

CLAY MINERALS DISTRIBUTION IN THE SEA-BOTTOM SEDIMENTS NEIGHBOURING TAIWAN ISLAND AND NORTHERN SOUTH CHINA SEA

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ABSTRACT

A total of 118 samples of sea-bottom sediments were analyzed by X-ray diffraction method and electron microscopy for their clay mineral composition. These samples include both dredged and cored sediments from the north of Taiwan to the northern part of the South China Sea, between Lat. 27° to 18°N. A brief discussion on the quantitative X-ray determinations of clay minerals in sediments is presented.

Over the investigated region two clay-mineral provinces can be divided. one is the illite-chlorite-dominant suite that distributes over the continental shelf from the East China Sea to the south of Taiwan Strait. It is generally composed of 60-65% illite, 20-26% chlorite, 4-10% kaolinite and less than 10% smectite and mixed-layer clays. This province is bounded by shelf-break line.

Clays occur in the deep-water side to the east of the shelf-break line though are somewhat similar in mineral constituents to the former province are more rich in smectite. The content of smectite generally increases from the sea off eastern Taiwan to the South China Sea. A maximum smectite content (about 25% in total) was found in Taiwan-Luzon trough.

The clay-minerals in these sediments are essentially of land-derived origin from mainland China and Taiwan. Their fine, suspended particles have been widely dispersed and well mixed in the epi-continental sea by the motions of sea water. The origin of smectite in the South China Sea province may be derived from either the altered glassy volcanic sediment in the sea or from the argillization of basic rock in the adjacent lands.

INTRODUCTION

Knowledge of the clay-mineral composition of marine sediments are accumulating rather rapidly over the world in recent years. As comparing with the studies of land clays, the time-lag in the studies of marine or oceanic clays is due to both the inconvenient sampling and the relative difficulty in mineral identification. The latter is because the marine clays being frequently a complex mixture of relatively poorly crystallized minerals (Grim, 1968, p. 528).

Studies of the origin of non-biogenic fine sediments or clays in ocean has interested many workers in the relation with the problems of sources and processes of marine sedimentation. Gorbunova (1963), Griffin and Goldberg (1963), Griffin *et al.* (1968), Rateev *et al.* (1969), and Fan (1972) have studied the mineralogy of deep-sea clays from the Pacific region to a rather extensive extent. Oinuma and Kobayashi (1966) also reported the clay component of the recent sediments from the East China Sea and northwestern Pacific. However, none of them have furnished data from the present investigated region (Rateev, 1969, Fig. 1)

Systematic study of the marine sediments on the broad continental shelf off the China coast was initiated by Niino and Emery (1961). Also Wang (1960) made sand-fraction study, and Polski (1959) and Waller (1960) made foraminiferal studies of the Niino's materials. In the recent years, further petrographical, geochemical and paleontological studies of the recent marine sediments from

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