



## 1-D Coupled Physical-Biological Model of a Stratified Shelf-Sea

**A. I. Karafistan** and Y. Buyukates

Canakkale Onsekiz Mart University, SUF Department of Fundamental Sciences, Canakkale, Turkey, 17020

[akarafistan@yahoo](mailto:akarafistan@yahoo) Tel: +90-286-218-0018 ext. 1568 Fax: +90-286-218-0543

[ybuyukates@yahoo](mailto:ybuyukates@yahoo) Tel: +90-286-218-0018 ext. 1540 Fax: +90-286-218-0543

A one-dimensional coupled ecological model is developed in order to simulate the vertical distribution of phytoplankton in a seasonally stratified shelf sea. First, a hydrodynamic and vertically one-dimensional sub-model adapted from a heat budget method is described. In this model we use the bi-monthly measured temperature profiles in order to estimate the seasonal evolution of depth-varying eddy diffusion coefficients. It is assumed that heat transport from the deeper layers is only in the vertical direction with no significant advective heat flux. Bathymetry, surface energy exchanges and through-flow are taken into account in the solution of the 1-D diffusion equation. The seasonal temperature profiles obtained from the simulated diffusion coefficients are in good agreement with the measured ones and reproduce very well the seasonal thermocline.

In the biological sub-model, described in another presentation (Buyukates Karafistan), space and time variability of the phytoplankton is explained in terms of the vertical diffusivity together with the light and nutrient availability in the water column.