Exchanges Between the N. Pacific Ocean and Its Marginal Seas

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LONG-TERM GOALS

It is the long-term goal of the principal investigators of this grant to better understand the circulation of the N. Pacific Ocean and its marginal seas, especially the flow and water masses in the thermocline and above.

OBJECTIVES

The objectives of this work are to examine measurements collected in recent years in the western N. Pacific and its marginal seas (Japan Sea, Okhotsk Sea, Bering Sea), and CTD profiles collected from Argo floats, in the context of the NRL high-resolution model of the N. Pacific. We are especially interested in examining the production and spreading of North Pacific Intermediate Water (NPIW) in both the model and the data.

APPROACH

We are in the process of compiling all CTD and float data from the western N. Pacific that has been collected in recent years in order to have the best dataset possible for model comparison. The NRL model is being run at high resolution (1/12 degree), with the present run approximately 20 years in length. We plan to carry out the best comparison of the data and model that can be done. We intend to focus the comparison on the origins, circulation, and *T*/*S* properties of NPIW. The model includes both the Japan Sea and Okhotsk Sea, so it is possible to examine NPIW origins in some detail.

WORK COMPLETED

At this time, the model has been run for about 20 years in a high resolution mode. Sections of salinity and temperature from the model along 153.92 ºE are shown in Figure 1. The subsurface salinity minimum indicative of NPIW can be seen at depths around 500 m. This is approximately the correct depth for NPIW in this region, and the values of salinity are plausible. We hope to compare these model results to temperature and salinity profiles from UW floats in the Japan and Okhotsk Sea, and Argo floats, in the western N. Pacific, as shown in Figure 2.

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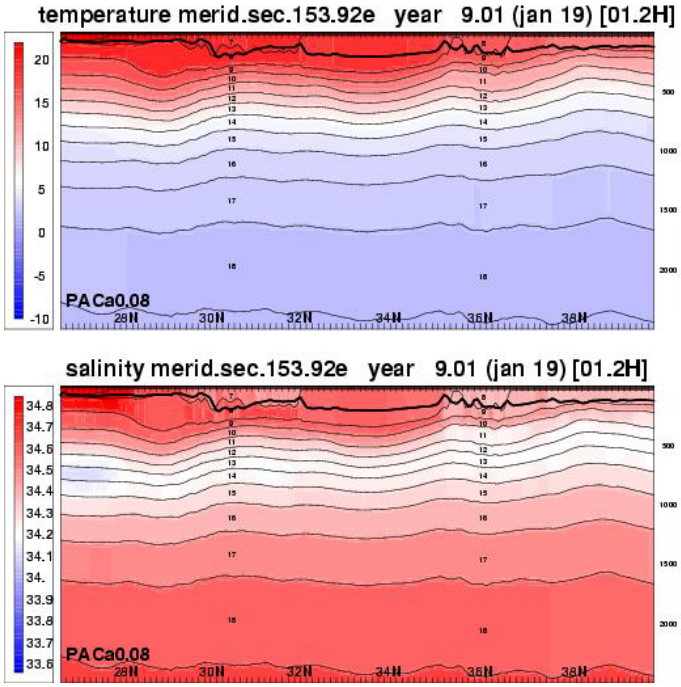

Figure 1. Temperature and salinity on 153.92 ºE in the N. Pacific from the NRL high resolution HYCOM model.

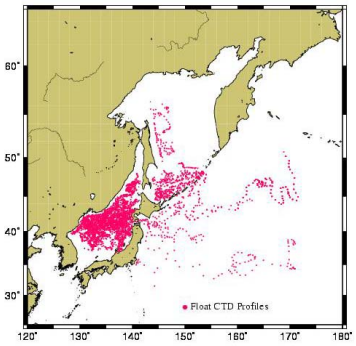

Figure 2. Positions of profiles from UW profiling floats in the western N. Pacific.

RESULTS

We have so far assembled the requisite data sets (both UW floats and all Argo floats) and WOCE CTD sections in the western N. Pacific, as well as CTD data collected in the Okhotsk Sea and Japan Sea in recent years. Additionally, the NRL HYCOM model continues to be run in order to increase the length of the simulation. We hope to begin the actual model/data comparison later in 2003.

IMPACT/APPLICATIONS

We hope to be able to discern the details of marginal seas/N. Pacific interactions from our study, especially mixing and formation of water masses near the marginal sea straits. A graduate student is working on this project, and it is planned that the student will use the results for a PhD dissertation.