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THE DISTRIBUTION OF CARBON, NITROGEN AND SULFUR IN SURFICIAL SEDIMENTS ON THE CONTINENTAL SHELF AND SLOPE IN NORTHERN SOUTH CHINA SEA

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ABSTRACT

In the northern South China Sea, sediment samples were collected at 27 stations on the continental shelf and slope in order to understand the deposition of organic carbon. Total organic carbon (TOC), total nitrogen (TN), total sulfur (TS) and total calcium carbonate contents were determined for the surficial sediments. On the shelf, the TOC abundance is depleted except near the Pearl River mouth. On the slope, relatively high abundance of TOC (0.6-0.8%) is found in the middle slope, indicating a potentially important carbon sink. The TN content is well correlated with TOC content with a $\Delta N/\Delta C$ ratio near the Redfield ratio, indicating that the additional organic matter in the more enriched region is from marine origin. The TS content also correlates linearly with TOC content with a $\Delta S/\Delta C$ ratio of 0.11.

INTRODUCTION

The fate of CO_2 emission from burning of fossil fuel has attracted much attention in the recent years. Walsh *et al.* (1981) claimed that large fraction of the organic matter produced on continental shelves was exported and deposited on continental slope which may be a sink for anthropogenic CO_2. Subsequently, more studies on this topic were carried out and produced different conclusions. Some support this hypothesis (e. g., Walsh *et al.*, 1985; Venkatessan *et al.*, 1987, 1988) and some do not (e. g., Rowe *et al.*, 1986). Though it still needs more data to verify this view, the continental margins are by any means an important area for the study of carbon cycle (Chen *et al.*, 1992; IGBP, 1992).

In order to search for the deposition center of organic matter at the continental margin in the northern South China Sea, we collected sediments from the continental shelf and slope and analyzed the total organic carbon content and total nitrogen content in the surficial sediments. We also determined total sulfur content and total carbonate content.

The bottom topography of the northern South China Sea can be divided into three types: the continental shelf, the continental slope and the abyssal plain which is deeper than 3000 m. The continental shelf follows the northeast-southwest (NE-SW) trend of the coast. The Taiwan Bank lies in the northeastern side of the shelf. The shelf becomes narrower towards the SW and widens again off the Pearl River mouth. The two wider regions of the shelf correspond to two deltaic systems, namely the Hanjiang River delta and the Pearl River delta. The Dongsha Islands are coral reefs sitting on a platform on the upper continental slope. The study area (Fig. 1) is in the shelf and slope region west of the Taiwan Bank.

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