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K. Shafer Smith

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New York University
Courant Institute of Mathematical Science
251 Mercer Street, New York, NY 10012

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14. ABSTRACT

This award supported preliminary simulations necessary to aid in the planning stages of the Scalable Lateral Mixing and Coherent Turbulence DRI. The PI performed a series of simulations using a high-resolution model of mesoscale stirring of submesoscale features. In particular, the model used a series of baroclinically unstable mean flows and stratification profiles, relevant to a planned tracer release experiment, to generate an active mesoscale eddy field. The simulation also included a three-dimensional tracer forced by mean lateral gradients. The results indicate that mesoscale stirring can generate ample vertical as well as horizontal structure in the steady-state tracer. The structure is sufficient to explain observed T-S finescale measurements in some locations.

15. SUBJECT TERMS

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a. REPORT	b. ABSTRACT	c. THIS PAGE			K. Shafer Smith
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Final Report: Collaborative Proposal: Study of the temperature and salinity fine-scale structure in the ocean

Award Number:	**N00014-08-1-1074**
Principal Investigator:	K. Shafer Smith
Institution:	New York University
	Courant Institute of Mathematical Sciences
	251 Mercer Street
	New York, NY 10012
	Phone: (212) 998-3176
	Fax: (212) 995-4121
	Email: shafer@cims.nyu.edu

This is a final technical report on the work performed under ONR award N00014-08-1-1074 during the interval from July 2008 through the end of June 2009.

Background: The proposal that led to this funding was submitted to the standard ONR Physical Oceanography core program. The program managers (Theresa Paluszkiewicz and Scott Harper) did not fund the proposal outright, but gave the collaborative PIs Smith and Raf Ferrari (MIT) seed money to enable our participation in the planning stage of the Scalable Lateral Mixing and Coherent Turbulence DRI. The funding for PI Smith covered three weeks of summer salary, used in August 2008.

Objective: The original objective of the proposal was to investigate mesoscale generation of T-S fine-scale structure in models and in data from NATRE and SFTRE. The effective objective was to allow participation in the planning stage of the above-mentioned DRI.

Approach: The intended approach was a combination of numerical modeling and analysis of existing data sets. The PI used his support to do preliminary numerical simulations of the stirring of T-S fronts by mesoscale eddies, using a high-resolution quasigeostrophic model, in the presence of baroclinically unstable mean flows relevant to the tracer release experiments proposed as part of the DRI mentioned above.

Accomplishments: The results of the simulations indicate that mesoscale eddies likely play an active or dominant role in the generation of both horizontal and vertical gradients in released and naturally-occurring tracers. The structure is sufficient to explain observed T-S finescale measurements in some locations.

Publications: None, as of yet, that are the direct result of this funding.