TUESDAY MORNING, 5 OCTOBER 1993 LOWER LEVEL PLAZA, 10:00 A.M. TO 5:00 P.M.

EQUIPMENT EXHIBIT

See pages xxxi and xxxii for the list of exhibitors.

TUESDAY MORNING, 5 OCTOBER 1993 TERRACE ROOM, 8:00 A.M. TO 12:00 NOON

Session 2aAO

Acoustical Oceanography: Acoustical Determination of Polar Ocean Processes II

Subramaniam D. Rajan, Cochair
Department of Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543

James H. Miller, Cochair
Department of Electrical and Computer Engineering, Naval Postgraduate School, Monterey, California 93943

Chair's Introduction—8:00

Invited Papers

8:05

2aAO1. The fine scale oceanography of the Arctic Ocean: Doppler acoustic studies. Robert Pinkel and Mark Merrifield (Marine Phys. Lab., Scripps Inst. of Oceanogr., La Jolla, CA 92093)

Focus is on fine-scale studies of the upper Arctic Ocean using a variety of Doppler sonars constructed at the Marine Physical Laboratory. From two Spring experiments in the Beaufort Sea (AIWEX, 1985; LEADEX, 1992), considerable insight has been gained into the climatology of the internal wave field. The most energetic constituents of the wave field, near inertial currents, have very different amplitudes and scales than at lower latitudes. The generation of these waves below the ice and lead-covered surface is considered as a possible factor for their unique characteristics in the Arctic. In order to map the current field below an Arctic lead, a sector-scan Doppler sonar has been developed. Using beamforming techniques, the sonar resolves acoustic backscatter and current speed along 28 contiguous beams with an angular resolution of 1.5°. The sonar was deployed at two leads during the LEADEX experiment. Observations were obtained from a 45° vertical fan directed normal to the lead axis. In these leads, convection associated with atmospheric cooling did not modify strongly the background velocity field. However, a clear increase in acoustic backscatter was detected just below the base of the mixed layer, possibly associated with convective processes.

8:30

2aAO2. Tomographic measurements of frontal variability in the Barents Sea. Ching-Sang Chiu (Dept. of Oceanogr., Code OC/Ci, Naval Postgraduate School, Monterey, CA 93943), James H. Miller (Naval Postgraduate School, Monterey, CA 93943), and James F. Lynch (Woods Hole Oceanogr. Inst., Woods Hole, MA 02543)

In August 1992 a coastal ocean tomography experiment was conducted in the Barents Sea over the steep northwestern slope of the Bear Island Trough, about 100 km east of Bear Island. The objective of the experiment was to map and study the oscillations of the Barents Sea Polar Front using acoustic tomography coupled with traditional hydrographic techniques. Because mesoscale ocean variability has shorter spatial and temporal scales in a coastal environment, a vertical receiving array and frequently transmitting tomography sound sources were used to achieve an enhanced system resolution appropriate for coastal monitoring. The vertical array data were processed using plane-wave beamforming to separate ray arrivals in both time and angle. In addition, modal arrivals were separated using broadband modal beamforming techniques. The processed travel time data were then "inverted" using a hybrid ray-mode inverse technique to produce a time series of maps of the polar front. In this presentation, the hybrid ray-mode inverse method and the frontal variability as imaged by this shallow-water tomography system are discussed. [Work supported by ONR 1125AR.]