A Survey of Studies on the South China Sea
Upper Ocean Circulation

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(Received 1998/2/5, revised 1998/4/14, accepted 1998/4/16)

ABSTRACT

Advances in understanding the upper ocean circulation of the South China Sea (SCS) since the works of Dale (1956) and Wyrtki (1961) are reviewed. The focus is on the major features of the circulation pattern. The circulation in the northern SCS is driven mainly by monsoon winds and Kuroshio intrusion, and secondly by surface heat flux. Major components include the Kuroshio intrusion through the Luzon Strait, the SCS Branch of the Kuroshio, the Northwest Luzon Cyclonic Gyre, the Northwest Luzon Cyclonic Eddy, the Northwest Luzon Coastal Current, the SCS Warm Current and the Guangdong Coastal Current. The circulation in the southern SCS is driven mainly by monsoon winds. In winter, the SCS Southern Cyclonic Gyre occupies most of the southern SCS. A weaker anti-cyclonic gyre may exist southeast of the main gyre. Along the border of these two gyres a strong upwind current called the Natuna Off-Shelf Current flows northeastward. In summer, the SCS Southern Anti-Cyclonic Gyre occupies most of the southern SCS. Its northern edge is a very strong off-shore current jet called the Southeast Vietnam Off-Shore Current located at a latitude of about 11°N. The circulation in the central SCS is governed by monsoon winds and the interaction between the circulation systems in northern and southern SCS. The basic features of the circulation in the central SCS are not yet well understood, though some results based on dynamic calculation and numerical simulation have been presented.

(Key Words: South China Sea, Circulation, Upper Ocean)

INTRODUCTION

The South China Sea (SCS) occupies an area of about $3.4 \times 10^6$ km², in the northeast of which is situated a deep basin with an area of about $1.5 \times 10^6$ km². The deep basin connects with the

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