



Newsletter of Coastal Ocean Processes



Announcement and Call for Participation
Buoyancy-Driven Transport Processes (CoOP) Workshop
6-8 October, 1998 - Salt Lake City, Utah
Deadline for Receipt of Applications is 14 August, 1998.

CoOP is an interdisciplinary scientific program formulated to study basic scientific questions in the coastal ocean.* The goal of CoOP is to obtain a new level of quantitative understanding of the processes that dominate the transports, transformations and fates of biogeochemically important matter over the continental margins. The basic objectives of CoOP are to understand:

- ◆ The quantitative mechanisms, rates and consequences of cross-margin transport of momentum, energy, solutes, particulates and organisms;
- ◆ The atmospheric and air-sea interaction processes that affect biological productivity, chemical transformations and cross-margin solute and particulate transport;
- ◆ The roles of transport processes that couple the benthic and pelagic zones of the continental margin;
- ◆ The nature, effects and fates of terrestrial inputs of solutes, particles and productivity in the coastal ocean;
- ◆ The transformations of solutes, particulates and organisms across the continental margin.

The goal of the Salt Lake City workshop is to create a document that will define a possible CoOP process study on buoyancy-driven transport. The envisioned field study must be fully interdisciplinary and focus on the CoOP program goals. The document should address needed modeling, specific choices (and motivations) for geographic locations and planned observations. The workshop report will delineate the important CoOP relevant scientific problems to be addressed, develop a cohesive interdisciplinary approach to these problems, and establish research priorities. The workshop is open to all interested scientists. Participants will cover their own travel, meal and lodging expenses. In order to plan meeting space and to get a reduced rate on hotel rooms, we ask that interested individuals indicate their willingness to participate in the workshop by filling out the on-line form found on the CoOP website (www.hpl.umces.edu/coop). If you do not have Web access, see page 7 of this newsletter.

*The specific goals of CoOP are described in the CoOP Report No. 2, "A Science Prospectus".

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**Newsletter Issue No. 8
July 1998**

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The purpose of the Coastal Ocean Processes (CoOP) Newsletter is to inform the ocean science community of current and planned CoOP activities. CoOP is funded by the National Science Foundation, the Office of Naval Research and the National Oceanic and Atmospheric Administration's Coastal Ocean Program. We view CoOP as a broad-based U.S. program in coastal oceanography. Thus this newsletter also contains information on coastal research activities from various Federal and State programs. We welcome your comments and suggestions regarding the CoOP newsletter.

The CoOP newsletter is published periodically by the Coastal Ocean Processes program and edited by Jane Hawkey. If you would like to be on our mailing list, please send your name and address via Internet to: "hawkey@hpl.umces.edu".

VISIT OUR WEBSITE at:
www.hpl.umces.edu/coop



CoOP's Wind-Driven Transport Processes Study

The Coastal Ocean Processes (CoOP) program held an open scientific workshop, "Wind-driven transport processes on the U.S. west coast" in Portland Oregon July 14-16, 1993. The goal of the workshop was to create a document that would define a CoOP process study involving cross-margin transport processes centering on the predominantly wind-driven currents of the United States west coast continental shelf and slope. The 70 attendees of the meeting were divided into various working groups (Bottom Boundary Layer Processes, Inner Shelf Processes, Upper Ocean Processes, Interior Water Column Processes, Frontal Processes) which discussed important interdisciplinary aspects of a wind-driven transport study. The workshop report by Bob Smith and Ken Brink (CoOP Report No. 4, 1994) includes the recommendations of these working groups as well as a science plan based on the recommendations.

The CoOP program now plans to begin a major process study of wind-driven transport on the U.S. west coast. The CoOP Scientific Steering Committee felt that it was appropriate to update the Wind-Driven Transport Science Plan to include relevant findings since the 1993 workshop and to revise, if necessary, the important research objectives of a proposed CoOP study. An editorial committee of: John Allen, Nick Bond, Peter Franks, Claire Reimers, Bob Smith and Dick Sternberg revised the original 1994 Wind-Driven Transport Science Plan, with additional input from the CoOP Scientific Steering Committee. The revised CoOP Wind-Driven Transport Science Plan (CoOP Report No. 6) is being distributed this summer.

It is anticipated that the National Science Foundation will soon release an Announcement of Opportunity (AO) for proposals submitted to study wind-driven transport processes in the NE Pacific as part of the CoOP program. This AO will be mailed to scientists as well as posted on the CoOP website (www.hpl.umces.edu/coop).

New Vessels on the Horizon for Coastal Research

Dr. Richard A. Jahnke, Skidaway University

Efforts are currently underway at Skidaway Institute of Oceanography and Woods Hole Oceanographic Institution to provide new coastal research vessels for the academic community. While several milestones remain for each project, these initiatives are well on their way to provide new ships in the relatively near future.

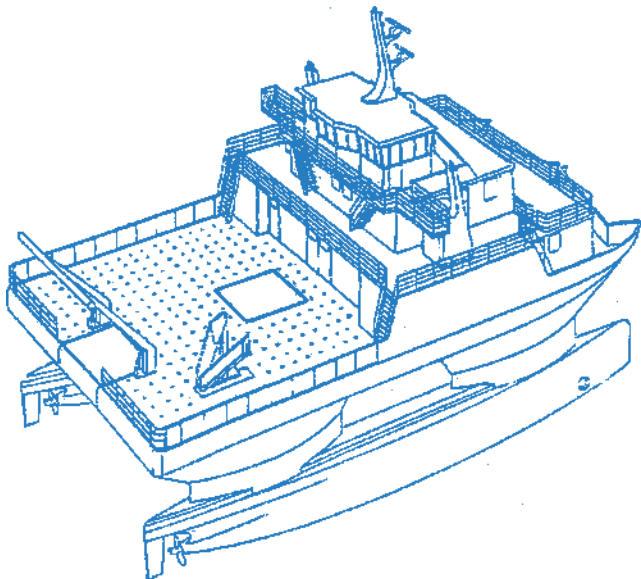
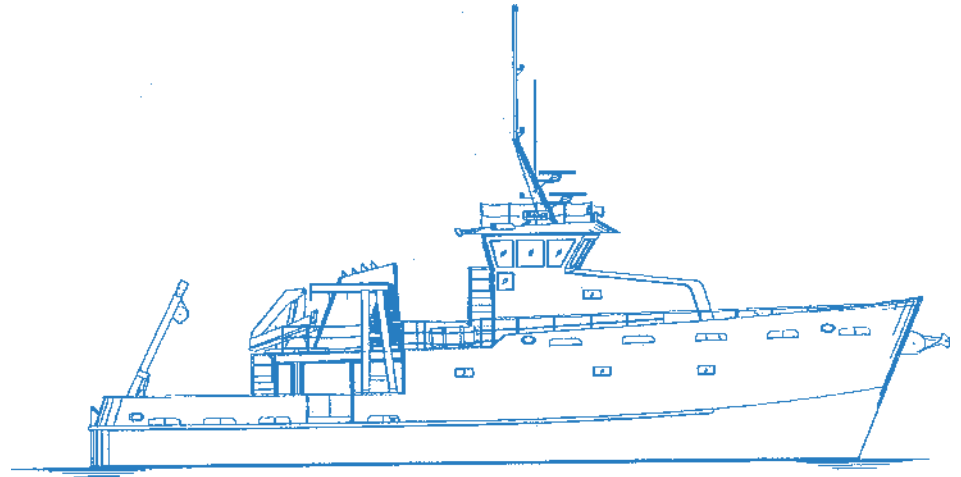
Skidaway Institute has completed the design of a 90 foot, mono-hull vessel to serve as a general purpose research platform in the river, estuarine, sound and continental shelf regions of the southeastern U.S. The vessel is designed to have a maximum draft of 8 feet, which will allow it to operate in the many shallow environments that characterize this coastal region. To accommodate multi-disciplinary studies, the vessel design includes approx. 520 sq.ft. of dry and wet enclosed laboratory space and 600 sq.ft. of fantail work space. Ship accommodations include 18 berths, in 2-berth cabins and galley space for 16. It is likely that four berths will be reserved for the ship's crew. Storage of expendables is designed to accommodate expeditions of 14 days.

Propulsion will be supplied by twin, electronically-controlled diesel engines connected by straight shafts to fixed-pitch propellers. The simplicity of this design should minimize maintenance costs. Further station keeping will be provided by a tunnel bow thruster. Scientific operations will be performed with a standard trawl winch equipped with 1/2 inch wire, articulated crane, and two CTD winches equipped with conducting wire. Drums on the conducting winches and "A" and "J" frame shives are sized to not exceed the bend radius of fiber optic and multiconductor wire that may be required in the future.

Woods Hole Oceanographic Institution is in the processes of designing a Small Waterplane Area Twin Hull (SWATH) coastal research vessel to operate in the New England coastal region. The SWATH design should permit operations in most

weather conditions that occur along the northeastern coast. Overall, it is anticipated that the ship will have a variable draft (10-15 feet) and a cruising speed of 13 knots. Accommodations for 16 persons are planned for relatively short expeditions (15 days). Interior science spaces include a general purpose laboratory (360 sq.ft.) and a small computer room (<90 sq.ft.). The SWATH design results in a very generous outside working deck space of approximately 2300 sq.ft. Space and sufficient buoyancy is provided for at least 1 standard 20 ft. shipping container.

The different designs of these vessels exemplify the different missions and operating conditions of these two coastal areas. Collectively, they will significantly expand the capabilities of the coastal fleet, increasing science opportunities and promoting coastal research.



Episodic Events: Great Lakes Experiment (EEGLE)

Dr. Brian J. Eadie, NOAA, GLERL

In August, 1997 the NOAA-Coastal Ocean Program and National Science Foundation-Coastal Ocean Processes began a jointly funded program to study the impact of episodic plume events on sediment and constituent transport and subsequent ecological effects in Lake Michigan. This program, Episodic Events: Great Lakes Experiment (EEGLE), is being coordinated by NOAA-GLERL and is scheduled to include three field years and two years of subsequent interpretation and product development.

EEGLE program components include a retrospective analysis of satellite imagery, water intakes, and other historical data, process and survey cruises, moored current meters, traps and data acquisition instruments and coupled hydrodynamic/sediment transport/ecological modeling. Our goal is to characterize the materials in the plume, infer their sources, and assess their potential impact on the cycling and transport of nutrients and contaminants.

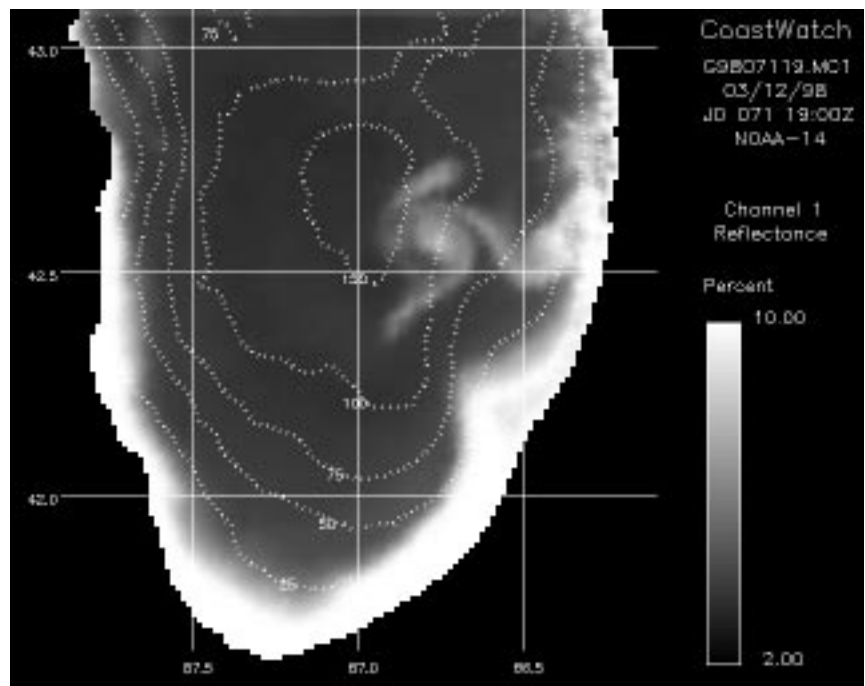
During this first year, the program was fortunate to have the opportunity to examine a very large event as shown in the figure. Only once before, in its 37 years of intake turbidity records, did the St. Joseph water treatment plant experience an event of similar magnitude. Although not scheduled to be a full field year, efforts were made to exploit the opportunity of examining this rare event. Seventeen cruises on four different vessels totaling approximately 60 days and a one day Coast Guard helicopter drifter deployment flight have been completed so far.

In addition to extensive sampling of the plume and background environments, several new instruments underwent testing during this first year, some with immediate success, while others are still going through modifications. Most recently 11 sequencing traps were successfully retrieved providing 230 samples, including good coverage of the event. Preliminary findings from our efforts include: 1) high particle fluxes associated with the event and synchronized throughout the basin; and 2) elevated phosphorus concentrations, low primary production (due to light limitation), elevated heterotrophic rates, elevated Th-234 activity (its use as a tracer looks promising), and elevated PCB concentrations within the plume region.

New activities have been added to the EEGLE program: 1) the EPA-Great Lakes National Program Office has provided their 180' research vessel for a winter cruise and funded an important study to examine the impact of the plume on PCB cycling; and 2) NOAA-GLERL has provided funding for the Physical Group of the Canada Centre for Inland Waters to deploy 5 ADCP current meters and 2 meteorological towers and also funding for the purchase and deployment of pressure sensors to measure waves under ice.

Survey cruises will continue throughout the summer to evaluate the plume's effect on the lake ecology. Current meters (15) are scheduled for retrieval in June and deployment of more extensive mooring arrays (current meters and traps) are scheduled for summer/fall. Most of our planned effort in the summer will be the interpretation of the first year's data. This will be discussed and integrated at our next all-hands meeting, Oct 14-16, 1998. Further interpretation will be made as part of a Special Session at the Feb, 1999, ASLO meeting in Sante Fe, NM.

Further program information, including details of the program's products and outreach activities, is available on the web at: www.glerl.noaa.gov/eeGLE.



Lake Michigan Turbidity Plume Image. NOAA-14 AVHRR Visible Imagery, March 12, 1998.

Keweenaw Interdisciplinary Transport Experiment in Superior (KITES)

Dr. Sarah Green, Michigan Technological University

This spring KITES project scientists and students began fieldwork off Lake Superior's Keweenaw Peninsula aboard the R/V Blue Heron and R/V Laurentian. Our focus is the Keweenaw Current, a coastal jet that flows northeast along the peninsula with reported velocities up to 1.5 kts. In order to study the current dynamics and its impact on the nearshore and offshore ecosystems, we have defined three primary and two secondary transects normal to the coastline for intensive sampling. Since early May, 9 current moorings, 9 sediment traps, and 1 BASS (benthic acoustic stress sensor) have been deployed in the lake. We have collected over 250 CTD casts, 50 optical profiles, and more than 200 water samples, as well as dozens of plankton and larval fish tows and detailed sediment cores at 8 sites.

Our initial look at the data suggests that the thermal regime of the lake is approximately 6 weeks ahead of normal following an extremely mild winter and early spring. The thermal bar (shore-parallel 4°C isotherm) was well defined and dynamic throughout the month of May. Off-shore propagation of this front was obvious at Ontonagon, our shallowest transect, where the water depth is only 130 m at 21 km from shore. On May 11th the 4°C isotherm was vertical and already out to 17 km offshore, by May 19th it moved out to 21 km, and on May 27th the region was stratified with 9°C surface water out to 25 km (Fig. 1). Further north at Eagle Harbor steeper bathymetry (240 m at 9 km offshore) results in much slower heating of the water column; by May 26th the 4°C isotherm had propagated only 4 km offshore.

Dissolved organic carbon (DOC) concentrations were as high as 640 $\mu\text{M C}$ in the Ontonagon River, but fell off abruptly within 100 m of the mouth to about $125 \pm 1 \mu\text{M C}$ in the surface water. On the Ontonagon transects DOC concentrations tracked the thermal structure, both with depth and distance off-shore (Fig. 2); however, this observation does not generalize to all the transects. DOC concentrations as low as $102 \pm 2 \mu\text{M C}$ were measured on the Eagle Harbor transect.

We look forward to comparing data from up-coming July cruises with these early results. More information on KITES is available at <http://chmac2.chem.mtu.edu/KITES/kites.ssi>.

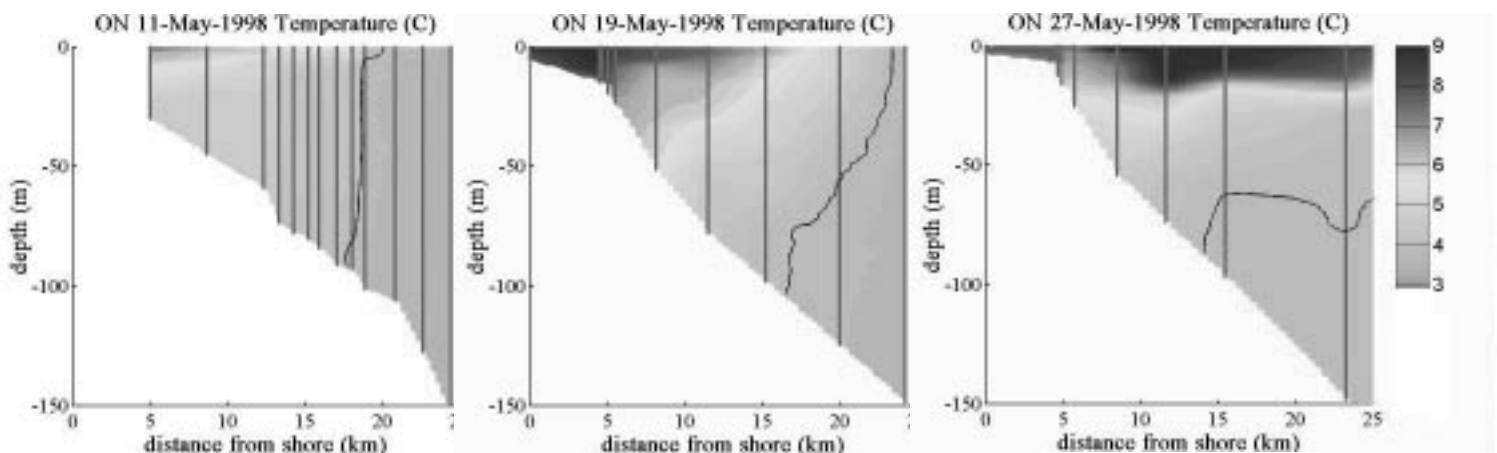


Fig 1. Progression of the thermal bar on the Ontonagon North transect on (a) May 11th (b) May 19th and (c) May 27th, 1998; vertical lines represent CTD stations, jaç ontours are shaded.

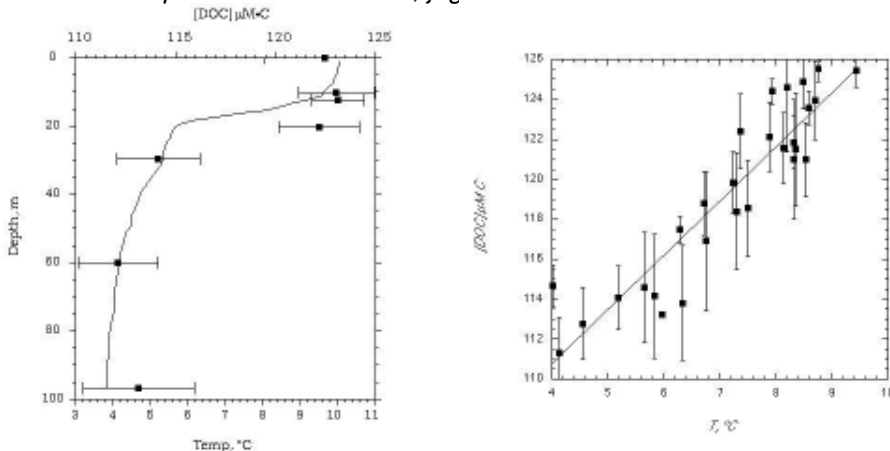


Fig 2. DOC concentrations as a function of (a) depth for the Ontonagon South transect, 17 km off-shore on May 28th, and (b) temperature for Ontonagon North, all stations (mainly surface water) May 18th.

CoOP Welcomes New Scientific Steering Committee Members

Coastal Ocean Processes welcomes the newest members of the Scientific Steering Committee (SSC): Dr. Gail Kineke of Boston College (7/98), Dr. Billy Moore of University of South Carolina (6/98), and Dr. Elise Ralph of University of Minnesota (1/98). Visit the CoOP web site (<http://www.hpl.umces.edu/coop>) for a brief introduction to their backgrounds and fields of study.

Additionally, many thanks to Dr. Rick Jahnke and Dr. Tom C. Johnson who have recently completed their terms on the SSC. Coastal Ocean Processes and the community of coastal scientists have benefited from their time, effort and wisdom in guiding the CoOP program.

1998 CoOP Scientific Steering Committee

◆ **Bruce Albrecht**

University of Miami
Marine Meteorology

◆ **Nick Bond**

NOAA/PMEL
Marine Meteorology

◆ **Cheryl Ann Butman**

Woods Hole Oceanographic Institution
Biological Oceanography

◆ **David Cacchione**

U.S. Geological Survey
Geological Oceanography

◆ **Peter Franks**

Scripps Institution of Oceanography
Biological Oceanography

◆ **Carl Friehe**

University of California-Irvine
Marine Meteorology

◆ **Susan Henrichs**

University of Alaska
Chemical Oceanography

◆ **Barbara Hickey**

University of Washington
Physical Oceanography

◆ **Paul Hill**

Dalhousie University
Geological Oceanography

◆ **Gail Kineke**

Boston College
Geological Oceanography

◆ **Steve Lohrenz**

University of Southern Mississippi
Biological Oceanography

◆ **Billy Moore**

University of South Carolina
Chemical Oceanography

◆ **Elise Ralph**

University of Minnesota
Physical Oceanography

◆ **Clare Reimers**

Rutgers University
Chemical Oceanography

◆ **Mike Roman - Chair**

University of Maryland
Biological Oceanography

◆ **Tom Royer**

Old Dominion University
Physical Oceanography

◆ **Dave Schwab**

NOAA/GLERL
Physical Oceanography

Buoyancy-Driven Transport Workshop (continued from page 1)

AGENDA

Plenary Session:

Introduction

Keynote Presentations:

1. Seasonal and interannual variation in precipitation and winds; causes and effects on circulation processes of buoyancy-driven shelves
2. Buoyancy-driven circulation and cross-shelf transport
3. Chemical tracers and transformations on buoyancy-driven shelves
4. Nutrient sources and their influence on food-web dynamics on buoyancy-driven shelves
5. Flux and fate of sediments on shelves with point and line sources

Working Group Sessions:

Charge to Working Groups

Working Groups

1. Freshwater inflow and cross-shelf transport processes
2. Wind effects on shelf circulation and cross-shelf transport
3. Roles of fronts and eddies in cross-shelf transport
4. Biogeochemical transformations and cross-shelf transport
5. Benthic-pelagic coupling and cross-shelf transport

Synthesis & Priority: reporting out, preparation and distribution of text addressing:

- ◆ elements of science plan
- ◆ high priority items (ranked)
- ◆ instrumentation needs
- ◆ modeling issues
- ◆ location of study
- ◆ data needs
- ◆ vessel and facilities needs

HOTEL RESERVATIONS

To reserve hotel accommodations in Salt Lake City for the Workshop, contact the Best Western Olympus Hotel by *September 4, 1998*.

Please specify that you are attending the CoOP Buoyancy-Driven Transport Workshop. You will need to provide credit card information to guarantee your reservation. At that time, a confirmation number will be issued to you by the hotel.

Best Western Olympus Hotel

161 West 600 South

Salt Lake City, UT 84101

1-800-426-0722 or 1-801-521-7373

Workshop Organizing Committee: Susan Henrichs (Chair), Bruce Albrecht, Steve Lohrenz, Rich Garvine, Gail Kineke, Mike Roman

Deadline for Receipt of Applications is 14 August, 1998.

We would prefer that you register your interest in participating in the Workshop by completing the on-line form at CoOP's website (www.hpl.umces.edu/coop). But if you do not have Web access, then please complete and mail this form to: Jane Hawkey, CoOP Office, UMCES-Horn Point Lab, P.O.Box 775, Cambridge, MD 21613

Print Name: _____

University/Organization: _____

Position/Title: _____

Office Address: _____

City: _____ State or Province/Country: _____ Zip: _____

Phone: (_____) _____ Email: _____

Please indicate your particular activities and research interests relevant toward participation in and contribution to this Workshop:

Signature: _____ Date: _____

CoOP Publications

Publications can be requested by contacting Jane Hawkey at the CoOP office.

Report
No.

1. *Coastal Ocean Processes (CoOP): Results of an Interdisciplinary Workshop* (1990). Report prepared by the CoOP Interim Steering Committee. Contribution number 7584 from the Woods Hole Oceanographic Institution, Woods Hole, MA.
2. *Coastal Ocean Processes: A Science Prospectus* (1992). Report prepared by the CoOP Steering Committee. Woods Hole Oceanographic Institution Technical Report, WHOI-92-18.
3. *Long Time Series Measurements in the Coastal Ocean: A Workshop* (1993). C.L. Vincent, T.C. Royer, and K.H. Brink. Coastal Ocean Processes (CoOP) Report No. 3, Nov., 1993. Woods Hole Oceanographic Institution Technical Report, WHOI-93-49.
4. *Coastal Ocean Processes: Wind-Driven Transport Processes on the U.S. West Coast* (1994). R.L. Smith and K.H. Brink. Coastal Ocean Processes (CoOP) Report No. 4, Oct., 1994. Woods Hole Oceanographic Institution Technical Report, WHOI-94-20.
5. *Coastal Ocean Processes (CoOP): Cross-Margin Transport in the Great Lakes* (1995). J.V. Klump, K.W. Bedford, M.A. Donelan, B.J. Eadie, G.L. Fahnenstiel and M.R. Roman. Coastal Ocean Processes (CoOP) Report No. 5. Technical Report number TS-148-95 from the University of Maryland Center for Environmental Science, Cambridge, MD.
6. *Coastal Ocean Processes: Wind-Driven Transport Science Plan* (1998). Coastal Ocean Processes (CoOP) Report No. 6. Technical Report number TS-170-98 from the University of Maryland Center for Environmental Science, Cambridge, MD.



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