The Currents in the Luzon Strait Obtained from of CTD and Argo Observations and a Diagnostic Calculation of the Circulation During October of 2008

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On the basis of ADCP current measurements and hydrographic data form the five Argo floats and CTD and wind data obtained in the Luzon Strait, a three-dimensional diagnostic model of ocean circulation with a modified inverse method (MIM) is used to study the circulation in the investigated region during October cruise of 2008. Five Argo floats 2901169, 290170, 2901171, 2901172 and 2901167 were deployed at (20°N, 120°45' E), (20°N, 121°13' E), (20°N, 122°20' E), (20°N, 122°40' E) and (20°N, 123°0' E) during October cruise of 2008, respectively. The main observed results of Argo floats during October to December, 2008 are as follows. The Argo float 2901169 moved firstly northwestward, and then northward or northeastward into the region southwest of Taiwan. When Argo2901172 moved into the area (21° 30'-21°00' N, 120°30'-121°15'E), for example, it was at the surface about (121°10'E). 20°35'N), and it turned to move northwestward or westward with the Kuroshi near the surface cross Luzon Strait into the South China Sea (SCS), and then it moved down from the surface to 1000 m level to reach at about (120°50'E, 20°40'N) with northwestward direction and it continue moving into the SCS, which agree qualitatively with the computed currents. On the Argo float 2901172 moved into the SCS through the Luzon Strait, there are following two causes. 1) During October to December the NW wind field dominates in the computed region. Thus, the probabilities in the NW wind field are in the favor for the Argo2901172 moving cross Luzon Strait into the SCS. 2) From diagnostic computation, in the area (20° 30'-21°00' N, 120°45'-121°50'E) the westward and northwestward flows dominate at the surface, but at the 1000 m level the southwestward and westward flows dominate. The flows at the surface and the 1000 m level both result in the Argo2901172 moving cross Luzon Strait into the SCS in the above area, which is firstly found in this cruise.

The results of diagnostic computation reveal that 1) there are two branches of the Kuroshio near the southern bounday of investigated region. One is located at area east of about 122°10' E; and other, namely the western branch, is located at area west of about 121°40' E. The western branch of the Kuroshio is located in the area above 400 m, and its maximum velocity is greater than 170 cm/s. 2) At the 1000 m level the southwestward and westward flow dominates in area north of 20°30' N, but southeastward flow dominates in area south of 20°30' N. The cyclonic eddy exists in the region east of Luzon Strait. 3) The joint effect of the baroclinity and relief (JEBAR) is essential dynamical cause. It is next important dynamical cause that the interaction between the wind stress and bottom topographic.