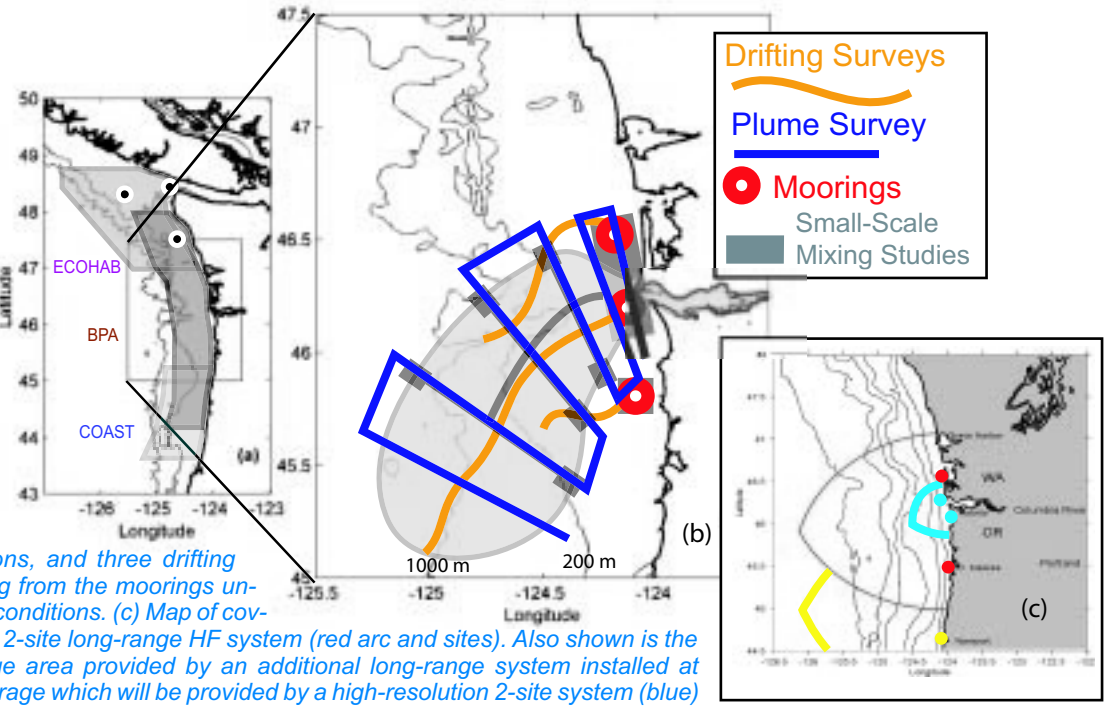

Figure 2. (a) A map of the region and other ongoing projects, including ECOHAB PNW (moorings shown with circles), BPA, and COAST (a CoOP wind-driven processes study). (b) Sketch of the RISE sampling plan, showing biogeochemical moorings, a hypothetical plume survey during upwelling conditions, and three drifting surveys emanating from the moorings under different wind conditions. (c) Map of coverage region from 2-site long-range HF system (red arc and sites). Also shown is the extended coverage area provided by an additional long-range system installed at (yellow), and coverage which will be provided by a high-resolution 2-site system (blue) to be in place during spring 2004 (pending BPA proposal).

(continued from p. 3)

and southwestward across the continental margin, while the other ship obtains regional surveys interspersed with turbulent flux profiles at key locations. During downwelling/relaxation events the ships will follow and survey plume water as it moves northward and onshore. This approach provides a Lagrangian history of mixing and biogeochemical transformations as well as the broader quasi-synoptic view. Studies will also compare between regions north and south of the plume where iron sufficiency may differ, as well as in the plume. The time-space context of observed variability will be provided by an array of moored sensors deployed in the plume as well as on the shelf north and south of the plume, and by an array of long-range HF current-mapping radars producing hourly maps of regional surface currents. Satellite AVHRR and synthetic aperture radar (SAR) will be used to determine scales of spatial variability in the plume region. Results from field studies will be combined with circulation and ecosystem models to examine variability in nutrient pathways, plankton growth rates, zooplankton grazing pressure, stratification, mixed layer depth and local entrainment or retention of plankton as well as export across the coastal margin.

The backbone for this project will be four 21-day cruises scheduled in the high-flow period (June) in each of three years (2004-06) and in a low-flow period in one year (August, 2005). The sampling is spread over three years to include interannual (including, possibly, ENSO) differences in processes related to wind and river flow variability.

COAST Wintertime Experiment

Jack Barth, Oregon State University

The COAST group successfully conducted a wintertime experiment off central Oregon. An ocean circulation model was run before the field experiment, using observed winter stratification and subject to strong southerly wind forcing, to help guide the experimental design. Wind forecasts, surface velocity maps from land-based coastal radar and satellite remote-sensed surface properties were available from a central web server throughout the experiment. Four moorings were installed across the shelf starting on 11 January 2003, one of which was equipped with a cell-phone link reporting surface meteorological measurements and subsurface velocity and temperature.

The intensive field experiment took place from 19 January to 9 February, when both the R/V Wecoma and the R/V Roger Revelle made measurements in the study region. The winds cooperated beautifully, starting with an extended period of upwelling favorable winds sustained at 30 - 40 knots for 12 days, by a week of downwelling winds sustained at 15 knots.

The quantity of measurements we were able to make in the heavily fished - it's the height of the Dungeness crab season - central Oregon region exceeded our expectations. This resulted in part from a series of pre-experiment meetings with several local crab fishermen facilitated by OSU Marine Extension agent Ginny Goblirsch based in Newport. Scientists and fishermen exchanged

(continued on page 7)

WEST

(continued from page 6)

too weak, the nutrient flux and new production is low; whereas for winds that are too strong, the plankton blooms may develop off the shelf and not be available to the shelf pelagic ecosystem. Ultimately, this can be expressed in terms of the relative time scales of blooms and of transport, so that retention zones may be very important in enhancing the availability of wind-driven productivity to shelf ecosystems. Preliminary studies indicate that periods of relaxation from upwelling winds are periods when retention on the shelf is likely, pointing to the importance of time-dependence in upwelling winds on shelf productivity. Further, retention through vertical migration behavior is important for organisms at higher trophic levels - organisms that are capable of significant swimming behavior and that exhibit longer bloom time scales. Finally, we are working to evaluate the importance of localized retention zones in enhancing productivity along the coastlines north and south.

COAST

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information about how they each conduct their operations. We asked that the fishermen try and help keep down the number of pots in a 1/2-mile wide cross-shelf strip where we would place our moorings and concentrate the ship sampling. Posters announcing our sampling plans and asking for cooperation to minimize gear conflicts were posted at the docks and distributed by the OSU Marine Extension agent. This strategy evidently paid off, since there were less pots on our main survey line. Both the Wecoma towing SeaSoar and the HTI bioacoustics sled, and Revelle, towing a turbulence profiler and a pumped vertical profiling system, were able to make measurements while carefully dodging crab pots. We coordinated daylight towing operations with nightime fixed station work to maximize our sampling time.

The crews of both the Wecoma and Revelle did an outstanding job helping us avoid fishing gear, working overtime to insure the success of our project. The moorings were all recovered on 16-17 March, marking the end of a very successful COAST wintertime experiment.

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Gordon Research Conference on Permeable Sediments

(continued from page 2)

Sessions 5a and 5b. Case studies (the examples)
Discussion leader (5a): Evgeny Kontar (Shirsov Institute of Oceanology, Russia)
Featured speakers:
Henry Bokuniewicz (Stony Brook) Circulation and Salt Dispersion in Coastal Aquifers: The Classification of Subterranean Estuaries
Willard Moore (University of South Carolina) Use of Radium Isotopes to Infer and Measure Fluid Exchange Between the Seabed and Overlying Ocean
Discussion leader (5b): Jan-Marcin Weslawski (Polish Academy of Sciences)
Anthony D'Andrea (Oregon State Univ.) The Role of Tidal Mixing and Bioturbation in Controlling the Efficiency of Permeable Sands as Organic Matter Biofilters: An Intertidal Example
Allen Burton (Wright State Univ.) The Critical Role of Permeable Sediments in Risk Assessments of Streams
Wiebke Ziebis (Scripps Institution of Oceanography) Convective Porewater Transport at Shallow-water Hydrothermal Vents and Effects on Geochemical Gradients, Biogeochemical Processes and Associated Microbial Communities

Sessions 6a and 6b. Methods and modeling (the techniques)
Discussion leader (6a): Frank Sansone (Univ. Hawaii)
Featured speakers:
Session 6a - methods:
Clare Reimers (Oregon State University) In Situ Measurements of Solute Transport Velocities in Permeable Shelf Sand Ripples
Makoto Taniguchi (Nara Univ.) Interactions Between Groundwater and Seawater in Permeable Sediments
Discussion leader (6b): Leslie Smith (University of British Columbia)
Session 6b - models:
Peter Berg (University of Virginia) Oxygen Uptake by Aquatic Sediments Measured With a New Eddy Correlation Technique
Gia Destouni (Stockholm University, Sweden) Temporal Variability of Submarine Groundwater Discharge: Model Results and Implications
Arzhang Khalili (Max Planck Institute) Modeling Porewater Exchange in Permeable Sediments

Session 7. Final conclusions (summary and outlook)
Discussion leader: Richard Jahnke (Skidaway Institute of Oceanography)
Featured speaker:
Bernie Boudreau (Dalhousie University) Where Do We Go from Here?

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