

DISSOLVED OXYGEN AND NUTRIENT CONCENTRATIONS IN KORINTHIAKOS GULF DURING 2004-2005

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Abstract

In this paper dissolved oxygen (DO) and nutrient data in the Korinthiakos Gulf are presented. Four sampling cruises were conducted by the Hellenic Centre for Marine Research, during 2004 - 2005, within the framework of the monitoring program "MED/POL". High DO concentrations were measured at all the stations of Korinthiakos Gulf. High values of nitrate and silicate were also measured in the deep basin of the Gulf. According to the DO and nutrient concentrations, it seems that the water column of the deep basin of Korinthiakos Gulf was fully homogenized.

Keywords : Eutrophication, Oxygen, Pollution.

Korinthiakos Gulf with a maximum depth of 900m, is connected to the west with the Ionian Sea through Patraikos Gulf and with the Saronikos Gulf to the east, through Korinthos channel. It is noteworthy, that very few scientific data for Korinthiakos Gulf are available and that makes the study of the area very interesting [1, 2]. The study area is affected by agricultural activities in the coastal zone as well as pollutants from domestic and industrial effluents (e.g. PECHINEY Power Plant Station in the north coast). Water samples for DO and nutrient (nitrate, nitrite, silicate, ammonium and phosphate) determination were collected during four sampling cruises in May and September 2004 and in February and December 2005, over a grid of six oceanographic stations [3]. The samples for the determination of nutrients were collected in 100 ml polyethylene bottles and kept continuously under deep freeze (-20 °C) until their analysis in the laboratory [4-7], whereas the DO analysis was performed on board, immediately after sampling using the modified Winkler method [8]. DO concentrations were high at all the stations of the Gulf showing temporal as well as spatial variation. The minimum DO concentration (4.73 ml/l) was observed in September 2004 at the relatively shallow station (depth 80m) in Itea bay. It is noteworthy, that at the deep basin of Korinthiakos Gulf the water column was well oxygenised. The comparison with existing data (2000) [2] confirmed that the deep waters of Korinthiakos Gulf are quite often renewed. During the period 2004 - 2005, nutrient concentrations in Korinthiakos Gulf ranged as follows: Phosphate: 0.097 - 0.264 $\mu\text{mol/l}$; Silicate: 0.98 - 7.23 $\mu\text{mol/l}$; Nitrite: 0.040 - 0.608 $\mu\text{mol/l}$; Nitrate: 0.07 - 5.87 $\mu\text{mol/l}$; Ammonium: 0.010 - 1.429 $\mu\text{mol/l}$. Spatial and temporal variation of nutrient concentrations was observed. Relatively high ammonium concentrations at the surface waters were measured probably related with anthropogenic pollution. High values of nitrate and silicate were observed in the deep basin of Korinthiakos Gulf (below 100-150m). It is interesting to notice that nitrate concentrations at the deep stations of Korinthiakos Gulf were lower than those recorded in the deep basin of the Western Saronikos Gulf (depth 420m). According to the nutrient data, the deep waters of Korinthiakos Gulf are enriched in nutrients showing the high rate of productivity in the area. The comparison with the previous data of 2000 showed a decrease in nitrate concentrations in the deeper layer (near the sea floor) as well as an increase in phosphate concentrations [2, 3].

water analysis. *Bull. Fish. Res. Bd. Canada*, 167: 310

8 - Carritt, D.E. & Carpenter, J.H., 1960. Comparison and evaluation of currently employed modifications of the Winkler method for determining dissolved oxygen in seawater. *J. Mar. Res.* 24: 286-318

References

- 1 - Anderson J. J & Carmack E.C., 1973. Some Physical and Chemical Properties of the Gulf of Corinth. *Estuarine and Coastal Marine Science*. I: 195-202.
- 2 - Krasakopoulou, E., 2000. Nutrient distribution in Ionian Sea (Mach/September 2000). In: INTEREG II -Study of the inter-boundary pollution in Ionian sea, Final Technical Report, H.C.M.R., 2000
- 3 - Pavlidou, A., 2006. DO and nutrient concentrations in Korinthiakos Gulf during 2004-2005. Final Technical Report, H.C.M.R., 2006
- 4 - Koroleff, F., 1970. Revised version of Direct determination of ammonia in natural waters as indophenol blue. *Int. Con. Explor. Sea C. M.* 1969/ C:9 ICES information on techniques and methods for sea water analysis. Interlab. Rep., 3: 19-22
- 5 - Mullin, J.B., Riley, J.P., 1955. The colorimetric determination of silicate with special reference to sea and natural waters. *Anal. Chim. Acta*, 12:162-176
- 6 - Murphy, J., Riley, J. P. (1962). A modified single solution method for phosphate in natural waters. *Anal. Chim. Acta.*, 1: 162-176
- 7 - Strickland, J.D.H., Parsons, T.R., 1968. A practical handbook of sea