DYNAMICS OF THE SOUTH CHINA SEA OFF PENINSULAR MALAYSIA'S EAST COAST

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Introduction

Our research group is actively involved in the dynamic circulation of the South China Sea (SCS) driven by both the northeast (NE) and the southwest (SW) monsoons winds, respectively (Camerlengo and Demmler, 1997). This is done primarily from a descriptive point of view. Particular emphasis is given to the dynamics off Peninsular Malaysia' s eastern continental shelf. In doing so, a better understanding of the ocean dynamics of the SCS is attained (Camerlengo and Demmler, 1996a). An ocean model to simulate the wind-driven circulation is very much needed. For this purpose, a nonlinear hydrodynamic vertically integrated ocean model has been developed at UPM (Camerlengo and Demmler, 1996b).

Materials and Methods

Oceanographic data is obtained from current-meters. On the other hand, climatological wind stress data is used to force the numerical model. The ocean model is run in a PC.

Results and Discussion

Our results show that turbulence produced by strong NE monsoon winds mixes down momentum input causing the deepening of the mixed layer of the SCS. This is conjunction with typical overcasts skies during the boreal winter makes the temperature cooler and lesser saline during the boreal winter as compared to the boreal summer. The ocean numerical model developed at UPM solves the external mode. For a detailed information about the ocean model the reader is addressed to a particular manuscript. A new technique to handle the horizontal Laplacian term at the open boundaries is used (Camerlengo and Demmler, 1995). Particular emphasis is given to both the initialisation problem of the ocean model as well as the vertical internal structure of the SCS (Camerlengo, 1997). Qualitatively the model simulates reasonable well the maximum currents flowing along both the Vietnamese coast and along Peninsular Malaysia' s eastern continental shelf, as well as both gyres one in the Gulf of Thailand and the other one on the SCS. Furthermore, it has been demonstrated that the existence of the latter gyre is only due to topographic effects (Camerlengo and Demmler, 1997). Our numerical results for the mass transport off Vietnam and along Peninsular Malaysia's eastern continental shelf during the boreal winter (summer) are 4.7 and 4.1 (2.8 and 2.6) Sverdups (1 Sv = $10^6 m^3/s$)), respectively; which compares reasonably well with the observed values of 5.0 (3.0) Sv and 4.0 (3.0) Sv for these same two locations, respectively (Camerlengo and Demmler, 1997).

Conclusions

The ocean dynamics of the SCS is our main area of interest. As a result of our studies a better understanding of the wind-driven circulation of the SCS and the dynamical behaviour of its mixed layer due to both the SW and the NE monsoon winds emerges.

References

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