Annual Progress Report

Title: SFERPM 2000: Wind events and benthic pelagic coupling in Florida Bay

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Award period: August 1, 2000 to July 31, 2002

Period covered by this report: August 1, 2001 to July 31, 2002

General summary of progress:

Work accomplishments.
In this study, our goal was to describe changes in water column properties (suspended particulate materials, chlorophyll, light, and dissolved nutrients) and processes (phytoplankton growth, and microzooplankton and mesozooplankton grazing) during strong mixing events in Florida Bay. During our first study in March 2001, we encountered strong winds (>15 m sec^{-1}) associated with the passage of a continental air mass through the Florida Bay region. The strong winds of 5 - 7 March caused significant suspension of bottom materials in Florida Bay. Associated with this event, there was a decrease in light transmission, an increase in suspended particulate matter (SPM), strong increases in NH_4 and PO_4, weaker increases in NO_3+NO_2, and $Si(OH)_4$, and an increase in benthic copepods in the water column. These increases were followed by a decrease in SPM to pre-event levels at our study site by 10 March, an even quicker decline in PO_4 concentration, gradual declines in NH_4 and $Si(OH)_4$ such that minima were attained at the end of our study, an increase in chlorophyll stock in the latter half of our study, an increase in phytoplankton growth and productivity, an increase in microzooplankton grazing rate, and a settling of the benthic harpacticoid community. The wind event clearly injected benthic materials in dissolved and particulate forms into the water column where they directly stimulated the phytoplankton and microzooplankton communities within 1-2 days after the event. This stimulation of the pelagic food web continued at least until we completed our study 6 days after the event. No response in the mesozooplankton community was apparent.

During year 2 (the current reporting period) we again returned to Florida Bay to repeat our year 1 study. By scheduling our study for April, we had hoped to encounter a period of low winds which would give us a set of calm conditions to contrast with our year 1 study. Unfortunately, wind speeds throughout our year 2 study were high (typically 8-10 m sec^{-1}) and the suspended sediment concentrations encountered were similar to those encountered in year 1. We did not encounter the conditions we would have liked, conditions that would have provided us with the other end of the benthic-pelagic coupling spectrum. We did however, obtain additional data for describing system responses to wind events. Our intent is to analyze previous data from other work in the same general area, to provide information on the contrasting conditions associated with calm winds.

This is year 2 of a 2 year award. (Unfunded) work to be performed next year will be related to writing.

Applications
A manuscript for submission to the journal Estuaries, titled "Wind events and benthic-pelagic coupling in a subtropical bay in Florida, USA." by D. Lawrence, M. J. Dagg, H. Liu, S. R. Cummings, P. B. Ortner, and C. Kelble, will be submitted before the end of June.

A presentation of this same work was given at the February 2002 meeting of the American Society of Limnology and Oceanography. "Wind events and benthic-pelagic coupling in western Florida Bay" by David J. Lawrence, Michael J. Dagg, Hongbin Liu, Shailer R. Cummings, Peter B. Ortner, and Christopher Kelble.