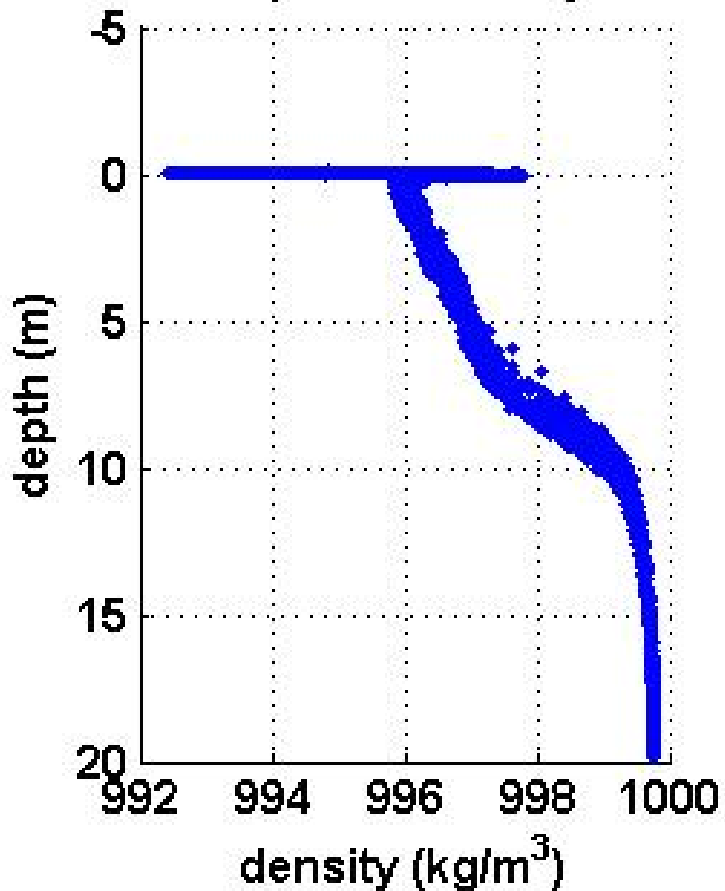


Lake Maxinkuckee Field Research

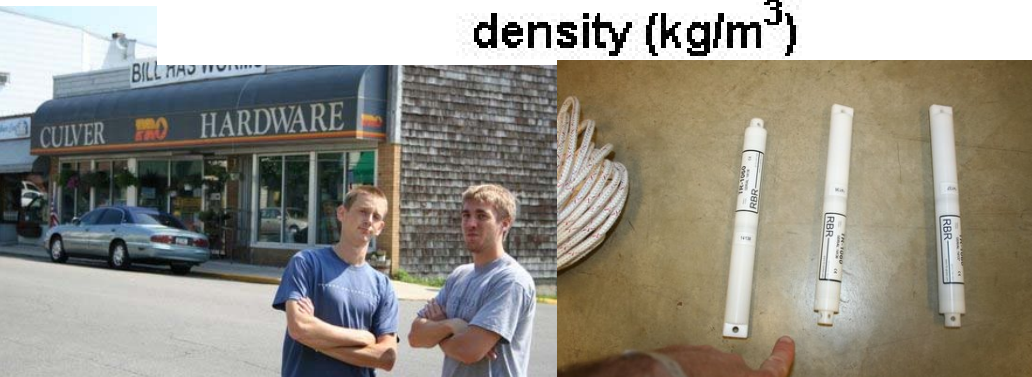
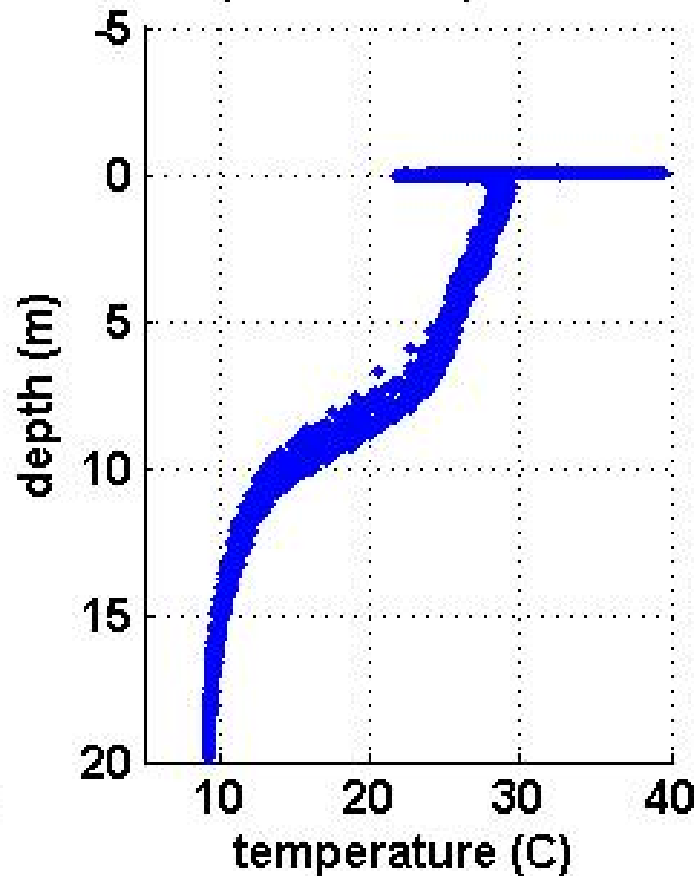
- Initial goals:
 - Measure temperature distribution in lake over different seasons
 - Apply simple 1-D computer model to simulate temperature changes
 - Inputs:
 - Solar radiation (heating and cooling)
 - Air temperature
 - Wind speed
 - Lake geometry

August 2007 measurements

depth vs. density

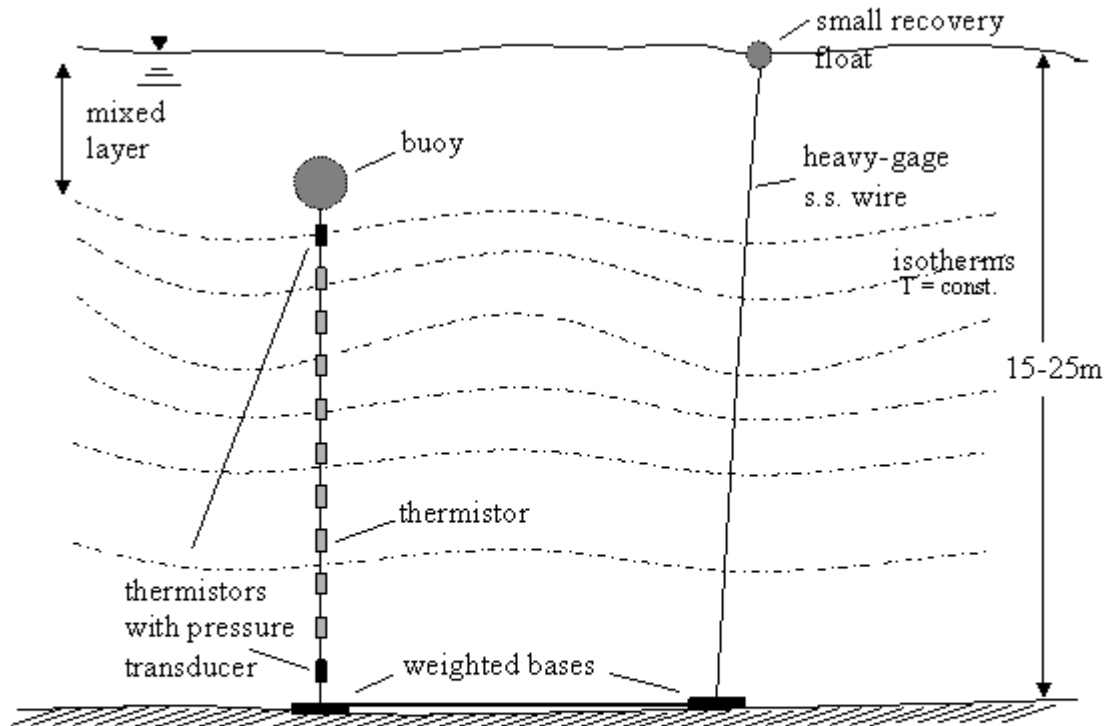


depth vs. temperature



October-December 2007

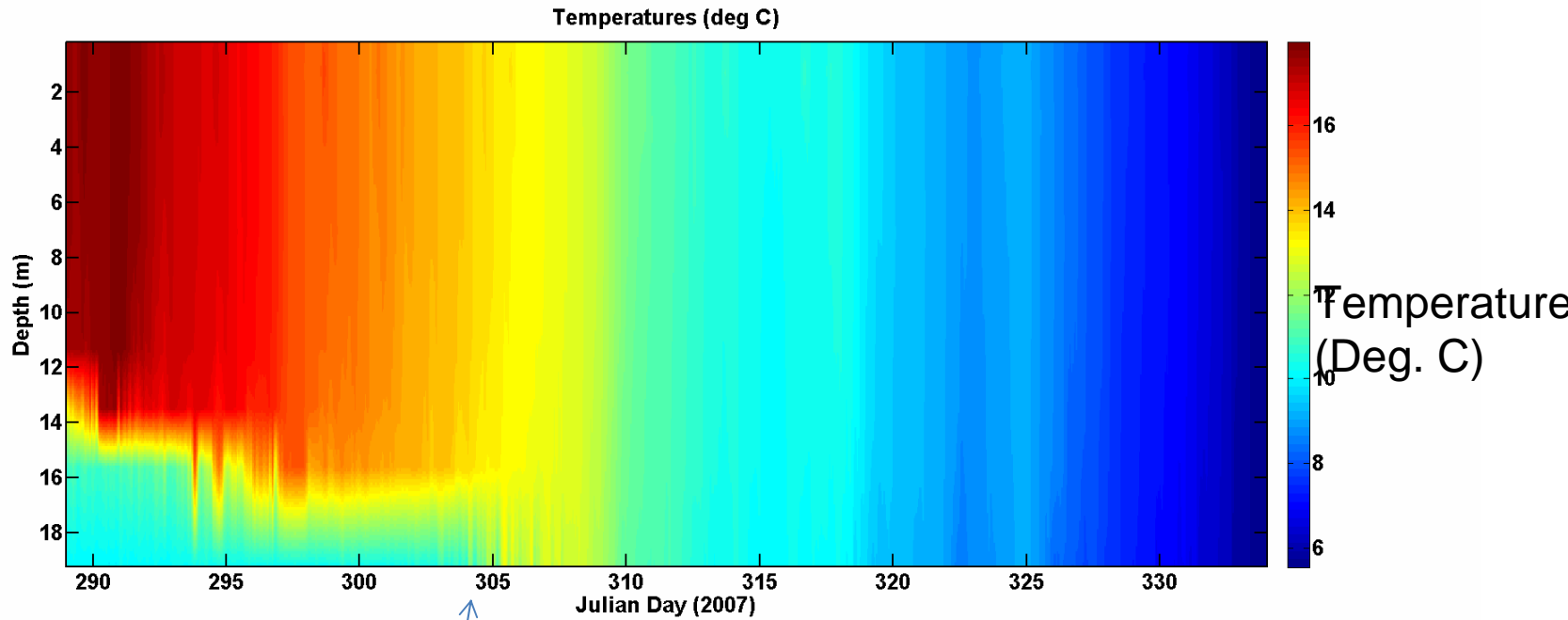
- “Thermistor chain”



Design Notes

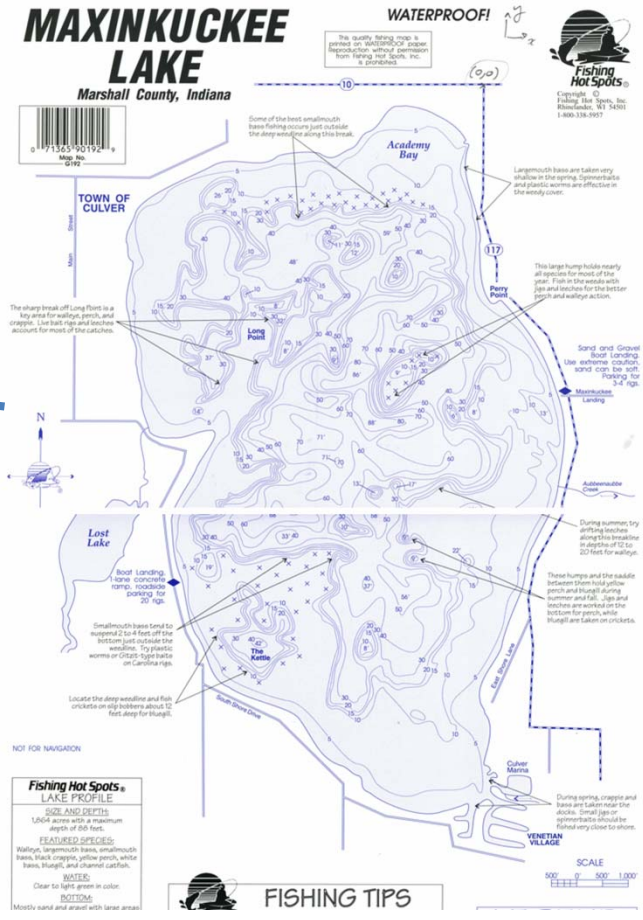
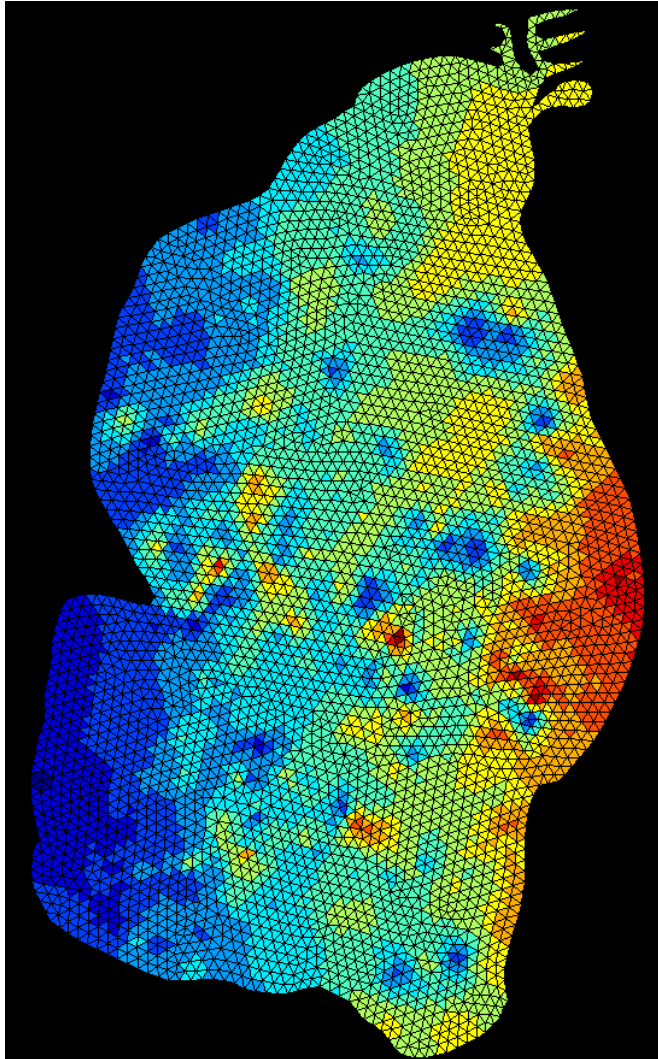
Thermistors are Sea-Bird model SBE-39, the industry standard
Vertical scale of isotherm motions is exaggerated for effect
Thermistor chain terminates sub-surface to prevent damage by vessels

Measurements – fall



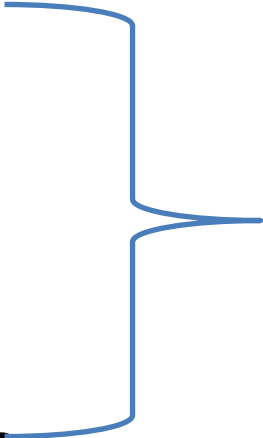
“Fall overturn”

Temperature modeling



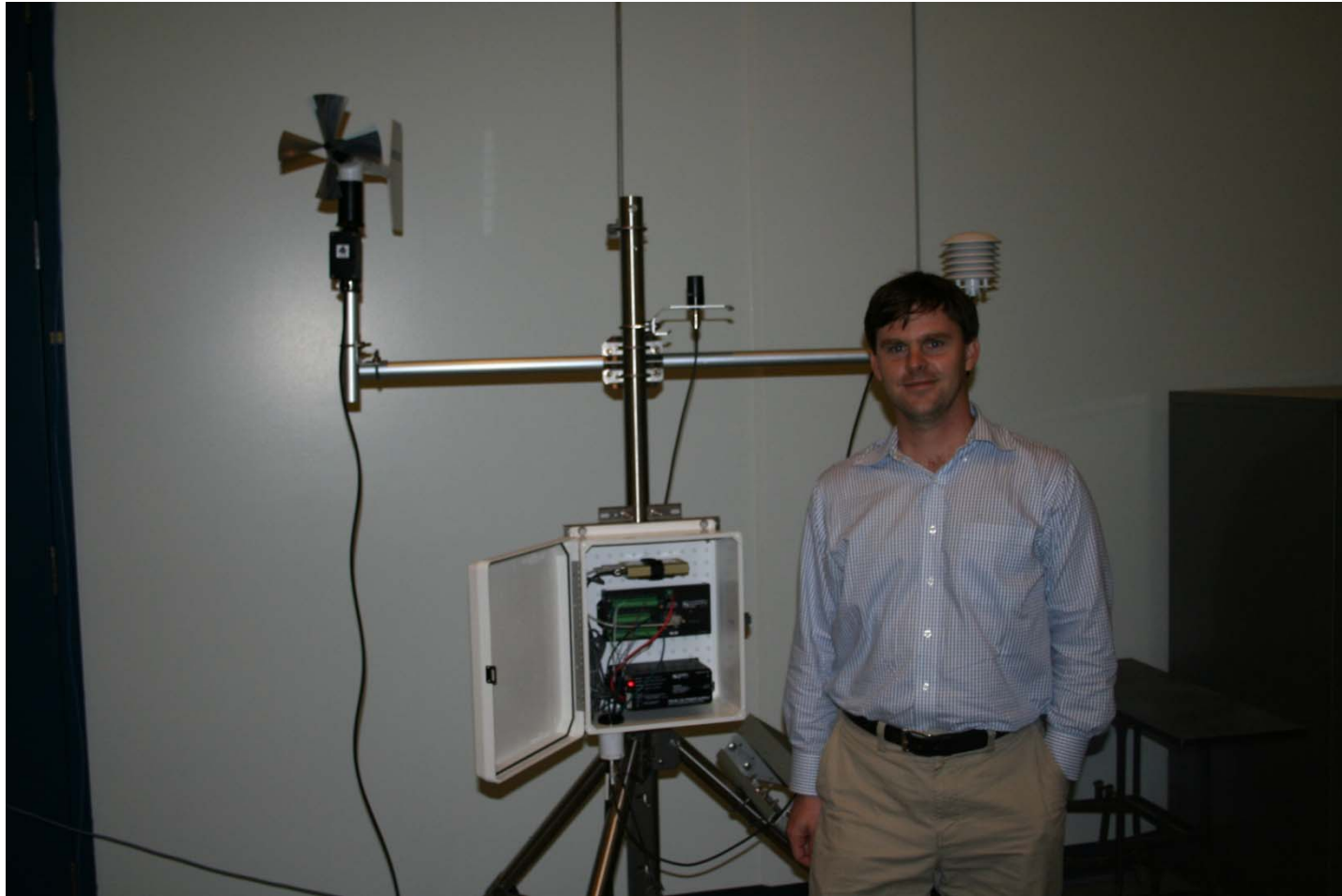
1-D Water Temperature Model

- “DYRESM”
- Inputs:
 - Air temperature
 - Solar radiation
 - Wind speed
 - Humidity
 - Initial water temperature
 - Cloud cover



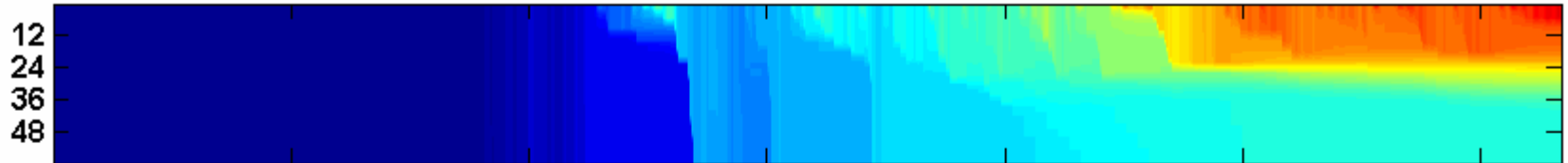
Data from nearby weather observations

Weather station

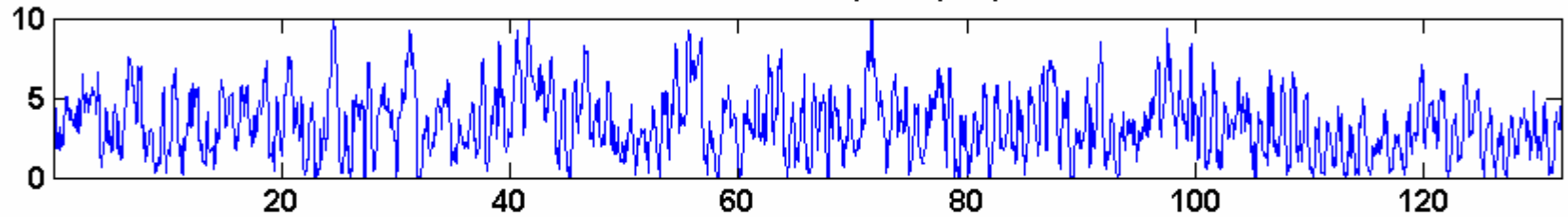


Model results

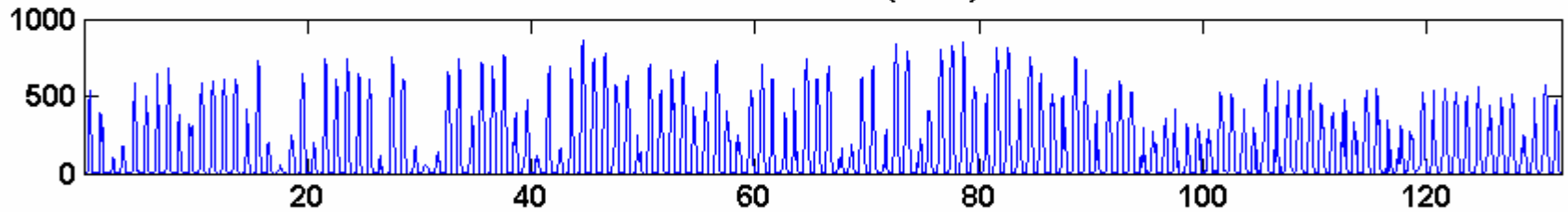
Lake Maxinkuckee Temperature (C)



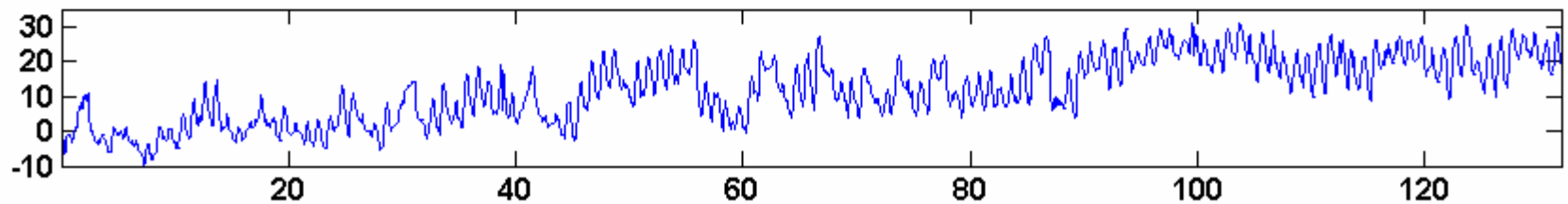
Rochester windspeed (m/s)



Solar Radiation (W/m^2)



Air Temperature (C)



Longer-term goals

- Apply water quality model to Lake Max.
 - Oxygen concentrations
 - Algae
 - Nutrients
 - Plankton
- Develop comprehensive monitoring program
 - Community-based (State funding?)
 - Periodic field experiments
 - Outreach/learning activities with community
 - “SURF” program – Purdue undergrad. researchers

Upcoming research

- EcoMapper Autonomous Vehicle !!



- Map Water Quality of Lake Michigan and Lake Max.
 - Oxygen
 - Algae
 - Chlorophyl A