Canadian National Committee for SCOR
Comité national canadien pour SCOR

Scientific Committee on Oceanic Research

CANADIAN OCEAN SCIENCE NEWSLETTER
LE BULLETIN CANADIEN DES SCIENCES DE L'OCÉAN

Table of Contents, Newsletter Number 15, May 18, 2005
Table des matières, Bulletin numéro 15, 18 mai 2005

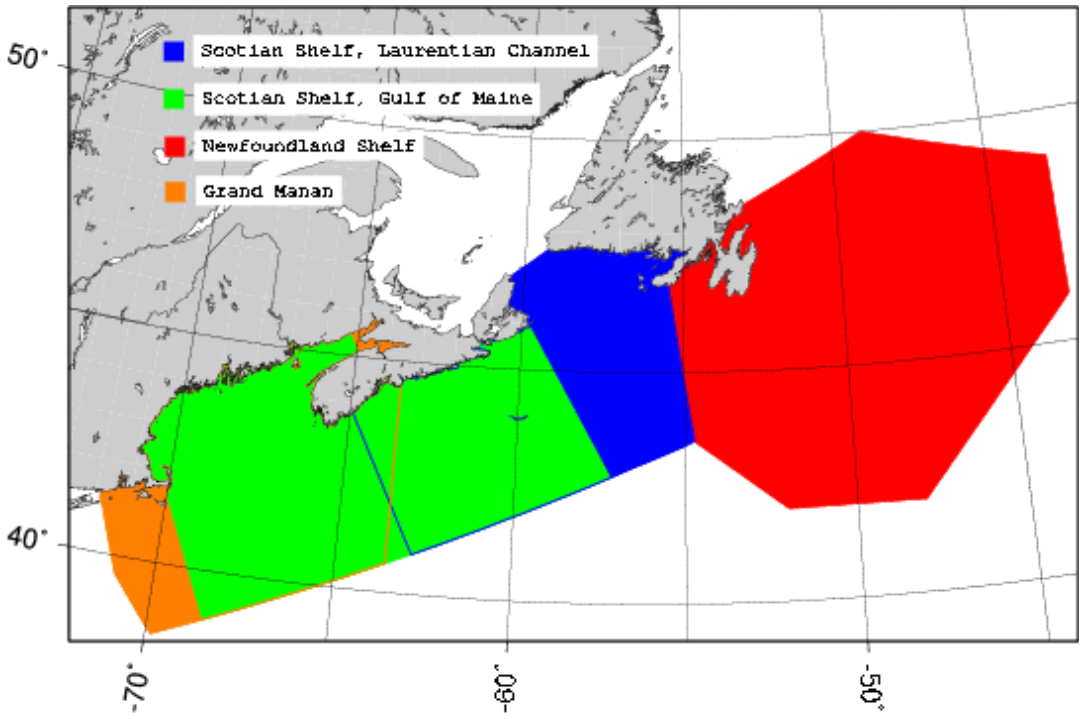
WebDrogue now runs backwards

Report by, J. Chaffey ChasseJ@mar.dfo-mpo.gc.ca, A. Drozdowski DrozdowskiA@mar.dfo-mpo.gc.ca, C. Hannah HannahC@mar.dfo-mpo.gc.ca

WebDrogue is a desktop application that allows the user to track particles in flow fields created by combining seasonal mean currents, tidal flows, and additional contributions due to wind forcing. The available model domains are shown in the Figure 1. The software can be downloaded from the OSD website: www.mar.dfo-mpo.gc.ca/science/ocean/home.html

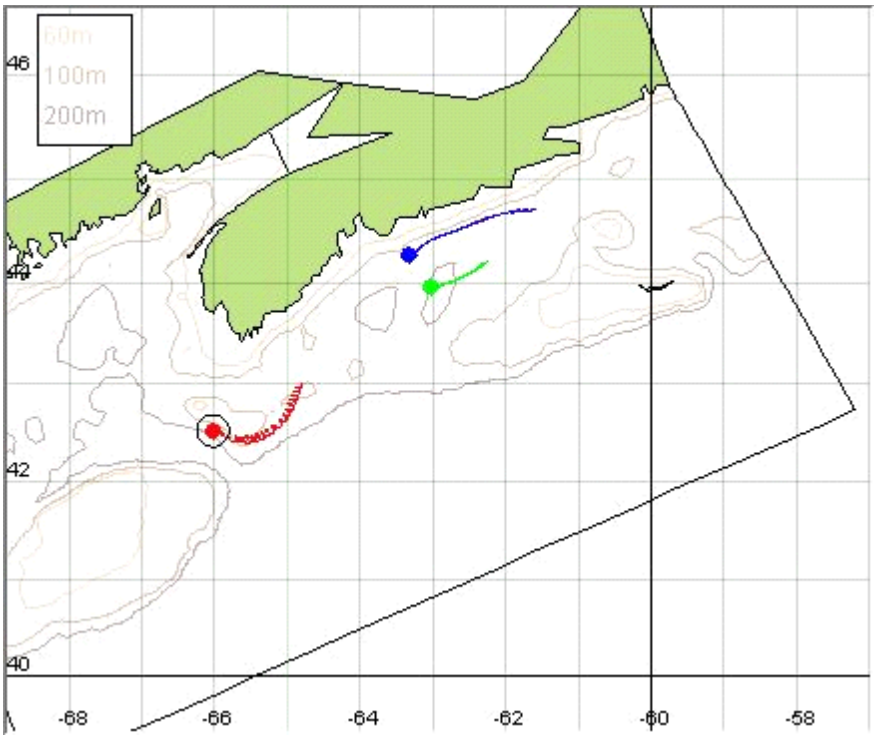
A new version of WebDrogue (v0.66) was released on March 4, 2005. This version allows for tracking particles backwards in time and has several important bug fixes including ones affecting the details of the tidal phase calculation, the 1 minute time step option, and a 1 hour error in the output time stamp related to daylight savings time. We recommend that current users download the new version.

Figure 1: WebDrogue model domains



Backtracking, or tracking particles backwards in time, is a useful new feature of WebDrogue. One potential application is estimating where a water parcel might have been before it was sampled (Figure 2). Another application is trying to unravel the space-time relationships between multiple observations taken in a tidally dominated region. For example assume you have taken several net tows at a fixed location over a couple of tidal cycles. The backtracking feature allows you to answer questions like 'Did we sample the same water mass several times?' and to estimate where the sampled water was at a common time and thus estimate spatial variability.

Figure 2: Backtracking for 15 days from March 31. The circles represent the location at 12:00 March 31 2005 and the lines extend backwards in time to 12:00 16 March 2005. The blue trajectory starts at Station 2 on the Halifax line. The flow field is based on the spring seasonal mean at 25 m and the tidal currents.



There is a small problem with installing WebDrogue at BIO sites (and probably other DFO sites). The latest version of the MacAfee virus scanner does not cooperate with the installer. The version of WebDrogue that includes the Java VM (Virtual Machine) will timeout with a message like "$JAVA_ENV not found" because the virus scanner takes too long to scan the file. If you already have the appropriate java installed, give the "without Java VM" version a try. Otherwise, you will have to contact Informatics (the HelpDesk) and get them to turn of the scanner for the minute or two it takes to install WebDrogue.

It recently came to our attention that the email-update form was not working on the WebDrogue/WebTide home pages. If you tried to register between February 2004 and March 2005 please do so again. The WebDrogue developers thank Josée Michaud (Dalhousie) for her determined effort to make WebDrogue more useful. The WebDrogue home page: http://www.mar.dfo-mpo.gc.ca/science/ocean/coastal_hydrodynamics/WebDrogue/webdrogue.html

Summaries of completed oceanography theses in Canada

Submitted by Paul Myers, myers@sumeria.eas.ualberta.ca

Over the past several years, SCOR has considered ways to publisize the excellent work being done by graduate students in Canada. Such an activity is important for a number of reasons, ranging from showing the range of high quality research being done by graduate students in Canada, to helping ourselves see what our colleagues and students are working on, to allowing our graduate students to advertise themselves and their work (which will hopefully assist them when they are applying for future graduate work or jobs after finishing their schooling).

Additionally, such activities should also help us attract interested graduate students by letting prospective students see what other student projects exists and some of their results.

To initiate this process, SCOR initiated a program to set-up a web site to list graduate students theses completed. Although the information provided depends on the institute, it is hoped this will include, at a minimum, all such students, and give the thesis title and the name of the supervisor. So far information has been collected, going back to 2000, from 5 institutes (Dalhousie, Quebec Ocean, University of Alberta, University of British Columbia and University of Victoria). It is hoped that other institutes will join in. This should not be a difficult task for one member at each institute to ensure is done once a year. Thus, we ask for support in this initiative for members at each institute in Canada that has oceanographic graduate students.

Additionally, to provide a more immediate record of graduate student accomplishments, it was suggested to include short summaries of completed theses in the regular newsletter. The hope here is that these submissions are more than just the thesis abstract, but are a fairly plain language summary that it is clear to all. To get this process started, I've agreed to provide (hereunder) such a summary for one of my recently completed master's students. I then ask that faculty members (or the students themselves) continue to submit these to the newsletter after each thesis is completed.

Investigation of Mixed Layer Depths along Line P and throughout the Gulf of Alaska Using Historical Data and Argo Floats

Michelle Li, University of Alberta, 2005

This study began with a re-examination of historical mixed layer depths along Line P (a line of stations regularly occupied by DFO, stretching from Vancouver Island to the interior of the Gulf of Alaska), covering the years 1965-2001. A climatological of the average mixed layer depth for each of 13 stations along the line, for each month, showed the general behavior of the mixed layer in this region. As the possible regime shift in the North Pacific during the mid-1970s has drawn much attention, climatological mixed layers were also produced for pre and post 1976. Interestingly, no consistent regime shift in mixed layer depth was seen all along Line P, with significant deepening for the coastal stations with potentially some shoaling farther offshore and a shift in the deepest mixed layers towards later in the year (April).

Although Station P is a very useful location with its long history of repeat measurements, but it is one location and the question can be asked how representative it is for the entire Gulf of Alaska. With the significant increase in data collection associated with the international Argo program, this study then asked if mixed layers could be mapped over the entire Gulf of Alaska using the Argo data. Mapping mixed layer depths from Argo floats onto the locations of the Line P stations showed that the mixed layer depths estimated from the Argo floats compared well with the Line P observations (for those stations beyond the continental shelf). Mixed layer depths were then mapped throughout the Gulf of Alaska from July 2001 through to April 2004. The results show strikingly different patterns of mixed layer depth across the basin from one year to the next, including the unprecedented shoaling first reported by Freeland and Cummins (2005) during the winter of 02/03.

Max Taylor Retires

Submission by Max Taylor, maxt@unixg.ubc.ca

"Max" (F.J.R.) Taylor has retired from the Departments of Earth and Ocean Sciences, and Botany (a joint appointment) , U.B.C., after serving on the faculty for 40 years. He joined the faculty at the age of 24 , fresh out of graduate school at the University of Cape Town, having been offered a job before his thesis was formally approved. His thesis was a contribution to the multinational International Indian Ocean Expedition and dealt with water masses and associated phytoplankton communities in the South West Indian Ocean, including the strong, warm Agulhas Current (a southern hemisphere Gulf Stream). His thesis was rather large - as he put it, he didn't have time to write a shorter one! At U.B.C. he continued work for the Expedition, carrying out analyses for the Smithsonian Indian Ocean Center in Washingtoi, D.C., using material collected by the R.V. "Anton Bruun" (formerly the millionairess Barbara Hutton's luxury yacht), from a much wider area encompassing the Bay of Bengal, Andaman Sea, Arabian Sea and the whole western Indian Ocean.

At the end of 1964 he joined the UBC Institute of Oceanography, headed by George Pickard. It was a happy and stimulating group. Somehow being in old WWII huts seemed to foster camaraderie. At that time the strongest group in the Institute was the Air-Sea Interaction Group, led by Bob Stewart. The Institute was remarkable for its strength in physics, both oceanographic and atmospheric, and was periodically visited by groups of foreign, particularly Russian, scientists. All members and students were expected to attend all seminars, including some mind-numbing (for biologists) 40-minute exercises in mathematical simplification. The Holy Grail for the ASI group seemed to be Minus Five-Thirds!

The Institute eventually became a Department of Oceanography and later still, was combined with Geology and Geophysics into the large Department it is today. Max's students primarily explored the phytoplankton ecology of the coastal waters of British Columbia while he continued to develop his specialty: the ecology of red tides, brown tides and other "Harmful Algal Blooms" (HABs). The B.C, coast is plagued with annual outbreaks of paralytic shellfish poisoning This multidisciplinary field of coastal oceanography has grown into a major discipline of its own, with an international society (Max was the first President), a UNESCO-sponsored program (GEOHAB) and special sections of ICES and PICES, devoted to it. Sabbaticals in Villefranche-sur-Mer, Phuket, Barbados and Oxford University, plus teaching numerous summer courses at Friday Harbor (University of Washington) and Bamfield, B.C., were happy breaks from university routine. Most recently he has become interested in paleo-ecology and particularly the evolution of marine phytoplankton, leading to a review in Science co-authored with, among others, one of his more illustrious students, Paul Falkowski of Rutgers University.

This relates to Max's other, more academic side. Early in his career he developed a strong interest in the early evolution of the cells by which we are constructed and the probable involvement of symbiosis in it. He formulated the Serial Endosymbiosis Theory, a view which gradually became the accepted hypothesis found in cell biology textbooks today. It was largely this work that led to his election as a Fellow of the Royal Society of Canada in 1996.

His teaching was recognized by three awards. Max continues as an Emeritus Professor at UBC, interacting with other faculty and post-docs, and has found an new outlet for his instructional skills, giving lectures on 91,000-ton cruise ships several times a year, a whole new meaning to going on cruises. His waterfront home study/library looks out over the tranquil waters of Deep Cove on the North Shore near Vancouver.

Oceanic Engineering in Canada - A Puzzle – What is missing?

The following is the Executive Summary of a Blue Ribbon Panel Discussion. Panelists were: Geoff L. Holland, Michael Isaacson, James R. McFarlane, and Judith A. Whittick. The full report may be found on the web site of CNC/ECOR at www.ecor.ca

Victoria British Columbia was the venue for Canada's premiere ocean technology event *OCEAN INNOVATION 2004* (October 24-26th). Organized by CCMC (www.ccmc.nf.ca), the conference featured several oceans-focused themes. One of the more enlightening activities was a panel discussion organized by the Canadian National Committee for the Engineering Committee on Oceanic Resources (CNC/ECOR). The panel brought together representatives from government, university and the private sector. The Chair of the panel, Dr. Jim Collins (University of Victoria), set the stage for the deliberations by way of a simple question: What is missing in the dynamic of Canadian ocean engineering?

While the intention was to discuss ocean engineering in Canada, the discussion actually oscillated between 'What is ocean engineering and why is it important', to 'What is ocean innovation and why is Canada so poor at it'? Based on the outcome of the panel discussion, the answers to these questions may be summarized as follows:

- Engineers need good fundamentals. Ocean engineers learn their craft 'on the job'.
- Engineering graduates prefer to work for large companies, or do they? Some graduates prefer the security of a large company; others prefer the challenges of working for a small company in a cutting edge area such as ocean technology. More research is needed to better understand where engineering graduates end up (small business, big business, government or academia).
- The ocean sector in Canada lacks long term, multi-tier relationships like those that exist in the aerospace industry (for example). Engineering students (graduate and undergraduate) are seen to be the key to these long term relationships. They represent a form of 'indirect commercialization'.
- Better collaboration between government, industry and academia is needed in order to fully leverage expenditures in ocean innovation. Major projects such as NEPTUNE/VENUS represent excellent opportunities to drive collaboration, innovation and success.
- Canada is not doing a good job in the area of ocean innovation (turning ideas into money). The failure of the Fast Cat project undertaken by BC Ferry Corporation, and the subsequent award of a contract to a German yard to build new ferries based on old technology point to major problems in how Canada is approaching opportunities for ocean innovation and ocean engineering.

- Economic activity in the oceans will drive ocean innovation and the demand for ocean engineering. This is already happening on the East Coast of Canada where offshore oil and gas development represents a significant local market driver with considerable potential for export opportunities.
- Canada needs to be a global player in ocean engineering and innovation. The ocean market is international, and other countries are much more aggressive than Canada in terms of economic nationalism.
- We must collectively set goals for ocean engineering in Canada, and invest our relative wealth wisely to achieve these goals. As the saying goes, if we don't know where we are going, then any road will take us there.

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Bulletin #16 sera distribué le 29 juin 2005. Veuillez faire parvenir vos contributions à dick.stoddart@sympatico.ca

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