basis results obtained during these studies and previous longterm investigations, which this Institute has been doing in the middle Adriatic sea, we can conclude that in the entire area we have intensive processes of mixing water masses.

Table 1. Mean values, range and coefficient of variation (c.v%) of nutrients (mmol/m^3) and some trace metals in water (W), sediments (S) and marine organisms. (MO) at four characteristic stations in the studied area.

Stations		201	204	210	218
Parameters					
PO_4-P	$\bar{x}$	0.061 ± 0.02	0.063 ± 0.02	0.065 ± 0.04	0.051 ± 0.03
	c.v.	3.23	3.23	6.15	5.88
	P	0.047	0.104	0.146	0.103
NH_4-N	$\bar{x}$	0.66 ± 0.29	0.66 ± 0.30	0.83 ± 0.44	0.74 ± 0.55
	c.v.	43.9	44.8	48.3	74.3
	N	0.55	1.30	2.36	1.36
NO_2-N	$\bar{x}$	0.173 ± 0.08	0.111 ± 0.04	0.115 ± 0.5	0.156 ± 0.09
	c.v	46.2	36.0	43.5	57.7
	N	0.288	0.188	0.355	0.410
NO_3-N	$\bar{x}$	0.76 ± 0.18	1.17 ± 0.36	0.83 ± 0.31	0.72 ± 0.39
	c.v	23.7	39.1	37.4	54.2
	N	0.58	3.71	2.77	2.14
Hg	W*	2.2 ± 1.1	2.4 ± 2.3	2.5 ± 2.0	1.9 ± 1.1
	S**	43.3	80.0	70.0	80.0
	MO***	260	350	370	1090
Zn	W	640	770	510	1070
	S	11.6	44.6	79.5	37.0
	MO	3910	2600	2150	-
Cd	W	117	30	23	30
	S	0.10	0.10	0.06	0.04
	MO	10	10	10	-
Pb	W	230	90	170	170
	S	18	29	38	29
	MO	1000	1000	1000	-
Cu	W	340	130	220	320
	S	3.04	24.1	27.4	21.1
	MO	380	470	17670	-

* Values in ng/dm^3 of water (W)
** Values in µg/kg DW of sediments (S)
*** Values in µg/kg FW of marine organisms (MO, Mullus barbatus)

Hydrography and chemical parameters shou us, that the whole studied area belongs to the warm sea with rather high salinity, well aerated sea, with high content of oxygen (O_2) and saturation of oxygen and poor in nutrients. (Buljan, M. 1976). (Tab. 1).

Despite the above mentioned facts we still have high organic production (Pucher-Petković, T. et al. 1985) which possibly enables rapid turn-over and contributes to a high production rate (about 90 gC/m^2 year).

As far as concentrations and distribution are concerned, we can conclude that assimilation-regeneration processes have a main role in the nutrient cycle in the Adriatic sea.

We have also investigated content of some heavy metals (Hg, Zn, Cd, Pb and Cu) in water sediments and marine organisms. Obteined data (tab. 1) are at the level of natural content of those elements in ecosystem, (Branica, M. et al. 1985), that is, the study area is not influenced by antropogenic factors, although in some organisms we have recorded higher concentration of some elements, especially mercury. Therefore, it should be pointed out that special attention should be paid to a continuous "monitoring" of these metals in the sea, especially in sediments and marine organisms.

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