

A PRELIMINARY STUDY ON THE RESPONSE OF SUBTIDAL FLOWS TO THE WINTER MONSOON IN THE VICINITY OF FORMOSA BANKS

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ABSTRACT

For several winters, instrument moorings had been installed on a monthly basis at southeast of Formosa Banks and west and south of Peng-Hu Islands, asynchronously. Data collected, including currents and water temperature at different levels as well as bottom pressure (from which the corresponded surface elevation is derived) and oceanic surface winds, are analyzed statistically. Preliminary results on the response of subtidal currents to the monsoon winds are reported here.

During the winter, surface wind stress exerted by the NE monsoon is perhaps the most dominant external forcing governed the fluctuation of water flows over the continental shelf southeast of Formosa Banks. The enhancement of monsoon winds favors surface currents deflecting toward the bank, thence induces the rise of water level and a southwestward current at southeast of the bank; whereas, during the reduction of the wind, in the upper layer a northward warm flow emerges. These features could be interpreted in terms of the relative movements of mixed waters and Kuroshio intrusion waters.

INTRODUCTION

Although the Taiwan Strait is the only channel connecting the East and the South China Seas (the latter, SCS for later reference), but considering the complicated topography of the strait (Fig. 1), which possesses shoals, banks, shallow troughs and islands, exchanges of waters between both seas can not be horizontally evenly-distributed, only few particular passages in the strait are likely significant to the interchange process. The Peng-Hu Channel, located in between the southwest coast of Taiwan and east of Peng-Hu Islands (Fig. 1), is one of the candidates; the channel and the region southeast of Formosa Banks had long been recognized to be the most strategic places for studying the above-mentioned exchange process. However, for decades only few direct measurements of currents had been made in there, e.g. Chuang (1984). Still, available data sets are insufficient to clarify the many ambiguities appeared in previous literatures; e.g. arguments about the Taiwan Strait offshoot of Kuroshio branch (Wu 1984, Wang and Chern 1988) and the proposed connection between the so-called SCS warm current and the Taiwan warm current (Guan and Mao 1982, Guan 1984) are two familiar ones. Moreover, the presence of a warm-core, anti-cyclonic gyre, occurring in the northern SCS during the winter and spring, had been mentioned by Wang and Chern (1987) and Li and Wu (1989); though a different name, Kuroshio loop in the SCS, was denominated by the latter authors; but, all of these authors agreed that the phenomenon is associated with

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