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14. ABSTRACT
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A Chiometer and a New Winch for SWIMS3

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LONG-TERM GOALS

Our goal is to understand mixing in shallow water, i.e., the upper 500 to 1000 m, by observing it in relation to the larger-scale processes producing it. Regimes of interest include open-ocean fronts, continental slopes and shelves, ridges and canyons.

OBJECTIVES

This project will add a chiometer to SWIMS3, our depth-cycling towed body, to observe scalar microstructure in addition to the larger-scale variables currently measured. It will also replace the winch used to cycle SWIMS3 in depth.

APPROACH

Owing to its faster speed and tighter profiles, SWIMS3 can sample mixing processes much more intensively than can microstructure profilers. We have been estimating dissipation rates using Ozmidov scaling of density overturns. Adding the Chiometer will provide a more direct measure by adding the variance of small-scale scalar gradients to the data suite.

The new winch is needed simply to replace the present one, which we have used since 1993. Because it will carry longer and thicker tow line, it will let us profiler deeper and reduce the chance of losing SWIM3 by cable failure.

WORK COMPLETED

Firmware for Chiometer data acquisition has been written, and all pieces have been built. We, however, hit a snag when a prototype analog-to-digital unit was too noisy to be useful. To obtain 18-bit conversion at high speeds requires building an A/D board from scratch; no suitable conversion modules are available. Fortunately, a new commercial A/D prototype board proved successful, and our board is now being built to mimic it. We still expect to provide a working unit to Craig Lee for use on Triaxus next February in the Philippines.

After nearly losing SWIMS3 in the Philippines earlier this year, when it apparently snagged a sunken Fish Aggregation Device (FAD), we went through a lengthy redesign effort to increase the diameter of

the cable to be used with the new winch, which had not been ordered. Now ordered, the new winch should be delivered early next year.

RESULTS

No results have been obtained yet.

IMPACT/APPLICATIONS

The Chiometer is expected to be ready for Craig Lee to use during PHILEX09. Shortly afterward, we will use it in Monterey Canyon on an NSF.