

Southampton Oceanography Centre Searches for Clues on Harmful Algal Blooms



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YSI Continuous Water Quality Monitoring
Application Note A509-02

Harmful algal blooms (HABs) create noxious and toxic conditions for aquatic animals as well as human beings in and about the water where they occur. Data indicate that these phenomenon are on the rise world-wide, hence estuarine and near-coastal researchers have begun to invest increasing amounts of time and other resources in efforts to characterize these phenomenon and understand what causes them.

Dr. Duncan Purdie, University of Southampton, Southampton Oceanography Centre, has been studying the water quality of the Fleet Lagoon in Dorset, England for years as part of a cooperative effort that included the doctoral research work of Silvia Nascimento on Harmful Algal Blooms. The program was funded by the Brazilian Agency CAPES and by the EU agency's Harmful Algal Blooms Expert System (HABES) program. In September 2000, the Fleet Lagoon experienced a massive dinoflagellate bloom which prompted Southampton Oceanography Centre to acquire continuous water quality monitoring technology in order to learn more about the factors associated with HABs there and to record such an event should it happen again.

In September 2001, Dr. Purdie and coworkers deployed a YSI multiparameter sonde affixed to a bottom-mounted frame at the head of the Fleet Lagoon, adjacent to the Swannery at Abbottsbury. The sonde was left fully submerged collecting data in unattended mode every 10 minutes for three weeks. Water quality measurements including temperature, salinity, pH, dissolved oxygen, chlorophyll and turbidity, as well as depth data, were logged internally by the YSI sonde and stored in its memory. These data are being compared with tidal and meteorological information to begin to understand the conditions influencing the development and maintenance of algal blooms in the lagoon.

The Fleet Lagoon is a productive estuarine environment in which stationary substrates become covered or "fouled" by biological growth. After three weeks, the sonde was retrieved from its station. Visual inspection revealed the advantage of YSI's wiped sensor technology for minimizing fouling. Using the YSI sonde with wiped sensor technology, Dr. Purdie and company were able to observe the consequent and concomitant changes in water quality in response to and associated with the spring-neap tide patterns.



Fleet Lagoon in Dorset, England

Dr. Purdie commented that through the use of the sonde they were able to observe, "that temperature and salinity data fit with the spring-neap tide pattern, and that pH and percent dissolved oxygen saturation data show large diel changes reflecting day time production of dissolved oxygen and nightly removal by respiration. Similarly, pH increased during the day due to CO₂ uptake and decreases at night due to CO₂ release." Differences in turbidity and chlorophyll between spring and neap tides were also observed, with turbidity being notably higher on neap tides, when water depth is shallower, resulting from re-suspension of sediment by wind.

The sonde continues to facilitate the efforts of Southampton Oceanography Centre with the capability of continuously collecting accurate estuarine water quality data that could not be practically collected otherwise. Investigations are continuing on HABs in the Fleet Lagoon and other south coast estuaries like Southampton Water and Solent.

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