(*continued from page 1*)

Surface drifter deployments are made from the University of Miami's research vessel *F.G. Walton Smith*.

Keys coral reef tract. The Tortugas Gyre, generally located to the south of the Dry Tortugas along the inshore front of the Loop Current, tends to form periodically over a period of weeks to months and then slowly drifts through the region until it is absorbed by the Florida Current offshore of the Florida Keys. The trajectory shown on the previous page is of a surface drifter deployed in the Dry Tortugas in August 2002. This drifter meandered slowly to the northwest until it was entrained along the edge of the Loop Current, made one revolution around the Tortugas Gyre, and then exited the area via the Florida Current.

This is only one example of how satellite-tracked surface drifters can be used to gain insight into the regional circulation features that affect the waters of the Florida Keys National Marine Sanctuary. Trajectories from many other drifters deployed in the region may be viewed at the project web site at http://www.aoml.noaa.gov/sfcoo/SFP_drifters/.

Join Team AOML

Miami Corporate Run

May 6, 2004
Bayfront Park
6:45 p.m.

Contact:
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(305) 361-4401
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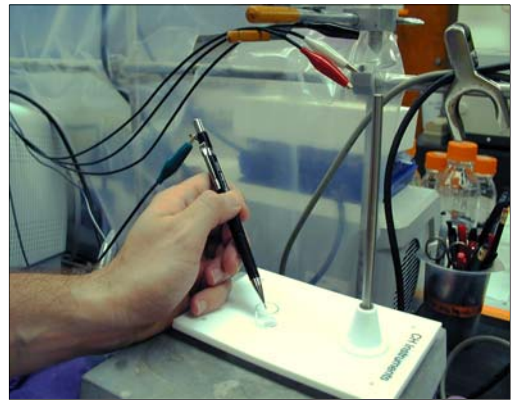
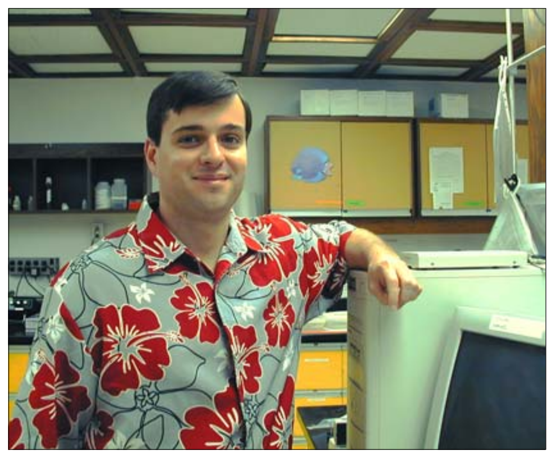
Detecting DNA with a Pencil



DNA signals captured by molecular probes are detected by a carbon electrode (a modified mechanical pencil).

AOML's Environmental Microbiology Laboratory is working to capitalize on biotechnology advances to develop the next generation of remote sensing technology. This high tech objective uses a low tech approach—they detect DNA with a pencil. Dr. Michael LaGier, a University of Miami postdoc in Dr. Kelly Goodwin's laboratory, uses a carbon electrode (a modified mechanical pencil) to detect the electrical signal created by DNA captured by molecular probes. The goal is to adapt the technique to use on a buoy, allowing for remote detection of the DNA of harmful algae and fecal bacteria. To do this, the project is tackling issues of remote DNA extraction, specific DNA hybridization, and sensitive electrochemical detection of the target DNA.

Using electrochemical methods rather than fluorescence is a novel approach to oceanographic studies. Electrochemical detection offers devices that are small, inexpensive, simple in design, and have low power requirements. Incorporating the benefits of electrochemical detection into a remote biosensor should have a major impact upon coastal and marine ecosystem monitoring.



Michael LaGier in the Ocean Chemistry Division's Environmental Microbiology Laboratory.

Present methods to monitor coastal water quality for microbial contaminants need improvement. Problems include issues with sample preservation, proper identification of species, and length of time to obtain results. Biosensors to monitor toxic organisms could provide early warning to close fisheries or beaches. Species-specific data generated by biosensors, in conjunction with measurement of environmental variables, could significantly contribute to the understanding of a variety of processes such as plankton dynamics, initiation of algal blooms, and the spread of coral disease. Economic benefits include reducing health and legal costs derived from consumption of contaminated fish and shellfish or from swimming in polluted waters. Benefits also include protecting aquaculture, sport and commercial fishing, and tourism.

By successfully addressing the major issues of sensitivity and selectivity facing electrochemical DNA detection, the technology developed by this project can provide an important tool for water quality managers. In addition, this work can benefit clinical assays, security surveillance, and food safety.

This project represents a collaborative effort between public, academic, and private sector scientists and engineers. The NOAA Environmental Microbiology Laboratory, headed by Dr. Kelly Goodwin, collaborates with Dr. Joseph Wang's group at New Mexico State University, Dr. Jack Fell's lab at the University of Miami, Dr. Chris Scholin at the Monterey Bay Research Institute, and private companies.

Earth Day – April 22, 2004