Joint Hydrographic Survey, Spring 2006

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Abstract

A four-ship joint hydrographic survey (JHS) for seas around Taiwan had been carried out for the first time in May 2006. Compared with the historical CTD measurements that were taken in May between 1985 and 2003, general patterns of warmer but fresher water masses for the upper 100 m are revealed by JHS data. A remarkable cold water is identified and centered at the intermediate depth around 300 m along the east coast. Heavy rainfall, the Kuroshio retraction, and mesoscale eddies all play the roles in the observed features.

Introduction

Taiwan is surrounded by seas and ocean that featured with complicated bottom topography such as continental shelves, canyons, seamounts, ridges, basins, and trenches. The strongest western boundary current in the North Pacific Ocean, the Kuroshio, flows northward along the east coast of Taiwan. In addition, alternate monsoons and typhoons are two primary forcing that act regularly on ocean surface. The oceanic conditions of the seas around Taiwan are inevitably complicated and highly variable. Based on several studies conducted in late 1990s, it had been realized that quasi-simultaneous observations are critical on data interpretation, especially for the region east of Taiwan over where mesoscale activities are prominent. The modern oceanography in Taiwan may be dated back to 1985, from when the *R/V Ocean Researcher I*, and also few years later the *Ocean Researcher II and III,* all together to make a valuable contribution to understanding of hydrographic condition around Taiwan. Even tens of thousands of CTD measurements have been conducted such that characteristics of seasonal hydrographic variations can be well revealed (http://www.ncor.ntu.edu.tw/odbs/Physics/ctd/index.html), the collected data are still too sparse to synoptic scale phenomena (Fig. 1). This forms the basis of conducting JHS. The first JHS were conducted in May 2006 (Fig. 2). Through the joint efforts of *R/V Ocean Researcher I, II, III,* and *Fishery Researcher I*, data of the underway thermosalinograph, current velocities from vessel-mounted ADCP, sub-bottom profiles from chirp sonar, echograms from EK500, surface wave signatures from marine radar, bottom sediment, and a total of 127 CTD stations were collected all in 7 days. One of the purposes of JHS is to get a quasi-simultaneous mapping of the highly variable oceanic condition around Taiwan, especially for the Pacific region east of Taiwan. All the collected data were processed mainly by the Ocean Data Bank and the results can be browsed at http://www.ncor.ntu.edu.tw/ODBS/2006JHS/.

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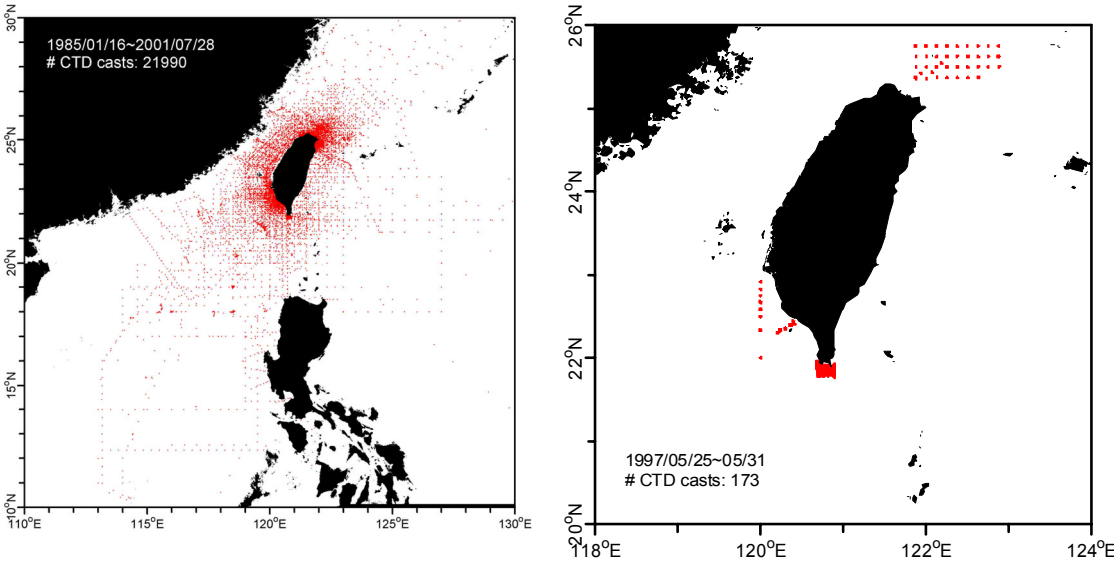

Fig. 1 Distribution of all the CTD stations conducted by OR I, II, and III between 1985 and 2001 (left) and the one that has maximum CTD stations occupied in 7 days (right).

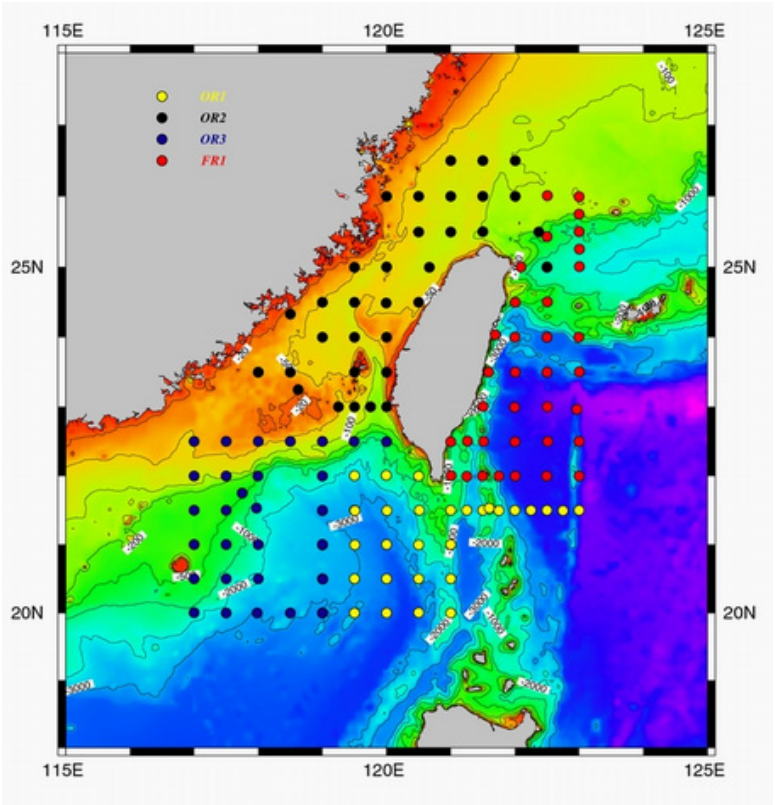

Fig. 2 Distribution of CTD stations of JHS, 2006.