

The effect of effluent discharge on primary production

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Summary

Phytoplankton primary production in the upper part of Saronicos Gulf was studied at a station situated near the Athens sewage outfall for an annual period. Production ranged from 100-1000 mgC/m²/da. The annual production was calculated to be 180 gC/m² which is 3 times higher than the production of the lower part of Saronicos which is not affected by the outfall.

Résumé

Des mesures de la production primaire phytoplanctonique dans la partie supérieure du golfe de Saronicos ont été faites pendant une année en une station située près de la conduite d'évacuation des déchets des égouts d'Athènes. Pendant la période des études les valeurs de la production primaire variaient entre 100 et 1000 mgC/m²/jour. La production primaire annuelle était calculée à 180 gC/m² qui est 3 fois plus élevée que la production de la partie inférieure de Saronicos qui n'est pas affectée par les déchets.

The rate of primary production of the phytoplankton community in the upper part of Saronicos Gulf was studied at a station (total depth about 70 meters) situated near the Athens sewage outfall for an annual period. Primary production was determined in situ by the ¹⁴C method of Steemann Nielsen (1958). Details of the procedure as used has been given by Becacos-Kontos (1968). The values of primary production ranged from 100 to 1.000 mg C m⁻²day⁻¹ with an integrated mean value of 500 mg C m⁻²day⁻¹. The annual primary production was found to be

180 g C m⁻². This value is the highest recorded value for the Saronic Gulf and for the whole Aegean Sea (Becacos-Kontos 1980). Primary production in this area amounts to three times the production in the unaffected part of the Gulf, while it is higher by a factor of 1.6 and 1.3 respectively than that of the stations Aegina & Glyfada, which are slightly influenced by urban pollution. It is of the same order of magnitude as that in Faliro, which is also affected by pollution. It must also be taken into consideration that the so-called unaffected part of the Gulf has primary production two times higher than in the adjacent Petalion Gulf, which is characterized as a typical oligotrophic biome that can be used as a baseline, (Becacos-Kontos 1977). Higher values of primary production were found in summer when the waters are stratified and lower values in winter when the waters are well mixed. The maximum production in the photic layer was found at the depth of 1 meter on the average and ranged from 1 to 10 meters for the period of study, while the compensation depth lay at about 40 meters, which is half that of the unaffected part of the Gulf. Although high nutrient concentrations are not the only requirements for high primary production rates in this case nutrient enrichment contributes to the enhancement of the rates of production that are observed. This is a response characteristic for waters with initial state of oligotrophy as indicated by the results of the unaffected part of the Gulf.

References

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