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WOODS HOLE OCEANOGRAPHIC INSTITUTION

Department of Physical Oceanography

Woods Hole, MA 02543

James F. Price, 508-548-1400 (x 2526)

Omnet: J.Price.WHOI, Internet: jim@buckwheat.whoi.edu, Fax: 508-457-2181

December 15, 1993

Dr. Steve Ramp
ONR

RE: Final Report on N00014-89-J-1053

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Dear Steve;

This is the final report on my grant to study the Mediterranean outflow. The major activity during the grant period was a field experiment carried out in fall 1988 in collaboration with Tom Sanford and Rolf Lueck. We made a detailed survey of the Mediterranean outflow in the Gulf of Cadiz, with special emphasis on the regions where the outflow mixes most rapidly with the overlying North Atlantic water. This new data set gave an unprecedented view of the dynamics of a marginal sea outflow. An overview of the results was reported in a major article in SCIENCE (copy enclosed), and a very detailed analysis was given by Molly Baringer in her WHOI/MIT PhD thesis entitled 'Mixing and dynamics of the Mediterranean outflow'. This grant supported Molly during much of her PhD work.

A second major effort was to develop models of marginal sea outflows, the results of which are in a paper that has been accepted to Progress in Oceanography (copy enclosed). This paper dealt with the four major outflows that supply new water to the thermohaline circulation, and provides considerable insight into the dynamics and possible climate consequences of these outflows. The next steps in the modelling work (unfunded at present) are to develop 3-D models of outflows and to learn how to include outflows within the framework of GCMs.

In all, this has been the most productive single grant I have ever had and the collaboration with Sanford and Lueck has been extremely fruitful (Tom has kept a log of contributions from our joint work on the Gulf of Cadiz project and the last I knew the count was up to more than 35 !).

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If you would like to have a seminar on the topic of outflows or deep water formation I would be delighted to come down and tell you what we have learned. The topic is inherently interesting, and our project is a very nice example of the interplay between theory and observations.

Best Regards,

Jim Price
Jim Price

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