

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 30 SEP 2003		2. REPORT TYPE		3. DATES COVERED 00-00-2003 to 00-00-2003	
4. TITLE AND SUBTITLE Aha Huliko'a Workshop Series				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Hawaii,,Department of Oceanography,1000 Pope Road, MSB 429,,Honolulu,,HI, 96822				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT The goal of the workshop series is to review the state-of-the-art, to identify areas of ignorance, and to make recommendations for future research on a topic or topics relevant to the Office of Naval Research.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 3	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

‘Aha Huliko’a Workshop Series

Peter Muller
University of Hawaii
Department of Oceanography
1000 Pope Road, MSB 429
Honolulu, HI 96822
phone: (808)956-8081 fax: (808)956-9164 email: pmuller@hawaii.edu

Grant Number: N00014-00-1-0168

LONG-TERM GOAL

The goal of the workshop series is to review the state-of-the-art, to identify areas of ignorance, and to make recommendations for future research on a topic or topics relevant to the Office of Naval Research.

OBJECTIVES

The participants of the 2003 workshop “*Near Boundary Processes and their Parameterization*” were tasked to assess the state of our understanding of the physical processes that link boundary layers and the ocean interior and that may need to be parameterized in ocean models. These processes include wave radiation, flow separation, secondary circulations, subduction and other complex and not yet fully understood processes near the sea surface, lateral boundaries and the ocean bottom.

APPROACH

Conduction of workshop and publication of workshop proceedings and a meeting report in a professional journal.

WORK COMPLETED

A four-day workshop on “*Near Boundary Processes and their Parameterization*” was held from January 21st through the 24th, 2003, in Honolulu, Hawaii. The workshop brought together about twenty five observationalists, theoreticians, and numerical modelers. It was convened by the PI and Christopher Garrett. The workshop focused on the interaction of boundary layers with the interior. Topics included:

- (1) The control of the ocean by boundary processes,
- (2) Near boundary mixing,
- (3) Overflows,
- (4) Radiation into the ocean interior of internal tides and near-inertial internal waves,
- (5) Numerical simulations of processes,
- (6) Form drag,
- (7) Evolution of vortical flow structures,
- (8) Ekman dynamics,
- (9) Subduction,
- (10) The role of mesoscale eddies, and

- (11) Inclusion of boundary layers and near boundary processes in ocean models.

The lectures of the participants will be published in Müller and Henderson (2003). A summary of the workshop will appear in Müller and Garrett (2003).

RESULTS

The ocean is mostly driven by forces that act at its boundaries and communicate their influence to the ocean interior via boundary layers and near-boundary processes. These layers and processes need to be understood and parameterized in a form that can be implemented into ocean models. The participants recognized:

- the heterogeneity of boundaries and processes there, making sampling and parameterization difficult,
 - the value of numerical studies of processes,
 - the value of transforming process understanding into useable and efficient but accurate parameterizations,
 - the importance of verifying proposed parameterizations by direct measurement of eddy fluxes rather than just by appealing to circumstantial evidence that a scheme “seems to work”.
-
- Particular questions concerning poorly understood and important processes where observational and theoretical investigation would be fruitful included these:
 - what are the mechanisms of exchange between bottom boundary layers and the ocean interior – does restratification occur in situ or by vigorous exchange?
 - what is the eddy momentum flux near boundaries and what processes are responsible for it?
 - what is happening in canyons and abyssal channels, and what is the role of small-scale topographic features within them?
 - what processes determine the behavior of the region below the base of the surface mixed layer?

IMPACT/APPLICATIONS

PUBLICATIONS

Müller, P. and D. Henderson, 2003: “*Near Boundary Processes and their Parameterization*” Proceedings, 'Aha Huliko'a Hawaiian Winter Workshop, School of Ocean and Earth Science and Technology, Special Publication, (to be published)

Müller, P. and C. Garrett, 2003: *Near Boundary Processes and their Parameterization*. *Oceanography*, (submitted)