

## FINAL TECHNICAL REPORT

### Stochastic Forcing of Quasi-Geostrophic Eddies (ONR Contract #: N00014-91-J-1778)

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The overall objective of this project was to understand to what extent the low frequency variability in the ocean is due to stochastic atmospheric forcing. Specifically, the project aimed at:

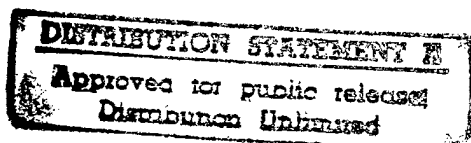
- confirming the notion that most of the large-scale barotropic quasi-geostrophic eddy field in the deep ocean away from unstable mean currents is stochastically forced by fluctuations in the atmospheric windstress, and
- exploring the extent to which the low frequency variability found in coupled ocean-atmosphere general circulation models is stochastically forced.

The following specific tasks were completed:

- Determination of the Green's function for barotropic Rossby waves in a basin, channel, and an infinite ocean.
- Comparison of coherence maps observed during BEMPEX (Barotropic Electromagnetic and Pressure Experiment) with those obtained from a stochastic forcing model developed by the PI
- Analysis of the output from a 1000y run of a coupled ocean-atmosphere general circulation model (the Millennium run) and comparison with the stochastic forcing model developed by PI.

The results have been, or will be published in:

1. Lippert, A. and P. Müller, 1995: Direct atmospheric forcing of geostrophic eddies, Part II: Coherence maps. *J. Phys. Oceanogr.*, **25**, 106-121.
2. Müller, P., 1996: Stochastic forcing of quasi-geostrophic eddies. In: *Stochastic Modeling in Physical Oceanography*. Birkhäuser. (accepted)
3. Müller, P., 1996: Stochastic forcing of oceanic motions. In: *Stochastic Models in Geosystems*. IMA volumes, Springer-Verlag. (accepted)
4. Frankignoul, C., P. Muller, and E. Zorita, 1996: A simple model of the decadal response of the ocean to stochastic wind forcing. *J. Phys. Oceanogr.* (to be submitted)



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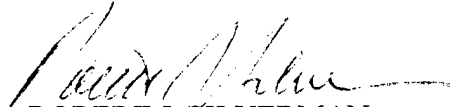
4330  
ONR 247  
11 Jul 97

From: Director, Office of Naval Research, Seattle Regional Office, 1107 NE 45th St., Suite 350,  
Seattle, WA 98105

To: Defense Technical Center, Attn: P. Mawby, 8725 John J. Kingman Rd., Suite 0944,  
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Subj: RETURNED GRANTEE/CONTRACTOR TECHNICAL REPORTS

1. This confirms our conversations of 27 Feb 97 and 11 Jul 97. Enclosed are a number of technical reports which were returned to our agency for lack of clear distribution availability statement. This confirms that all reports are unclassified and are "APPROVED FOR PUBLIC RELEASE" with no restrictions.
2. Please contact me if you require additional information. My e-mail is [silverr@onr.navy.mil](mailto:silverr@onr.navy.mil) and my phone is (206) 625-3196.

  
ROBERT J. SILVERMAN



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February 20, 1996

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To Whom It May Concern:

Enclosed please find a copy of the final technical report for the project entitled, "Stochastic Forcing Quasi-Geostrophic Eddies," by Peter Muller. This report is for research funded by the Office of Naval Research, Grant No. N00014-91-J-1778.

Sincerely,

Sharon Sakamoto  
Assistant to P. Müller