Thermal Structure Monitoring and Related Studies

Primary Investigator: Michael McCormick

Co-Investigators: Dave Schwab, Gary Fahnenstiel, Ed Rutherford - NOAA GLERL, Dima Beletsky - CILER, University of Michigan, Tomas Hook - Purdue University

Overview

Observationally, perhaps the biggest gap in our knowledge of the physical environment in the Great Lakes is in being able to provide a detailed description of the annual evolution of the three-dimensional temperature field and its year to year variability. This information impacts the annual evolution of the entire biological community, all the way from the lower food web, including phytoplankton and zooplankton, on up to fish. Some information on surface temperature is available from satellite surface temperature maps and from National Data Buoy Center buoys during the shipping season, but it is not possible to infer the details of the vertical thermal structure from surface temperature alone. Therefore, baseline measurements of the detailed horizontal and vertical distribution of water temperature data with high resolution in time and space are critically needed to assess interannual variability of the thermal structure of the Great Lakes, to test three dimensional model parameterization, to understand vertical mixing processes, and to aid in interpreting biological and other environmental data. In addition to making new observations it is equally important to study historical data sources such as coastal temperature and NDBC buoy data to see what insights they can provide into system behavior and whether or not any trends are evident.

Objectives

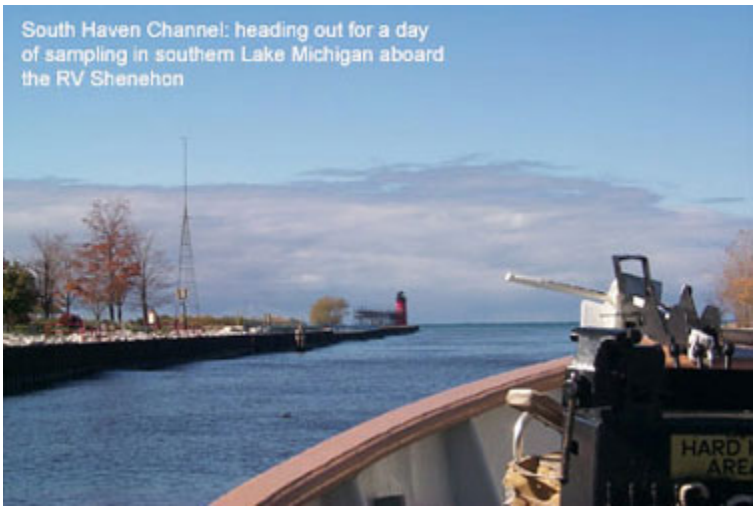
to develop improved climatological information by means of observations, new instrumentation, and improved analyses of the distribution and variability of coastal and offshore temperatures and by studying their dependence on meteorological and hydrological forces, with emphasis on potential changes in climate

to concurrently provide data for improving numerical models that can simulate and predict the thermal structure in the lakes.

Accomplishments 2005

The mid-lake ADCP/thermistor mooring was successfully retrieved. Both ADCPs functioned properly as well as the 11 temperature/data loggers.

A new mid-lake mooring was deployed containing 11 temperature data loggers. The ADCPs were not redeployed but were used in Lake Erie instead.



South Haven channel: heading out to southern Lake Michigan on mooring retrieval cruise aboard the RV Shenehon

Products

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