Y-IV10

A multiple regression model to determine Diatom abundance in an eutrophic area

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ABSTRACT: In an eutrophicated area (İzmir Bay, Aegean Sea), the variations of diatom cell numbers in hydrographic properties and nutrient concentrations of the environment were investigated seasonally and vertically. Statistically significant relationships between ln(cell numbers),σ_t, ln(N/P) and Si were determined.

According to our results, cell numbers of diatom might be represented with a multiple regression model as,

$$\ln(\text{DIAcells/l}) = -0.9217\ \sigma_t - 0.6492 \ln(N/P) + 0.0221\ Si + 37.3716$$

due to 70 percent success.

Y-IV11

Modelling the deep chlorophyll maximum in oligotrophic areas

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Mathematical models have been extensively developed in recent years, becoming a very important tool in understanding and analysis of marine systems (Wroblewski, 1975, 1976; Wroblewski and O' Brien, 1976; Dugdale, 1967, 1971; Eppley, 1969, etc). However, we have not yet completely understood and quantified the mechanisms that take place in the nitrogen cycle regulation and their uptake/release by marine phytoplankton or bacteria, particularly in oligotrophic ocean areas where is almost always present a deep chlorophyll maximun (Anderson, 1969; Cullen, 1982; Schulenberg, 1978).

Considering this, we combined now-accepted criteria into a simulation modelo, on the purpose to discuss their uselfulness and quantify the order of magnitude of each process.

Beginning with simple initial-conditions which include routine oceanographic variables like nitrate, ammonium, phytoplankton, light and a few model parameters we obtained, after a certain number of iterations, a stationary solution. Up to now, is a one dimensional modell, which simplify calculations and we uniquely fixed bottom values as boundary conditions. We logically included diffusion, advection and light intensity at sea-surface.

We done several runs varying the main parameters; during these tests we analysed the fluctuations experimented by the deep chlorophyll maximun, the nitrogen and phytoplankton concentrations. This depth is obviously regulated by light and, in a less amount, by diffusion. It appears to be a critical depth of a few meters with enough light (generally below de 1% level) and enough nutrients provided by diffusion, generally at the beginning of the nitracline.

Atmospheric inputs of nitrogen, phosphate and silicate are now considered as important as diffusion (in absolute values) and should not be neglected. On the other hand, in strong oligotrophic areas, the Monod equation could be of less interest in evaluating cinetic uptake by marine phytoplankton, since it is proportional to PN-ON, a second order equation.

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