High School Students Learn by Direct Experiences on the Effects of Recent Drought on the Water Properties of a Subtributary to the Chesapeake Bay

by Arnoldo Valle-Levinson

For a little more than one year now, the HIGH TIDE program has been involving students from four high schools of southeastern Virginia (from the cities of Chesapeake, Norfolk, Portsmouth and Virginia Beach) to measure weekly profiles of temperature, salinity, and density in one of the subtributaries to the Chesapeake Bay. One of the goals of the HIGH TIDE program is to stimulate the interest of pre-college generations about science and, in particular, to propel their curiosity about oceanography. Since the HIGH TIDE program’s inception in September 2000, the students have been learning first-hand about the annual cycles of water temperature and salinity (Figure 1a) and about the relative influence of temperature and salinity on water density and density stratification (Figure 1b), among other phenomena. Most interesting has been the high salinity values measured in the autumn of 2001 (over 25) compared to the lower values (between 22 and 23) recorded during the similar period the year before. The students have been able to appreciate that the high salinity values of the autumn of 2001 reflect the dry conditions that have affected the lower Chesapeake Bay. They are discussing with their teachers the potential implications of the apparently anomalously high salinity on the seafood they eat and the fresh water they drink, and therefore, how it affects their daily life. In this context of direct experiences, high school students are gaining a greater appreciation for science as expressed both by teachers and students participating.

HIGH TIDE stands for High Schools of Tidewater (the region of Virginia where CCPO and Old Dominion University are located) Interacting on Data collection Experiences. It is a program, funded by the United States National Science Foundation (NSF), that includes both scientific and educational activities. The educational activity bridges high school teachers and graduate students to facilitate data collection experiences for high school students. The program is directed by ARNOLDO VALLE-LEVINSON, CCPO associate professor, with the participation of the following teachers and graduate students. Teacher Michael Bates of Maury High in Norfolk participates in the program with CCPO’s DAVID SALAS and MARIO CÁCERES (Mario earned his Ph.D. in August 2001 and is now back in Chile). Teacher Debora Mosher of Cox High in Virginia Beach collaborates with CCPO’s ANDRÉS SEPULVEDA. Teacher Mary-Beth Moore of Western Branch High in Chesapeake participates with CCPO’s CRISTOBAL REYES. Teachers Dan Borick and Heather Groffy from I.C. Norcom High in Portsmouth interact with CCPO’s ROSARIO SANAY. While high school teachers and students learn by collecting environmental data, Arnoldo and CCPO’s graduate students learn about teaching methods and techniques that spark the curiosity of the students. The collaboration is yielding an exciting data set from which everybody learns.

The four high schools participating in the program take turns once every four weeks, measuring the profiles of water temperature, salinity, and density. The rotation of high schools allows weekly data collection. Sampling is carried out from a bridge (Figure 2) that crosses the Lafayette River (Figure 1), a branch of the Elizabeth River and James River that ultimately leads to the Chesapeake Bay. Every week, usually on Tuesdays, one of the teachers comes to CCPO with four...
NOTES from the Director..................

A quick glance over this issue of Circulation makes one think about youth. Youth can be seen in the highly successful Halloween party for the kids, in HIGH TIDE and the Blue Crab Bowl for high school students, and in our graduate students and staff. That is one of the satisfying aspects of education: we are surrounded by a renewing supply of youth.

Here at CCPO, ANN GARGETT has settled in, taught the core course in physical oceanography, received funding from NSF and NOAA, and hired a marine electronics technician, CHRIS POWELL. The new technician, combined with the arrival of the R/V Slover this summer (http://home.maine.rr.com/rlma/odurv.htm), greatly increases our capacity for local field work and instrument development and testing.

Continuing on the field work theme, I would like to mention that JAY AUSTIN is continuing the monthly hydro section across the Bay mouth. This section was started in April 1992 and is now producing time series information that will be valuable as we study climate change effects in the region. Jay is interested in incorporating other investigators who might want to initiate time series near the mouth of the Bay. Check out http://www.ccpo.odu.edu/~jay/cheshome.html or contact him at jay@ccpo.odu.edu.

Larry Atkinson
Director, Center for Coastal Physical Oceanography

Continued from Page 2

represents an invaluable data set that students may use to exercise different statistical tools. Lesson plans will be developed by teachers to further the applicability of the data set. A few students have already used parts of the data set to carry out their school science projects. In addition to data visualization and retrieval, the Web site is used to consult the tide tables corresponding to the sampling site and to verify the date and time of sampling for each high school. The data set furthers the scientific objective of the NSF project to better understand the exchange hydrodynamics at the mouth of estuaries. The data are complementing other observations on water velocities (currently being obtained by Arnoldo) to be put into the context of seasonal and interannual variability. It is hoped that this is only the beginning of a long time series that eventually will help to shed some light onto the effects of climate variability on estuaries. This will only be accomplished, in addition to securing the sources of funding, with the dedication and participation of middle and high school teachers and students who learn about science while they actually do it.

The HIGH TIDE program is creating synergy with other educational activities. It has become one of the featured oceanographic programs on the Windows to the Universe educational project (www.windows.edu; Roberta Johnson is the contact person) and is being injected with ideas from the local public television station (WHRO, with Brian Callahan being the contact person). Procedures to showcase this program in the Virginia Marine Science Museum, located in Virginia Beach, are being explored. You may become an active participant of this program. If you want to use the data sets being produced, please feel welcome to do so. The data being generated by the project are available for anyone to use. For further information, please consult the program’s Web site and/or contact Arnoldo (arnoldo@ccpo.odu.edu).

Figure 3. Students uploading and processing the CTD data.
On November 2, CCPO hosted a Halloween party for the children of faculty, staff, and students. CCPO staff members, CLEO PHILLIPS and BETH MILLER, organized the event. The children came in a variety of costumes, including scary creatures, popular television characters, animals, and even Harry Potter. The big hit of the party was the “scary box,” a JOE RUETTGER creation. While the kids crawled through an enormous appliance box, they tried to escape the several hands poking through holes on the sides. It generated much laughter, particularly when a few adults gave it a try! (Photos taken by NANDITA SARKAR and Joe.)

Prizes for best costumes were awarded to Liliana Valle (left) and Jake Morgan (right).

Halloween party participants from left to right: (left chair) Mikey Rink, Grant Morgan, Nate Tedrow, Jake Morgan. (middle couch) Emiliano Valle, Alvaro Valle, Malik Phillips. (right chair) Kathryn Savidge, Loana Blum Green, Helen Savidge, AJ Miller. (standing in front) Liliana Valle.

Not pictured: Will Friedrichs, Drew Friedrichs, Chase Miller

NEW STAFF PROFILE

CLEO PHILLIPS came to CCPO in September 2001 as the center’s Grants Administrator. Her responsibilities include planning and managing the center’s budgets, as well as overseeing and coordinating daily operations. Cleo is also the co-editor of CCPO’s newsletter, CCPO Circulation.

Cleo previously worked in the Ocean, Earth and Atmospheric Sciences Department here at Old Dominion University as a program support technician. In that capacity, she was responsible for Web page development and administrative support for 23 faculty members, as well as serving as the department’s assistant to the undergraduate Chief Departmental Advisor.

Cleo moved to the United States from a small island in the Caribbean called St. Kitts. She served in the Army Reserves for seven years and was promoted to a specialist before completing her enlistment. Cleo has a 5-year-old son, Malik, and is presently expecting an addition to her family in the spring. When not consumed with motherhood, she likes reading, cooking, and listening to music.
PRESENTATIONS


COTA, G.F., Ecosystem Responses to Climate Change in the Arctic. Department of Ocean, Earth and Atmospheric Sciences, Old Dominion University, Norfolk, VA, September 6, 2001.


COTA, G.F., How productive is the Arctic? Center for Coastal Physical Oceanography Fall 2001 Seminar Series, Old Dominion University, Norfolk, VA, November 5, 2001.

COTA, G.F., Climate Change in the Arctic: Ecosystem Responses. Norfolk College of Arts Upper School, Norfolk, VA, October 30, 2001.


VALLE-LEVINSON, A., Course on the use of ADCP for six Latin American participants, Center for Coastal Physical Oceanography, Norwich, VA, August 2001.


VALLE-LEVINSON, A., Course on ADCP data processing for 17 Latin American participants, University of Concepcion, Chile, January 2002.


VALLE-LEVINSON, A., K.C. Wing, and K.T. BOSLEY, "Comparison of the influence of Nor’easters and Hurricane Floyd on water exchange at the Chesapeake Bay entrance." Presentation at the Estuarine Research Federation Meeting, St. Petersburg, FL, November 18, 2001.


PUBLICATIONS
