Richardson, M.J.

Particulate Organic Carbon in the North-East Gulf of Mexico: Developing Algorithms Between Bio-Optical Data and Satellite Ocean Color Products

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During the North-East Gulf of Mexico project (NEGOM) data on beam attenuation and particulate organic carbon (POC) were collected in 9 cruises from November 1997 to November 2000. In each seasonal cruise about 100 CTD casts were completed along 11 lines normal to the coastline between mid-Florida and the Mississippi River from about 20 m on the shelf to the 1000 m isobath. This provided a wide range of particle concentrations and types from turbid river runoff to carbonate shelf to clear, open-ocean waters. Full hydrographic data, including transmissometer and optical backscatter measurements, were collected at each station. Water samples were filtered to obtain concentrations of total particulate matter (PM) and POC and optical data was converted to PM and organic carbon concentrations. In-situ measurements of POC and PM concentration were compared with SeaWiFS data to derive algorithms for estimating POC and "suspended" particulate matter. The large data set provides an excellent opportunity to define and test algorithms for particle concentrations in a wide spectrum of optical provinces on both seasonal and inter-annual time scales.

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Rigney, James P.

The Emerging Role of Ocean Forecasters in Operational Oceanography

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The last decade has seen the emergence of both real-time applications for oceanographic information and the maturing of real-time oceanographic observation and modelling systems that are capable of providing that information. For naval applications, oceanographic information is needed as input to quantitative tactical decision aids as well as to the broader decision-making process. Improved computational capacity, data sources, and model physics have resulted in significant improvements in ocean models and their adoption as operational tools at the Naval Oceanographic Office (NAVOCEANO). Experience with a variety of circulation models over the past decade, however, indicates that for many naval applications requiring highly specific time and space predictions, providing the most useful information for decision makers requires the analysis and interpretation of model output (sometimes from more than one model) in conjunction with real-time data, climatologies, and a thorough understanding of ocean dynamics, physics and model tendencies. There are parallels between preparing these operational ocean analyses and forecasts and the forecasts traditionally prepared by operational meteorologists. This paper provides examples from NAVOCEANO's operations of the emerging role of ocean forecasters and discusses some of the tools for enhancing ocean forecasting.

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Roger, D.

GAPS, A New Concept for USBL

D. Roger, F. Bellier, M. Audric and T. Gaiffe

Taking advantage of its great experience in acoustic positioning and inertial sensors, IXSEA OCEANO introduces a new concept for the Ultra Short Base Line positioning: the Global Acoustic Positioning System, in which all the necessary sensors – acoustic, inertial, GPS, - are integrated in the same housing and provide an accurate positioning of underwater vehicles. The advantages of this concept are numerous. It is compact, mobile, plug and play (no more calibration even when the system is moved from the ship) and can even provide more accurate and reliable data of the ship position and attitude than a traditional USBL system because the acoustics, inertial and GPS measurement are now merged in a single process. Innovative solutions based on iXSEA OCEANO unique acoustic chirp techniques and in-house master of inertial sensors allow an outstanding price to performance ratio for this portable but higher end performance-class system.

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Ross, Tetjana

Acoustic Scatter from Turbulence

Tetjana Ross[1] and Rolf Lueck[2]

Despite the existence of models predicting acoustic scatter from turbulence, and experiments showing that artificially generated turbulent temperature fluctuations scatter sound, most oceanographers still consider that—if scatter from oceanic turbulence does occur—it will be insignificant compared with biological sources of scatter. Acoustics is commonly used for assessing fish and zooplankton abundances—surveys and instruments being designed with the implicit assumption that all scatter is biological. As there is evidence that zooplankton locate food more easily in turbulent areas, the fact that elevated scatter is commonly observed in turbulent areas is often attributed to zooplankton congregating in these 'high food zones'. We simultaneously measured turbulent microstructure and acoustic scattering strength in a local fjord. Plankton net-hauls indicate that there are far too few zooplankton in the turbulent regions to account for the scattering intensity. At both 44.7 and 307 kHz, we observe scatter that is unambiguously correlated with turbulence. Somewhat surprisingly, turbulent scatter is much stronger at the higher frequency, illustrating the importance of salinity microstructure—long neglected in turbulent scattering models—and shedding light on the form of the turbulent temperature-salinity co-spectrum (which has never been measured directly). At 307 kHz, backscatter from salinity microstructure was often stronger than the signal from a zooplankton scattering layer, illustrating how turbulence could easily confound acoustic zooplankton biomass estimates.

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