



Deep Circulation in the South China Sea

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The South China Sea (SCS) is the largest marginal sea of the northwest Pacific. The deep circulation in the SCS is investigated on the basis of the Hybrid Coordinate Ocean Model (HYCOM). All the experiments show reasonable agreement with observation from mooring arrays. Analysis of these results provides a detailed spatial structure and temporal variability of the deep circulation in the SCS. The major features of the SCS deep circulation are basin-scale cyclonic gyre and concentrated deep western boundary current (DWBC). The transport of the DWBC is ~ 2 Sv at 16.5°N with a width of ~ 53 km. As flowing southwestward, the DWBC becomes weaker with a wider range. Deep upwelling in the SCS is estimated of 0.19 to 1.15 m d⁻¹ with the strongest area around the DWBC. The model results reveal the existence of 80 to 120 days oscillation in the deep northeastern circulation and the DWBC, which are also the areas with large eddy kinetic energy. This seasonal oscillation is northwestward with a velocity amplitude of $\sim 1.0\sim 1.5$ cm s⁻¹. The distribution of mixing parameters in the deep SCS plays a role in both spatial structure and volume transport of the deep circulation. Compared with the north shelf of the SCS with the Luzon Strait, deep circulation in the SCS is more sensitive to the large vertical mixing parameters of the Zhongsha Island Chain area.