



# MARINE ENVIRONMENTAL NEWSLETTER



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## COASTMAP

Imagine sailing from Newport to Block Island next week-end and you want to know the weather and ocean conditions for your trip. Or if you are helping to direct cleanup activities from an oil spill in the East Passage and need to know where the spilled oil will be heading over the next 24 hours and what sensitive resources are at risk. Both of these scenarios can be aided by a new computer software system now entering its prototype phase called COASTMAP.

ASA and the Ocean Engineering Department at the University of Rhode Island (URI) are leading the development of COASTMAP, a marine environmental monitoring, modeling and management system. COASTMAP provides an integrated linkage among real time and historical observations, modeling, and data distribution for shelf, coastal sea, and estuarine waters anywhere in the world.

COASTMAP is the natural evolution of ASA's modeling, GIS, and data software. COASTMAP combines remote data access, real-time data downloads and distribution, data analysis, GIS, and predictive modeling into a single PC-based software application.

COASTMAP can be employed as a framework customized for each client for any monitoring and modeling project

by providing direct links to oceanographic and meteorological sensors, large-scale models, as well as localized models.

As an example, a COASTMAP user will begin by seeing a GIS-based map for his or her region. When they log on, COASTMAP will automatically connect via the internet to the COASTMAP Data Server to access the latest available data for the region. This data may include:

- ◆ sensor data from the client's deployed instruments
- ◆ meteorological and oceanographic data from government programs such as NOAA's PORTS, NOAA/NOS
- ◆ weather data from the National Weather Service
- ◆ road weather information from road monitoring sensors
- ◆ model data from large scale meteorological or oceanographic models.

The user may view, analyse, and compare this data as well as data that they may locally store on their PC. The user may drag and drop data into graph windows for data comparison and analysis. New technology has allowed ASA to incorporate a variety of Matlab® based data analysis tools directly into COASTMAP. In addition, hydrodynamic, oil spill, chemical fate and transport and other pollutant and water quality models may be run directly from COASTMAP by simply listing real-time or historical data into the model as initial or boundary conditions for predictions.

### THE INSIDE STORY

- ◆ ASA Software Update
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- ◆ Conferences

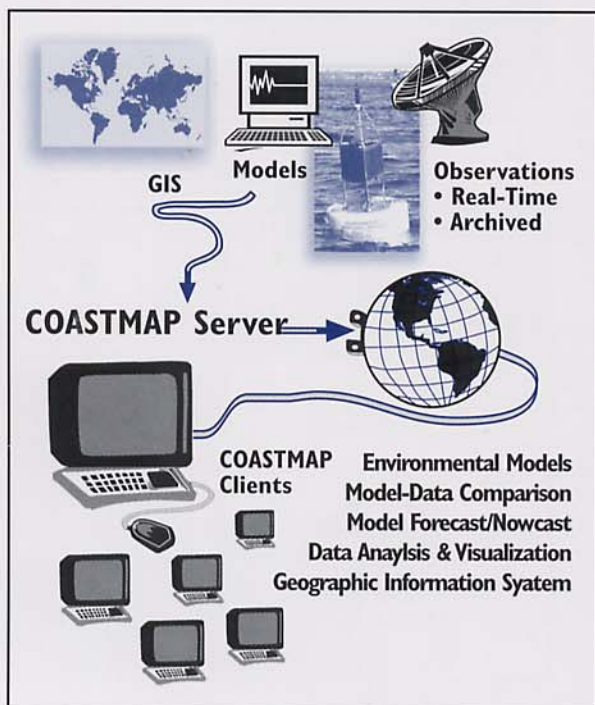


Impact from Hurricane Lili on offshore oil development, BP platform.

Dr. Malcolm Spaulding has been instrumental in combining the efforts of the URI, ASA, and other key players "To realize this vision of an integrated system for data collection, analysis, and distribution with numerical models is very exciting. The ability for modelers to link directly to real-time data for boundary conditions, data assimilation, and model validation is a major step forward."

ASA is currently using COASTMAP for an integrated observing and 3-D hydrodynamic and pollutant transport model for Narragansett Bay and adjacent southern New England coastal waters to provide high-resolution hindcasts, nowcasts, and forecasts. This project is funded by the National Ocean Partnership Program (NOPP). ASA is also working with the U.S. Naval Oceanographic Office (NAVO) to implement COASTMAP in support of special warfare, mine warfare and contaminant dispersion tracking activities..

Developments for the first quarter of 2003 will allow the COASTMAP module to be linked to a number of ASA systems including OILMAP, CHEMMAP, and HYDROMAP. This will allow users to automatically obtain current weather and ocean data and link to forecasts for improved emergency response predictions.



Waterspouts in the Gulf of Mexico during Hurricane Lili (2002).

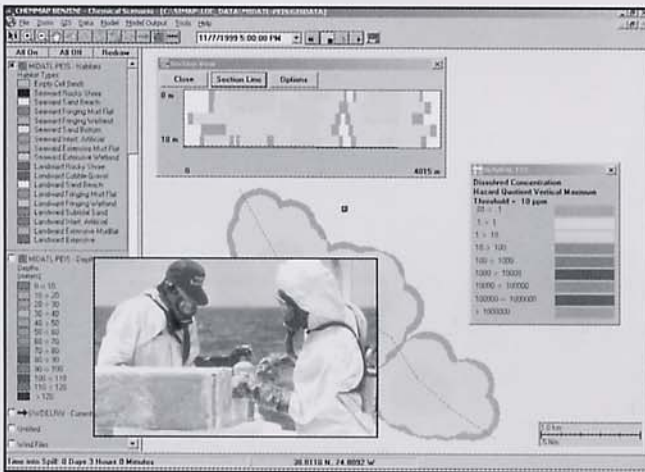
# ASA SOFTWARE NEWS

## SIMAP

ASA's spill impact model SIMAP, a three-dimensional model that estimates physical fates and biological effects of oil, now incorporates a variety of different spill response options such as mechanical recovery, dispersants and in-situ burning. Response options are needed because oil spills have the potential to cause problems not only for the environment, but also for the people who live in the area and for personnel who respond to clean up the spill.

## CHEMMAP

Chemical incidents and produced water discharge have raised many questions such as: What is the expected fate and concentrations of chemical in water? What are the ecological hazards to aquatic biota? A way to address these questions is to look at Hazard Quotients, (i.e., concentration divided by a threshold of concern), which is analogous to Predicted Effects Concentrations divided by Predicted No Effects Concentration (PEC/PNEC). A Hazard Quotient value greater than 1 signifies this area is potentially impacted, the larger the number the greater the contamination. ASA's chemical dispersion model, CHEMMAP now readily calculates Hazard Quotients. CHEMMAP provides the Predicted Effects Concentrations (PEC) for chemical products that include floating, sinking, soluble and insoluble chemicals. It can be used as a forecast, hind cast or in probabilistic mode to determine the area where the Hazard Quotient will be greater than 1 in the water column or air.



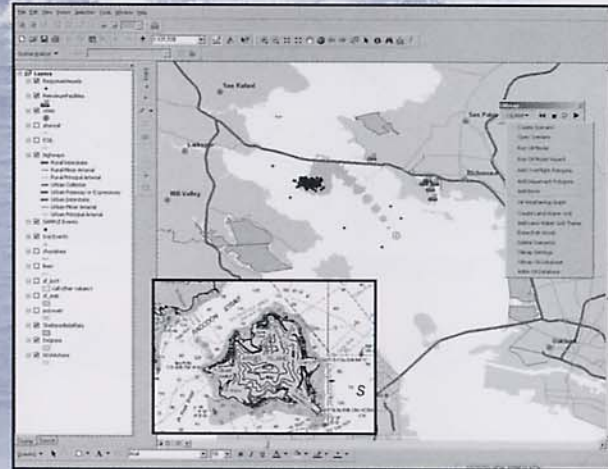
## SARMAP

The latest version of ASA's Search & Rescue model incorporates the newest drift data from the U.S. Coast Guard and search area calculations from the IAMSAR Manual (International Aeronautical and Maritime Search and Rescue Manual, International Maritime Organization, June 1999, updated July 2000). The model has been expanded to include a Lagrangian particle solution so that search areas may be calculated based on the traditional (automated manual) method or the Lagrangian particle approach.

## OILMAP

### OILMAP (Arcview 8.0)

ASA is wrapping up development of the OILMAP extension for Arcview 8.x improvements include better interface dialogues and improved oil and current data animation. The same models including the surface oil trajectory model, stochastic model and the chemical model (CHEMMAP) will be available. The OILMAP Arcview 8.x version will be available in January 2003.

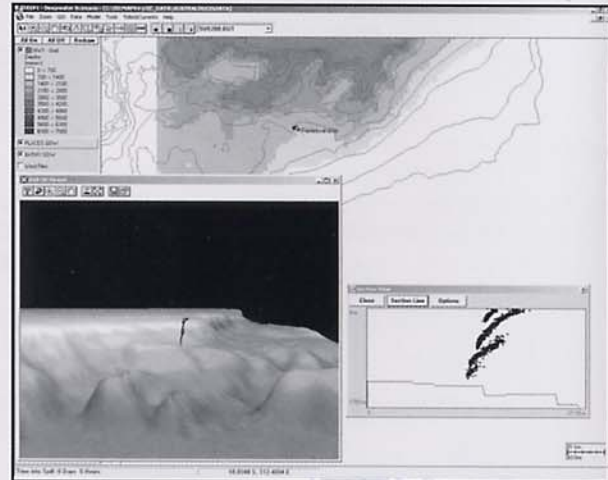


### Real-Time Data Linkage

The real-time Coastmap weather forecast module will be available within OILMAP next month. This module allows the user to select from thousands of weather stations via the internet and automatically run the oil spill model based on the latest forecasts.

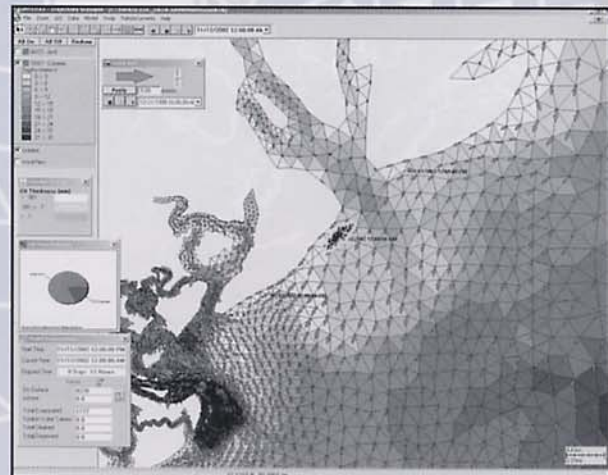
### CDOG Deepwater Blowout Model

An interface for the deepwater blowout model developed by Fanghui Chen and Poojitha Yapa of Clarkson University under joint oil industry funding has been added within OILMAP. The interface allows the user to enter/edit all of the parameters for the model including OILMAP's hydrodynamic databases. Visualization includes particle and plume animation in plan and section view and full three-dimensional views with fly-through capability.



### ADCIRC Data linkage

OILMAP has added support for current data files from this U.S. Army Corps of Engineers hydrodynamic model. This development was originally completed for the dredge material re-suspension model that ASA and the Corps of Engineers are co-developing.



# Personnel

**Craig Swanson** spoke on Impacts of Dredging at Quonset Point on Circulation and Water Quality to the senior project class in the Department of Ocean Engineering at the University of Rhode Island on 20 September. The purpose was to give the students, who are studying various engineering and environmental aspects of the proposed port, some insight into how ASA performs an environmental analysis incorporating both field data collection and modeling studies.

In August, PETROBRAS and ASA South America presented the development of OILMAP scenarios along the Brazilian Coast in the "Innovations in Science and Technology Expo". The Expo was sponsored by the Ministry of Science and Technology as a forum for discussions about new technologies and scientific developments in the environmental area. From left: Angelo Sartori, Jose Antonio Lima, Alvaro Maia, Manager of the Scientific Methods Division at PETROBRAS/CENPES, and **Eduardo Yassuda** from ASA South America.



On 8-12 July, **Nicole Whittier** traveled to the ASA South America office to train the office in the use of the chemical dispersion model CHEMMAP. While there **Eduardo Yassuda** from the ASA South America and Ricardo Serpa, Jacqueline Dadian, and Francisco Lima from ITSEMAP met with CETESB the Environmental Management Agency for the State of Sao Paulo to discuss the evaluation of chemicals selected for modeling based on the localization with respect to the terminals. This evaluation will be used in the analysis of how to respond to these chemical releases during emergency situations.



5 September **Nicole Whittier** visited Saint John, NB to present SIMAP model results regarding the Comparative Ecological Risk Assessment (CERA) of Spills in the Bay of Fundy. The CERA is part of the Environmental Impact Assessment to convert the Coleson Cove Generating Station to Orimulsion instead of heavy fuel oil. On 10 October the provincial government gave conditional approval for the conversion. For more information on this conversion you can visit <http://www.gnb.ca/0009/0377/0002/0009-e.html>.

East Asia Response Private Limited (EARL) is an international Tier Three Oil Spill Response Centre established in 1993 to provide rapid and efficient response to oil spill incidents in the Asia-Pacific region. EARL responds to oil spills with equipment and specialist staff to combat spills and provide technical support. EARL recently purchased ASA's oil spill model (OILMAP) to assist with tracking the weathering and movement of the spilled oil to assist the on-scene responders. **Mr. Sasha Zigic** from our Australian office, gave a three day OILMAP training session to 11 of EARL's personnel between the 15-17 October 2002.



**Deborah French McCay, Nicole Whittier and Jill Rowe** provided Anita George-Ares from ExxonMobil Biomedical training on SIMAP the 9-11 October. Dr. George-Ares worked with oil fates and effects models in hindcast mode, as well as physical, biological and toxicological data needs. Database tools, including importing GIS data, were also described during the training. Thus, it was a busy week for all involved!

The first week of August **Deborah French McCay, Nicole Whittier and Colleen Dalton** provided Ann Meador, Louis (Coke) Coakley and John Hampf from Florida Power & Light their annual SIMAP training. FP&L uses SIMAP for emergency response, and determining oil fates and effects in hindcast and probabilistic mode.

On 9-13 September, **Deborah French McCay and Jill Rowe** attended the NOAA Damage Assessment Center's NRDA Rapid Assessment Program (RAP) Training Workshop hosted by NOAA at the Darling Marine Center in Walpole, Maine. Dr. French McCay presented: an overview of oil toxicity, use of modeling to estimate the fates and effects of oil spills, and results of restoration scaling for the *North Cape* oil spill. During the course of the workshop, there were numerous field trips to such places as the site of the *Julie N* spill and the Pemaquid Point Lighthouse.



On 26-27 September, **Deborah French McCay** provided training on NRDA (Natural Resource Damage Assessment) modeling to Chevron-Texaco's NRDA team, lead by Mike Ammann. The training was at Chevron Park in San Ramon, California. The discussions focused on the content in the NRDA models in US regulations and on use of SIMAP and CHEMMAP as NRDA tools for injury assessment.

On 18-20 September, **Eoin Howlett and Eric Anderson** attended MARTECH 2002, the 5<sup>th</sup> International Conference and Exhibition on Maritime Accidents "Is Simulation the Answer?" held in Singapore. The conference provided a forum for discussion on views, experiences and ideas related to safety, pollution & simulation. Eric Anderson with Capt. Francis Wee and Theresa Pong from MPA.



Personnel from ExxonMobil and ERDC, U.S. Army Corps of Engineers in Vicksburg attended a two day workshop on HYDROMAP in September at ASA offices in Narragansett. HYDROMAP is ASA's re-locatable hydrodynamic model, which links directly to our oil, chemical, and sediment transport models. Dr. Michael Zelenka and Dr. Oleg Esenkov represented ExxonMobil, and Mr. Charles (Chuck) Dickerson represented the Army Corps. Dr. Billy Johnson, recently retired from the Corps' ERDC group, attended representing his new firm, Computational Hydraulics and Transport (CHT). ASA and CHT are working cooperatively to supply services in hydrodynamics and sediment transport to support dredging and port development projects.

**Mr. Eoin Howlett** had a very successful Oilmap review and User Certification test with a team from ExxonMobil's North America Regional Response organization in Tampa, Florida on 26 September. This first ever Oilmap certification focused on the appropriate use of oil spill models in emergency response, environmental data issues, and analysis of model results.



Applied Science Associates Inc.  
70 Dean Knauss Drive  
Narragansett, Rhode Island 02882-1143  
Phone: +1-401-789-6224  
Fax: +1-401-789-1932  
Email: asa@appsci.com  
www.appsci.com  
ADDRESS CORRECTION REQUESTED

ASA Aquitaine  
Castetbon, France  
+33 (0)5 59 66 2378

ASA Limited  
St. Andrews, Scotland  
+44 (0)1334 478354

Applied Science Associates – South America  
São Paulo, Brazil  
+55 11 3444-3748

Asia-Pacific Applied Science Associates  
Gold Coast, Australia  
+61 (0)7 5574-1112  
Perth, Australia  
+61 (0)8 9322-4900

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#### Personnel continued

## NEW FACES

**David Mansbach** is a scientist/ programmer with Applied Science Associates, Inc. He received his Bachelor of Art in math-physics/international relations from Brown University. He has been working on programming and model testing of our oil spill systems. In his senior research project he examined chaotic dynamics in atmospheric circulation models as well as in rectangular double-gyre ocean models.



**Claudia Santos**, a scientist at Applied Science Associates, Inc., has a Bachelor of Science in Mechanical Engineering from University Fermin Toro in Venezuela and has experience with PDVSA, the Venezuelan national oil company. Ms. Santos has been working on oil spill prediction modeling and also as a liaison with Spanish speaking clients and potential clients, both in Latin America and Spain.



**Paul Hall** is a hydrodynamic modeler with Applied Science Associates, Inc. He received his Bachelor of Arts in Physics from the College of Wooster in 1995 and will be completing his Ph.D. in Oceanography from the University of Rhode Island in the spring of 2003. Paul has extensive experience with the development and application of numerical models to study the dispersion of thermochemical plumes in a variety of environments. In addition to his modeling background, he has considerable experience with oceanographic fieldwork, having participated in a number of hydrographic surveys of estuarine flow.



## WEDDINGS

Our warm congratulations to **Jill Jennings**, one of our biologists, who married Greg Rowe on July 27 in Birmingham, Michigan. The couple took a short, but relaxing, honeymoon to Petoskey, Michigan where they were able to enjoy Little Traverse Bay and views of Lake Michigan.

## CONFERENCES

**Deborah French McCay** and **Jill Rowe** will be attending the **Society of Environmental Toxicology and Chemistry (SETAC)** conference 16-20 November in Salt Lake City, Utah. Dr. French McCay will be presenting a paper: "Probabilistic Bio-economic Modeling of Oil Spill Impacts in San Francisco Bay". Ms. Rowe will be providing instruction in spatial interpolation techniques and non-point source pollutant load estimation as part of the "Application of Geographic Information System (GIS) Technology to Water Quality Problems" short course.

**Nicole Whittier** and **Tara Aboyoum** will be attending the EPA Chemical Emergency Preparedness and Prevention Conference in Baltimore on 8-12 December. They will be demonstrating CHEMMAP as a response and contingency planning tool for both marine and land-based chemical releases.



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