Gaboury, I.

Small-Scale Biological and Physical Structure in a Tidally Mixed Fjord

I. Gaboury[1] and R. Lueck[2]

Knowledge of small-scale zooplankton distributions and their relationship to physical and biological parameters is important for understanding relationships and interactions in marine ecosystems, and requires high-resolution simultaneous measurements of these distributions. We used high-frequency (44 kHz and 307 kHz) echosounders mounted on a towed vehicle equipped with fine and microstructure sensors for temperature, salinity, velocity, and chlorophyll concentration to observe their spatial structure around the sill in Knight Inlet, British Columbia. Sampling the backscatter over a 1 to 20 m range in front of the towed vehicle allows us to observe undisturbed horizontal and vertical structures in zooplankton distributions, and to repeatedly sample volumes of water along the vehicle path. Data from the vehicle-mounted acoustic profiler reveal sub-meter scale patchiness in the mesozooplankton community, which is not resolved by traditional ship-mounted echosounders. The intensity of the acoustic backscatter signal compares well with the size and number density of zooplankton in the scattering layer determined by net sampling. We are currently comparing the zooplankton data to the corresponding turbulence and chlorophyll measurements to examine the nature of the relationships between their distributions.

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Regional and Mesoscale Models Nested in a Global Model: Dynamics and Boundary Conditions

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Regional and mesoscale models are being used to study various aspects of Coastal Oceanography. We are using a regional model of the Mid Atlantic Bight with an embedded mesoscale model of the New Jersey shelf/slope to study the outer shelf dynamics, particularly the internal wave field, and its affect on acoustical propagation. The results of several simulations with different forcing and boundary conditions will be discussed. The results will be compared with data from the SWAT experiment and with tide gauges. Both the regional and the mesoscale models are set up using the Navy Coastal Ocean Model (NCOM). NCOM is designed for efficient nesting with the capability of one- or two-way nesting. The effects of remote forcing are included through active open boundary conditions. These boundary conditions prescribe the temperature, salinity and velocity fields from the Global version of NCOM and tidal amplitude and phase from the ADCIRC model. The boundary conditions also allow for the radiation and advection of temperature, salinity and velocity out of the domains. Surface fluxes are taken from Coastal Ocean and Atmosphere Prediction System (COAMPS) forecasts

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Gallegos, Sonia C.

A New Technique to Extract Optical Properties of the Water from Environmental Parameters

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In this paper we report the development of a real-time environmental model to extract spectral light attenuation coefficient from the surface to the bottom of the Yellow Sea. It illustrates a technique that can be useful in the extraction of optical parameters in highly turbid and optically complex coastal areas. The model, which is based on a back-propagation neural network algorithm, is trained on optical and oceanographic parameters collected at various locations in the Yellow Sea from 1996-2000. It relies for its real-time optical estimations on a tidal model developed for the Yellow Sea (ADJOINT) and a statistical model (MODAS) that produces real-time estimations of temperature and salinity at any depth around the world. Sediment and bathymetry databases provide measures of particle size distribution and depth. The model can ingest satellite data, but it is not a requirement for its running. The inclusion of satellite data produces more accurate estimates. However, access to the data is limited to once during daylight hours and to cloud-free periods that are rare in the Yellow Sea. The accuracy of the model increases with the amount and variety of the input data. The best estimates occurred in coastal areas. The less accurate estimates occur in open waters.

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POC Distribution in the Pacific: Estimates using *in situ* Optical Data and SeaWiFS Products

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Beam attenuation data collected on 7 WOCE lines during 12 cruises to the Pacific were used for assessment of the particulate organic carbon concentration. A regression of beam c_p vs. POC using EqPac and HOT field data was applied in order to obtain spatial and vertical distribution of POC. Basin-wide POC data integrated over the upper water column down to one optical depth were compared with seasonally averaged ocean color products derived from SeaWiFS sensor. SeaWiFS data products were compared with integrated oceanic POC from calibrated transmissometer data to determine the best bio-optic product to use. A comparison between POC within one optical depth layer and POC standing stock from surface to the depth of background POC was made. Estimations of the POC seasonal dynamics in the upper layer over the entire Pacific was mapped based on monthly SeaWiFS mosaics.

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