



CCPO “... facilitating innovative research in the coastal ocean.”

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REMARKS FROM A NEW ARRIVAL: DR. ANN GARGETT

A second floor office full of cardboard boxes and a pair of rowing blades mark my recent arrival at CCPO. After 29.15 years of professional life as a Government of Canada researcher with the Institute of Ocean Sciences (IOS, Fisheries and Oceans Canada), I have been reconfigured as a Professor of Oceanography, now complete with a SSN and an English language retraining session (say “wheat” not “brown” bread – and that’s spelled “center” not “centre”).

I grew up in Winnipeg, Manitoba (just north of North Dakota, for the geographically challenged) and completed a B.Sc. in mathematics and physics at the University of Manitoba a long time ago. A succession of summer jobs in meteorology and oceanography led to graduate school in oceanography at the University of British Columbia, and a Ph.D. thesis studying generation and propagation of internal waves in the nearby Strait of Georgia, under the supervision of Dr. Paul LeBlond. Always lucky with timing, I emerged from a postdoctoral year with Dr. Steve Thorpe, at what was then the National Institute of Oceanography UK, just as

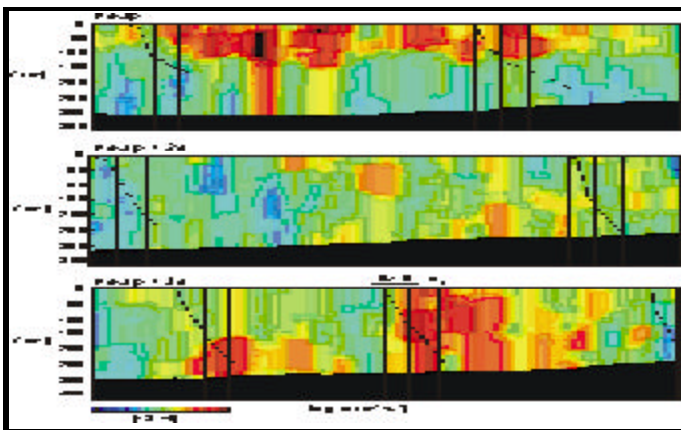
the west coast Institute of Ocean Sciences was being established near Victoria B.C. and became an IOS “original”, fortunate to work and live in the banana belt of Canada for nearly 30 years. Not that I exactly stayed put during all those years – at various

daughter, Joanna, now a third year student at the University of Calgary, I did do other things as well – evidenced by an extensive primary publication record, editorial service for AGU and AMS journals, and participation in a variety of science review and planning

committees. Although elected to the Science Academy of the Royal Society of Canada in 1991, the recognition I value the most came in the form of invitations to visit and interact with groups of graduate students at Woods Hole, the Pacific Northwest Oceanography Graduate Students retreat, and Dalhousie University (where the grad students pay for their expenses with profits from their Coke machine – now that’s a

honour, oops make that honor). The opportunity to teach and mentor some of the next generation of ocean researchers thus played a major role in my decision to make the big move from a government to a university research environment.

Discovering that the Hampton Roads Rowing Club operates out of CCPO’s backyard didn’t hurt either! Rowing is a recently acquired passion, and I look forward to the new chal-



This figure shows the variation of turbulent kinetic energy dissipation rate as tides increase from neap towards spring, determined from ADCP measurements of w' across a coastal tidal front in British Columbia. Superimposed profiles show the associated evolution of density, from a two-layer structure to a near-linear gradient. I plan to extend applications of this technique, using newer Dopplers deployed from moorings or a stable towed body.

times spending periods of 6 months to a year at the Woods Hole Oceanographic Institution, the University of Washington School of Oceanography, Scripps Institution of Oceanography, and the IFREMER (Institut Francais de Recherche pour l’Exploitation de la Mer) Center in Brest, France.

Although I would claim that the most important work I did over the last couple of decades was raising my

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lenges presented by sculling in shallow and tidal waters (not to mention the crab traps and oyster beds which await the unwary - in fact I may even take up rowing 8s, where there's a coxswain to blame for close encounters!).

When asked to describe my present research interests, I offer the following short description of two areas of general focus (and at the end, a short reading list for the truly motivated).

➤ **Turbulent Mixing: Observation and Parameterization**

Much of my past work has been in the observation of turbulent mixing in the ocean environment. Interpretation of early observational results led to subsequent investigations of the effects of different parameterizations of small-scale processes in large-scale numerical models of the ocean^{1,2}. More recently^{3,4}, I've developed a semi-automated system for detecting and assessing turbulent mixing in coastal waters, a challenging measurement environment because of strong space and time variability. Applications of this system include identification of locations and processes involved in resupply of nutrients which maintain the biological productivity of coastal waters, as well as site-specific assessments of "water-use" issues (sewage disposal, ocean dumpsites, mine tailing disposal, pulp-mill effluent discharges, etc.).

➤ **Physical Effects on Biological Productivity**

My other major interest is in the effects of physical processes on marine ecosystems. Consideration of such

effects led to the only existing mechanistic explanation for observed correlations between atmospheric climate forcing of the ocean and survival rates of Pacific salmon stocks⁵. Subsequent work with a biophysical box model of the Strait of Georgia, British Columbia suggests that the large interannual variability in primary and secondary production which is observed in this system is achieved through physical processes which modify biological rate processes⁶. Lack of time series data to verify such model predictions led to my recent involvement in a prototype biophysical mooring deployed in Saanich Inlet, British Columbia⁷ and an ongoing interest in automated time series measurements of physical and biological parameters.

In joining CCPO, I'm planning to pursue my personal focus on the development of instrumentation and techniques to enable space/time continuous measurements of crucial turbulence parameters from moored and/or towed platforms. Such systems will allow investigation of fundamental yet still unanswered questions about turbulent processes: What are the relative contributions of steady vs episodic forcing? In a stratified geophysical fluid, is the efficiency of mixing constant? When is "eddy diffusivity" an acceptable description of the effects of turbulence? Whether applied to shallow estuaries like the Chesapeake Bay, to the open-ocean surface mixed layer, or to mixing "hot spots" in the deep sea, answers to such

fundamental questions about the effects of turbulence are crucial to improving the models we build of the ocean environment and of its embedded marine ecosystems. I look forward to working with the faculty and students at CCPO in pursuit of these broader goals.

¹ Cummins, P.F., G. Holloway and A.E. Gargett. 1990: Sensitivity of the GFDL ocean general circulation model to a parameterization of vertical diffusion. *J. Phys. Oceanogr.* 20(6), 817-830.

² Gargett, A.E. and G. Holloway. 1992: Sensitivity of the GFDL ocean model to different diffusivities for heat and salt. *J. Phys. Oceanogr.* 22(10), 1158-1177.

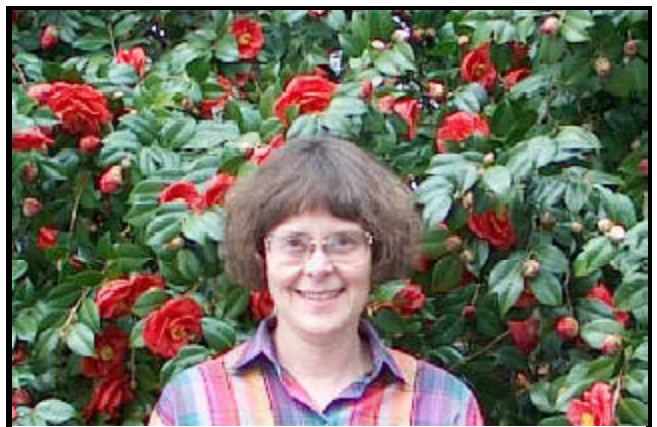
³ Gargett, A.E. 1994: Observing turbulence with a modified acoustic Doppler current profiler. *J. Atmosph. Oceanic Tech.* 11(6), 1592-1610.

⁴ Gargett, A. E. 1999: Velcro measurement of turbulence kinetic energy dissipation rate ϵ . *J. Atmosph. Oceanic Tech.* 16(12), 1973-1993.

⁵ Gargett, A. E. 1997: The optimal stability "window": a mechanism underlying decadal fluctuations in North Pacific salmon stocks? *Fish. Oceanogr.* 6 (2), 109-117.

⁶ Gargett, A. E., M. Li and R. M. Brown. 2001: Testing mechanistic explanations of observed correlations between environmental factors and marine fisheries. *Can. J. Fish. Aq. Sci.* 58, 208-219.

⁷ www.pac.dfo-mpo.gc.ca/sci/ecobuoys



NOTES from the Director

As you can see by this issue of *Circulation*, we have some new faces in Crittenton Hall. Some of those new faces are very young and demonstrate what must be a very local aberration in population dynamics.

We are very happy to have **ANN**, **JAY**, and **DANA** now onboard and nearly settled in. Each brings a refreshing new perspective. We are especially pleased to see such a well-known oceanographer as **ANN GARGETT**. Watching **ANN** adapt from the Canadian laboratory system to our rather loose, yet often maddeningly structured, university system has been delightful.

As I write this, **TOM ROYER** is returning from the Gulf of Alaska, where he reported first day seas at nearly 10 m outside Seward. We haven't heard from him for a week, so it either got real nice and they are busy or real bad and they cannot email. Also, **EILEEN HOFMANN** and students are preparing to leave for the Antarctic and a cruise on the R/V *Palmer*. Yes, they planned and are doing fieldwork in Antarctic waters in the winter. Clever! **JOHN KLINCK** and students have the June cruise.

I mention these field activities to remind us that, in the end, we go to sea on ships and sometimes it is not so pleasant. Yet, we go.

Enjoy this issue. Send in those quotes!

Larry Atkinson

Director, Center for Coastal Physical Oceanography

Site of the U.S. Southern Ocean Global Ocean Ecosystem Dynamics (SO GLOBEC) Field Study

Sea ice distribution, expressed as percent cover, around the Antarctic derived from the Special Sensor Microwave/Imager (SSM/I). Note that the area to the west of the Antarctic Peninsula is ice-free. This is the region that will be the site of the U.S. Southern Ocean Global Ocean Ecosystem Dynamics (SO GLOBEC) field study, which begins in April 2001. Several scientists from CCPO are involved in the SO GLOBEC cruises and details of these will be forthcoming in future issues of *CCPO Circulation*. The sea ice image was provided by Dr. Josefino Comiso from the Laboratory for Hydrospheric Processes at NASA Goddard Space Flight Center.

NEW FACULTY PROFILE

JAY A. AUSTIN

JAY A. AUSTIN came to CCPO in November 2001 as a research assistant professor. He holds B.S. degrees in math and physics, both from California Polytechnic State University, San Luis Obispo. He completed a Ph.D. in physical oceanography in 1999 in the



Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program. While there, he worked with Steve Lentz, focusing on the dynamics of the North Carolina inner shelf. His research took two separate but related directions: one half was devoted to observations of air-sea interaction and inter-annual heat balances, and the other focused on idealized numerical models of stratified wind-driven upwelling and downwelling. His postdoctoral work at Oregon State University got him involved in more observations as part of the Oregon State NOPP (National Oceanographic Partnership Program), where he headed up a field program using a small, towed, undulating vehicle to make fine-scale hydrographic surveys of the mid- to inner shelf. He is using this data, along with that collected in a number of other field programs during the same season, to better understand the relationship between upwelling intensity and wind stress. This is important for understanding nutrient transport processes and primary productivity on the shelf.

At CCPO, Jay is continuing to pursue his interest in the Oregon shelf, especially with regard to cross-shelf transport issues and inner-shelf and nearshore hydrography. He is collaborating with a group of Oregon State ecologists on understanding the role of physical forcing in coastal ecosystems. On a more local level, he is also interested in the climatology of the Chesapeake Bay mouth and is currently running the monthly Bay mouth cruises. He intends to investigate the role that the Chesapeake Bay plays in determining circulation and hydrography on the adjoining inner shelves.

Away from the lab, Jay and his wife, Dr. Elizabeth Austin-Minor (of ODU's Chemistry department), are avid road and trail runners, orienteers, and snowshoers. They are hoping to be able to spend more time on the water now that they live so close to the Chesapeake Bay.

QUOTES FROM THE FIELD

Sometime in the early 1970's, when I was in graduate school, the following quote appeared in EOS, I believe attributed to Walter Munk and quoted by Frank Press. I've always been inspired by these statements:

Make a better instrument or measure in a place where no one else has been and a great discovery will come your way.

Do not hesitate to enter new fields despite the giants who may be your competition, for it is the fresh analysis from a different vantage point that often leads to important new insights.

Competition is a good work and the fun and excitement of being first should be relished.

Nature does not give up her secrets lightly, and hard work, long hours, personal commitment are essential ingredients to scientific discovery.

Submitted by Brad Butman; Woods Hole Oceanographic Institution; Woods Hole, Massachusetts.

The following quote was brought to my attention by a land-seeking computer programmer from Nanaimo in 1969:

"There are times, too, when the motion of the ship, although not producing actual sickness, may curiously curtail the initiative and vision of those who seem most brilliant ashore; an insidious mental lethargy appears to creep over some and stifle the fires of enthusiasm which burnt so brightly when the seas were calm."

From The Open Sea: Its Natural History. Part II. Fish and Fisheries by Sir Alistair Hardy; Collins 1959; Page 300.

Submitted by George Cresswell; CSIRO Marine Research; Australia.

Please send in your favorite quote, preferably by or about oceanographers to mcquay@ccpo.odu.edu or julie@ccpo.odu.edu.

Collaborative U.S.-French Program on Clam Disease Underway

The role of disease in marine ecosystems is rarely considered as a potential cause of population fluctuations in ecological studies. However, recent outbreaks of infectious diseases in the marine environment have attracted much attention from the general scientific community. For example, the oyster diseases, Dermo and MSX, have had a large negative impact on Chesapeake Bay oyster populations, which has led to research programs focused on understanding the biology and ecology of these diseases.

Other shellfish are also affected by disease. One such species, the Manila clam (*Ruditapes philippinarum*), which is found in coastal waters off

northwest Brittany in France, began dying in large numbers in 1987. This species was introduced to Brittany in the early 1970s for aquaculture because it grows more rapidly than the native clam, *R. decussatus*. The disease that caused *R. philippinarum* to die was identified as Brown Ring Disease (BRD). This disease is so named because the affected clams have characteristic deposits of brown periostracum, which is organic material onto which inorganic crystals are deposited as the shell enlarges, ringing the inner shell edge. A

bacterial causative agent, *Vibrio tapetis*, was soon discovered, isolated, and grown in culture. BRD now affects many cultured and wild populations of *R. philippinarum* in Portugal, Spain, France, and the United Kingdom, with occasional cases found in more southern regions around the Mediterranean. The native clam, *R. decussatus*, can be affected by BRD, but it is less sensitive than the introduced species. Since 1987, scientists at the European Institute for Marine Studies (Institut Européen Universitaire de la Mer (IUEM)) in Brest, France have been studying BRD. A large database on BRD now exists at IUEM and includes information from both field and laboratory experiments and long-term field monitoring.

So, why is BRD in clams in Brittany of interest to scientists at CCPO? For the past ten years, John Klinck and Eileen Hofmann, CCPO professors, have been working with Eric Powell and Susan Ford from the Haskin Shellfish Research Laboratory (HSRL) at Rutgers University on the development of mathematical models for Dermo and MSX diseases in oyster populations. In 1998-99, Susan Ford spent a sabbatical at IUEM working with Christine Paillard, who is the principal

scientist involved in BRD research since its initial outbreak in 1987. While at IUEM, Susan Ford convinced her French colleagues that their data sets were ideal for the development of a BRD-clam model that could be used to examine the relative contributions of biological and environmental factors in regulating BRD prevalence and intensity. After some discussion, a proposal was submitted to the National Science Foundation International Programs Office as part of the U.S.-France Cooperative Science Program, which provides joint funding for research projects with the French National Center for Scientific Research (CNRS). In doing the proposal, we

entrained an additional French colleague, FrJderic Jean from IUEM, who is an ecologist with expertise in benthic-pelagic modeling. In fall 2000, we were notified that our proposal was funded.

The primary research questions focus on: 1) environmental and biological factors that trigger and/or stop epizootics of BRD in clams; 2) evaluation of clam farming practices that can reduce losses to BRD; 3) transmission dynamics of the BRD pathogen; 4) effects of habitat modification on BRD intensity and prevalence; 5) potential effects of long-term climate change on BRD; and 6) differences

in defense system responses of *R. philippinarum* (introduced species) and *R. decussatus* (native species). Constructing a model that will provide insight into these research areas will be a challenge. However, it is certain that the process of constructing a BRD-clam model is sure to provide new insights into the disease process and to highlight areas for future research.

To get started on the development of the BRD-clam model, the participants from IUEM and HSRL visited CCPO in late January 2001 (see photo). At this meeting, we outlined the structure of the BRD-clam model, identified needed data sets, and decided on additional data analyses that are needed. In discussing the model development, we educated each other on the pathology of BRD, clam physiology, numerical model structure, and French wine and cheese. The latter two topics seemed to be of more general interest. The next group meeting will be in fall 2001 in Brest. The U.S. component of the group is looking forward to testing the cuisine and culture of Brittany, as well as to interacting with our French colleagues on an exciting research project.



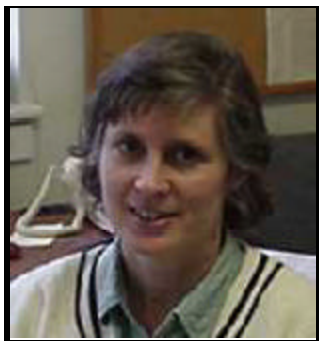
First meeting of the BRD-clam modeling group at CCPO. Front row (L-R) John Klinck, Eileen Hofmann, Christine Paillard (IUEM). Back row (L-R) FrJderic Jean (IUEM), Eric Powell (HSRL), Susan Ford (HSRL).

New Faculty Profile

Dana K. Savidge

I am an observationalist, primarily interested in describing and investigating the dynamics of synoptic to mesoscale processes. My career so far has been a mixture of open ocean and coastal work. I obtained a master's degree from Georgia Tech, working with Jack Blanton at the Skidaway Institute of Oceanography. During my three years at Skidaway, I studied the effect of the Gulf Stream on continental shelf flow on the South Carolina shelf, and participated in studies of the heat budget in the South Atlantic Bight, and of the fate of freshwater on the Georgia shelf. After a brief stint as a research tech at North Carolina State University, I began work on a Ph.D. at the University of North Carolina (Chapel Hill). My dissertation work with John Bane focused on cyclone spin-up in the deep ocean associated with the development of large amplitude Gulf Stream path curvature. After obtaining my Ph.D., I held a part-time post-doctoral position, also with John Bane at UNC, investigating mass transport on the Cape Hatteras continental shelf. The 'part-time' part of it was a real bonus, allowing me to continue to work a bit, while tending to my (then) toddler twin girls. When they reached three years old, I started as an NRC post-doc at the NOAA lab in Seattle, looking at tropical Atlantic sea surface temperature variability. Here at Old Dominion University, I hope to focus on the coastal ocean. I plan to continue looking at important aspects of cross-shelf flow at Cape Hatteras, and I also hope to consider the effects of boundary currents on shelf flow and cross-shelf transports in a variety of other shelf environments.

We are delighted to be back in the Southeast. The absence of crickets, lightning bugs, frogs, and songbirds, not to mention warmth in the Northwest summers was problematic. My husband, William Savidge, is also an oceanographer. He recently completed his Ph.D. in chemical oceanography at NC State, considering variability in $\delta^{13}C$ within amino acids from various macro-organisms. He has desk space in David Burdige's group in the Department of Ocean, Earth, and Atmospheric Sciences. The little misses Helen and Kathryn will be 5 this summer. We're hoping to encourage their interests in the natural world around them, but so far they want to be either princesses or cowboys when they grow up.



CATHOLIC HIGH SCHOOL OF VIRGINIA BEACH PINCHES COMPETITION IN BLUE CRAB BOWL 2001

by Liz Smith

Battling claw-to-claw in the final moments of a cliffhanger race, Catholic High School of Virginia Beach overcame last year's champions, Grafton High School, in the annual Blue Crab Bowl held at the College of William and Mary on February 3. The Catholic team, which was runner-up to Grafton last year, captured an all-expenses-paid trip to Miami, FL, where they will represent Virginia in the finals of the National Ocean Sciences Bowl competition in April.

The Blue Crab Bowl is the Virginia Regional Competition of the National Ocean Sciences Bowl (NOSB). Sponsored by the Consortium for Oceanographic Research and Education (CORE), in partnership with the National Marine Educators Association (NMEA), NOSB is a national competition for high school students on topics related to the study of the oceans. Fifteen hundred stellar students from around the country matched wits in 19 regional bowls like the Blue Crab Bowl during February 2001. In Miami, the Catholic High School team will go up against the other 18 championship teams from as far away as Maine and Alaska. The NOSB format consists of "timed competition" (defined as the use of "lock-out"-type buzzer systems and clocks) between two teams of four players. The subject matter encompasses all disciplines of oceanography, including topics on ocean-related national and international economics, history, and culture.

The Virginia Institute of Marine Science (VIMS), Virginia Sea Grant, and Old Dominion University's Department of Ocean, Earth, and Atmospheric Sciences (OEAS) and Center for Coastal Physical Oceanography (CCPO) are co-hosts for the Blue Crab Bowl. **ANNE WEST-VALLE** and **LIZ SMITH**, who coordinate the Bowl together with colleagues from VIMS, rely heavily on volunteers to make the Bowl a success. The significant resources contributed to the Blue Crab Bowl by Old Dominion University's College of Sciences, OEAS, CCPO, and VIMS faculty, students and staff are a testimony to the caliber of this outstanding outreach program. West-Valle and Smith are indebted to everyone involved and are already looking forward to the next Blue Crab Bowl, which will take place at Old Dominion University in early 2002.



Pictured left to right - Duncan McConaughy, Nicholas McConaughy, Kyle Chavers, Denise Harmeyer (not pictured, Lisa Matthews).

Just the facts ...

GRANTS/CONTRACTS AWARDED

FRIEDRICHS, M.A.M. and **E. E. HOFMANN**, "Regional Ecosystem Model Testbeds: A JGOFS Synthesis and Modeling Project," Joint Global Oceans Flux Study (JGOFS). \$271,916. June 2001- June 2004.

PRESENTATIONS

ATKINSON, L.P., "2000 Observations along the Chilean Coastline and Comments on the Ocean Margins." University of Concepcion, Chile, December 2000.

COTA, G.F., "The Bio-optical Properties of Arctic Seas." ASLO 2001 Aquatic Sciences Meeting, Albuquerque, New Mexico, February 12-16, 2001.

COTA, G.F., and L.R. Pomeroy, "Indices of Arctic Shelf-Basin Productivity." NSF ARCSS Shelf-Basin Interactions Meeting, Albuquerque, New Mexico, February 8-9, 2001.

FACH, B., E.E. HOFMANN, and E. Murphy, "Modeling Studies of Krill Survival During Transport Across the Scotia Sea." UKMS 2000 Meeting, Norwich, United Kingdom, September 2000.

HASKELL, A.G.E., G.-A. Paffenhofer, **E.E. HOFMANN**, and **J.M. KLINCK**, "Three-dimensional Lagrangian Modeling Study of Epipelagic Copepod Diversity." ASLO 2001 Aquatic Sciences Meeting, Albuquerque, New Mexico, February 12-16, 2001.

HOFMANN, E.E., A.G.E. HASKELL, J.M. KLINCK, and **C.M. LASCARA**, "Lagrangian Modeling Studies of the Spatial Dynamics of Antarctic krill (*Euphausia superba*)." ASLO 2001 Aquatic Sciences Meeting, Albuquerque, New Mexico, February 12-16, 2001.

HOFMANN, E.E., "Antarctic Marine Food Web and Environmental Linkages as Revealed through Modeling Studies." 2001 Gordon Research Conference on Polar Marine Science, Ventura, California, March 11-16, 2001.

HUSREVOGLU, Y.S. and **E.E. HOFMANN**, "Circumpolar Modeling study of Habitat Control on Antarctic Krill (*Euphausia superba*) Spawning." 2001 Gordon Research Conference on Polar Marine Science, Ventura, California, March 11-16, 2001.

HOFMANN, E.E., "Models of Antarctic Krill, Penguins, Circulation." University of Massachusetts-Dartmouth, School of Marine Science & Technology, New Bedford, Massachusetts, March 29, 2001.

KLINCK, J.M. and **M.S. DINNIMAN**, "Modeling the Circulation in the Ross Sea and on the West Antarctic Peninsula: A Prelude to Biogeochemical Modelling." 2001 Gordon Research Conference on Polar Marine Science, Ventura, California, March 11-16, 2001.

Moraga, J. and **A. VALLE-LEVINSON**, "Circulation in Semiarid Bays of Chile." Tenth International Conference of Physics of Estuaries and Coastal Seas, Norfolk, Virginia, October 8, 2000.

Caceres, M., **A. VALLE-LEVINSON**, and **A. SEPULVEDA**, "Flow Patterns in the Vicinity of the Mouth of a Chilean fjord." Tenth International Conference of Physics of Estuaries and Coastal Seas, Norfolk, Virginia, October 9, 2000.

Li, C., **A. VALLE-LEVINSON**, **L. ATKINSON**, K. Holderied, **C. REYES**, **A. SEPULVEDA**, and **R. SANAY**, "Thermodynamics and Hydrodynamics at Sand Shoal Inlet, Virginia." Tenth International Conference of Physics of Estuaries and Coastal Seas, Norfolk, Virginia, October 9, 2000.

VALLE-LEVINSON A., K. Wong, and **K. BOSLEY**, "Response of the lower Chesapeake Bay to forcing from Hurricane Floyd." Tenth International Conference of Physics of Estuaries and Coastal Seas, Norfolk, Virginia, October 9, 2000.

VALLE-LEVINSON, A., J. Delgado, and **L. ATKINSON**, "Reversing Water Exchange Patterns at the Entrance to a Semiarid Coastal Lagoon." Meeting of the Division of Fluid Dynamics of the Mexican Physical Society, Puebla, Mexico, October 31, 2000.

VALLE-LEVINSON, A., J. Delgado, and **L. ATKINSON**, "Reversing Water Exchange Patterns at the Entrance to a Semiarid Coastal Lagoon." Symposium on Biological Impacts Caused by La Nina Event, Lima, Peru, November 9, 2000.

VALLE-LEVINSON, A., J. Delgado, and **L. ATKINSON**, "Reversing Water Exchange Patterns at the Entrance to a Semiarid Coastal Lagoon." AGU Fall Meeting, San Francisco, California, December 17, 2000.

Li, C., **A. VALLE-LEVINSON**, **L. ATKINSON**, and **T. ROYER**, "Inference of Tidal Elevation in Shallow Water Using a Vessel-towed ADCP." AGU Fall Meeting, San Francisco, California, December 17, 2000.

WANG, J., G. COTA, and **D. RUBLE**, "Bio-Optical Observations in the Beaufort and Chukchi Seas." ASLO 2001 Aquatic Sciences Meeting, Albuquerque, New Mexico, February 12-16, 2001.

PUBLICATIONS

L. ATKINSON, Committee Member, 2000 Fleet Improvement Committee, "Academic research fleet faces ship shortage," *EOS*, 30(25):334, 2001. Cowles, T., and **L. ATKINSON**, "Assessment of future science needs in the context of the academic oceanographic fleet," A UNOLS Report.

FRIEDRICHS, M.A.M. and **E.E. HOFMANN**, "Physical control of biological processes in the central equatorial Pacific Ocean," *Deep-Sea Research*, 1 48, 1023-1069, 2001.

Li, C., **A. VALLE-LEVINSON**, **L. ATKINSON**, and **T.C. ROYER**, "Inference of tidal elevation in shallow water using a vessel-towed ADCP," *Journal of Geophysical Research*, 105(C11): 26,225-26,236, 2000.

SALIHOGU, B., W.R. Fraser, and **E.E. HOFMANN**, "Factors affecting the fledging weight of AdJlie (*Pygoscelis adeliae*) chicks: a modeling study," *Polar Biology*, 24, 328-337, 2001.

Sathyendranath, S., **G. COTA**, V. Stuart, H. Maass, and T. Platt, "Remote sensing of phytoplankton pigments: a comparison of empirical and theoretical approaches," *International Journal of Remote Sensing*, 22(2/3): 249-273, 2001.

VALLE-LEVINSON, A., C. Li, K. Wong, and K.M.M. Lwiza, "Convergence of Lateral Flow Along a Coastal Plain Estuary," *Journal of Geophysical Research*, 105(C7):17,045-17,061, 2000.

VALLE-LEVINSON, A., J. Moraga, J. Olivares, and **J. BLANCO**, "Tidal and Residual Circulation in a Semiarid Bay: Coquimbo Bay, Chile," *Continental Shelf Research*, 20(15): 2009-2028, 2000.

WORKSHOPS

Workshop on Eastern and Western Boundary Current Systems (LOICZ/JGOFS), Old Dominion University, Norfolk, Virginia, November 27-29, 2001.

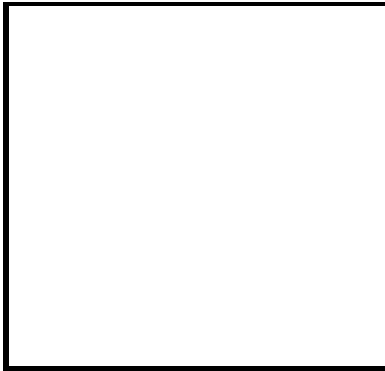
COMMITTEE SERVICE

ATKINSON, L.P., 2000 Fleet Improvement Committee.

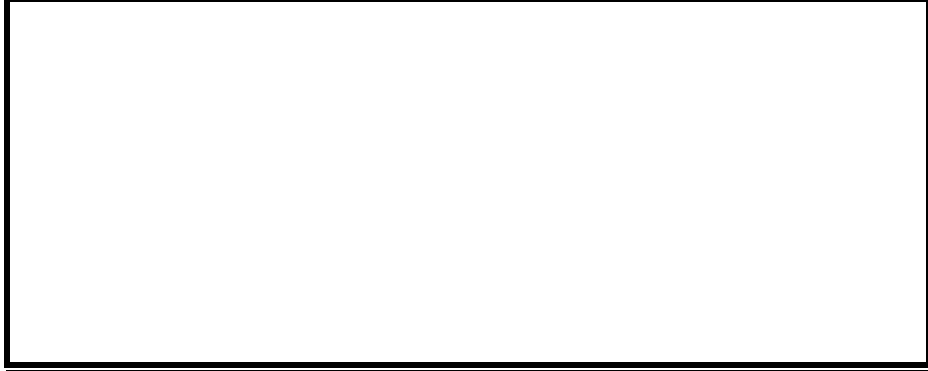
HOFMANN, E.E., Committee Member, National Research Council, Committee on Environmental Information for Naval Use.

HOFMANN, E.E., Committee Member, U.S. Joint Global Ocean Flux Study Science Steering Committee Meeting, February 27 - March 1, 2001, Santa Barbara, California.

Egg Hunt Sponsored by the Graduate Student Organization (GSO)



Jamie Whiteford and Ryan Whiteford proudly display one of the lucky silver eggs.



Egg hunt participants Top row (left to right): Jake Morgan, Mikey Klinck, Kathryn Savidge, Helen Savidge, Emiliano Valle, Drew Friedrichs. Bottom row (left to right): Grant Morgan, Will Friedrichs, Ileana Green, Alvaro Valle, Liliana Valle, Amelia Dobbs, Ian Ranhorn, Gemma Dobbs.



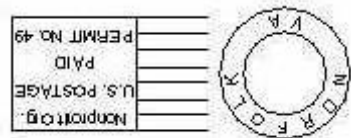
Left to right: Christopher Katzenmiller, GSO President; K.C. Filippino Scott Kline; Heather Groffy, GSO Vice President; Esther Cornfeld.

The GSO is comprised of masters and doctoral students; three officers oversee the organization. The GSO provides students with the opportunity to attend luncheons with weekly seminar speakers, in addition to coordinating the departmental Happy Hour throughout the year. Members of the GSO also participate in community service events at area schools, such as career days and science fairs. Other events sponsored by the GSO include car washes, CPR/first aid training, and the egg hunt. We finally remembered the camera at the egg hunt held for the children of students, faculty, and staff on April 11 at CCPO.

Co-Editor.....*Joy Hayes McQuay*
Co-Editor.....*Julie R. Morgan*

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