WEST *(continued from pages 2 and 3)*

Dugdale. 1996; Kudela and Chavez, 2000). This model is also being fine-tuned for the 2001 field year.

We are also testing the Carder (1996) and Garver-Siegel (1997) semi-analytical models; we anticipate routine dissemination of multiple parameters from this model output (pigments, colored dissolved materials, backscatter). Algorithm development done with SeaWiFS data is easily transferred to other coastal (or open ocean) sites, and is compatible with existing and future satellite platforms, including MODIS (Yoder, 2000) which will meet or exceed the data currently available from AVHRR and SeaWiFS.

The dynamics and scales of cross-shelf transport have eluded prior studies, owing to inadequate design or misfortune. The size-structured trophic dynamics and associated spatiotemporal patterns in the plankton have eluded prior studies owing to inadequate technology to resolve plankton size fast enough to measure spatiotemporal distributions. The fluxes of water-borne nutrients have eluded prior studies owing to the absence of in situ sensors that can sample nutrients on the same scale that currents need to be sampled. We offer the first truly integrated view of the high plankton productivity observed over continental shelves dominated by wind-driven transport. This work promises direct benefit to many other research fields, including fisheries, global carbon cycles, satellite remote sensing methodology. coastal water quality, biodiversity, and ecological implications of climate change.

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Episodic Events - Great Lakes Experiment (EEGLE)

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EEGLE PIs met at a three day workshop in late September, after the successful completion of our third and final year of field-work, to discuss preliminary findings and foster interdisciplinary activities. The EEGLE program was designed to quantify the impacts of major late winter-early spring storms on sediment-water exchange, nearshore-offshore transport and subsequent influence on the lakes1 productivity. At the beginning of the program, it was generally agreed that episodic resuspension and subsequent transport of the large inventories of nutrients and contaminants deposited over the past few decades (e.g. P, ^{137}Cs, PCBs), would result in greater fluxes to the water column than from all external inputs. In addition, control of biological processes could occur as a result of effects on light and substrate availability and the introduction of meroplanktonic species.

Our observation strategy consisted of three components (Fig. 5): (1) moored arrays of current meters, thermistors and sequencing traps, (2) interdisciplinary Lagrangian measurements, and (3) shipboard surveys. In addition, survey, and process measurement cruises were conducted along with special cruises for ROV sediment-water interface sampling. particle transformation measurements, and collection of sediments. The time series and survey data have been supplemented by synoptic coverage from satellite imagery and multi-frequency HF radar observations.

This collaborative Lake Michigan study provides an ideal framework for model testing and development. The modeling objectives are to create a numerical modeling framework and use the extensive observational programs to identify, quantify, and develop prediction tools for the primary physical processes responsible for nearshore-offshore transport and transformation of biogeochemically important materials (BIMS) in Lake Michigan. A lake-scale hydrodynamic circulation model (the Great Lakes version of the Princeton Ocean Model) has been coupled with a wave model and applied to Lake Michigan for selected periods in 1992-1997 during which the spring-time turbidity plume has been observed, and for the program's field years. In collaboration with other components of this program the hydrodynamic model will be coupled with sediment transport and lower food web models in order to assess the impact of internal nutrient recycling and nearshore-offshore transport on sedimentary and biological processes. Overall, the program is designed to provide the most comprehensive

(continued on page 9)

EEGLE (continued from page 8)

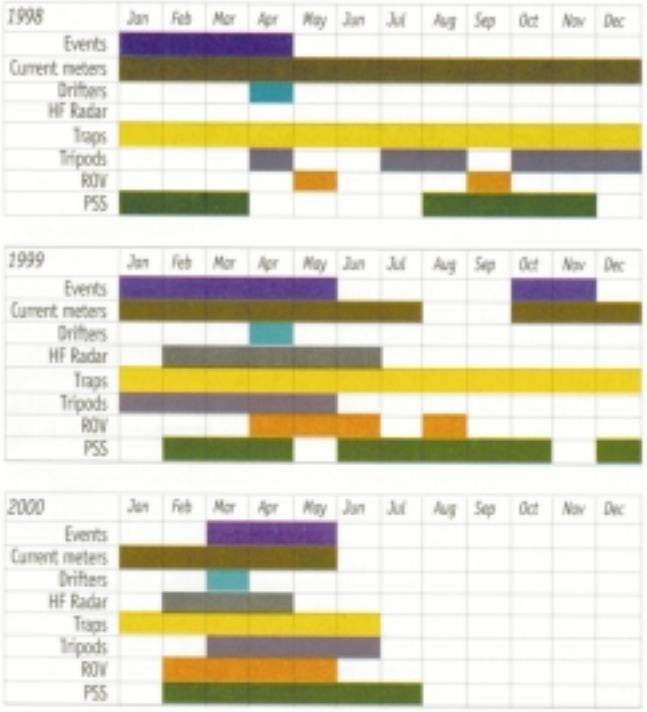

Figure 5 (left). Schematic of the temporal coverage of sediment resuspension events and successful collection of samples and daa for the three-year field program. ROV indicates sediment-water interface sampling with a remotely operated vehicle. PSS represents transects with the tow-yoed plankton survey system.

insight into the hydrodynamics of cross-margin transport, transormation and ecological consequences of BIMS ever accomplished on the Great Lakes (Fig. 6).

Some of the preliminary conclusions reached at the workshop include: 1) the magnitude of resuspended sediments is int he range of 1-5MMT, larger than annual external input of fine-grained materials to the southern basin, 2) resuspended total phosphorus is several times the annual external input, but only a small fraction appears to be available for primary production, 3) the reduction of light in the plume counteracts the increased nutrients and results in somewhat reduced productivity, 4) the ecological impacts (e.g. greatly increased heterotrophy) may be localized to the region near the plume, and 5) the events generally include substantial offshore transport. Further information can be obtained at the EEGLE website: http://www.glerl.noaa.gov/eegle

Figure 6. Results of hydrodynamic run (right - middle and lower panels) compared to observed longshore currents (right - upper panel) during the large Lake Michigan sediment resuspension event in mardh 1998. The location of the measured and modeled dcurrents is indicated on a color-enhanced visible-band satellite image from March 12, 1998 (left panel). When forced by winds from a high-resolution meteorological model (right - lower panel), the hydrodynamic models' simulation was much closer to the observed currents (right-upper panel) than when objectively modeled surface winds were used (right-middle panel).