<table>
<thead>
<tr>
<th>1. Agency Use Only (Leave blank)</th>
<th>2. Report Date.</th>
<th>3. Report Type and Dates Covered.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1987</td>
<td></td>
</tr>
</tbody>
</table>

4. Title and Subtitle.

**A Numerical Model Study of Sea Ice in the Barents Sea**

5. Funding Numbers.

- **Program Element No:** 61153N
- **Project No:** 3205
- **Task No:** 0010
- **Accession No:** DN257014

6. Author(s).

R. N. Preller, P. G. Posey, and S. H. Riedlinger

7. Performing Organization Name(s) and Address(es).

- **Naval Oceanographic and Atmospheric Research Laboratory**
  - **Ocean Science Directorate**
  - **Stennis Space Center, MS 39529-5004**


- **AB 87:322:003**

9. Sponsoring/Monitoring Agency Name(s) and Address(es).

- **Office of Naval Research**
  - **800 N. Quincy Street**
  - **Arlington, VA 2217-5000**


- **AB 87:322:003**

11. Supplementary Notes.

12a. Distribution/Availability Statement.

Approved for public release; distribution is unlimited.

13. Abstract (Maximum 200 words)

Various digital filters, edge detectors, histogram modification, and three-dimensional display experiments are performed on mosaicked Geologic Long-Range Inclined Asdic (GLORIA) acoustic imagery. These experiments have the motivation of establishing Navy capability for viewing the seafloor, especially in deep water and in three dimensions, detecting objects on the seafloor, and enhancing existing monochrome GLORIA imagery. It was found that a Gaussian filter with a kernel size of 5 x 5 provided subjective enhancement to the lower intensity areas while some of the other filtering techniques, e.g., difference and gradient, destroyed the dynamic range of the image. Kernel sizes were found to be extremely crucial in the experiments with this imagery, especially the median filter which did provide excellent smoothing of the imagery without sacrificing the edges. The digital mosaicking performed on this particular data set of acoustic imagery was determined to introduce multiple artificial artifacts. Image analysis showed the intensities (8 bit, 0-255) to follow the classic Gaussian distribution. Histogram equalization yielded exceptional results for adding contrast (which allows the determination of geological boundaries and detection of various seafloor objects). The vector intensity profile of the intensity offered an interesting future research objective, the correlation of acoustic imagery to bathymetry, the measurement of the depth of large bodies of water.

14. Subject Terms.

- (U) Hydrography;
- (U) Bathymetry;
- (U) Optical Properties;
- (U) Remote Sensing;
- (U) Reverberation

15. Number of Pages.

1


Unclassified

18. Security Classification of This Page.

Unclassified


Unclassified

20. Limitation of Abstract.

SAR
A numerical model study of sea ice in the Barents Sea activity.

Preller, R.H., Naval Ocean Research and Development Activity, Code 322, NSTL, MS P. Posey, Berkeley Scholars, Inc., P. O. Box 852, Springfield, VA 22151-8520.


Monthly mean geostrophic ocean currents and oceanic heat fluxes from the Hibler-Bryan (1984, Science, 224: 489-491) ice ocean model are used as oceanic forcing. Atmospheric models were used to provide the surface stress and heat fluxes for the model. Model grid resolution is 25 km and a 6-hour timestep is used. In tests performed using the model, surface stress and heat fluxes are used at the inflow boundary and a constant value of 0.01 W/m² is added at the outflow boundary.

A comparison is made between model results forced by a coarse resolution atmospheric prediction model (100 km) and the Naval Operational Global Atmospheric Prediction System (NOGAPS) model and by a Regional Atmospheric Prediction System (RAPS) model. Model results show good agreement between predicted ice edge advance and retreat.

The modeled value of Fb from being constant below a thin ice can be larger due to the important fraction of the solar irradiation that is transmitted through the ice, absorbed in the mixed layer and then returned to the ice. The changes of the sea water freezing temperature due to changes of salinity have an important effect on Fb and on the vertical density profile of the upper ocean.