

Sedimentary Features of Shelf North of Taiwan Revealed by 3.5 kHz Echo Character

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ABSTRACT

3.5 kHz echograms collected from the shelf north of Taiwan were classified and mapped to produce an echo character map which reveals the sedimentary features on the sea floor. Two major types and five subtypes of echoes were determined. Echo types are distributed generally into two major areas: A sandy shelf with prolonged echoes and a large submarine sand-dune field which generates sediment waves echoes.

The echo character map shows that each sedimentary feature is characterized by a corresponding echo type. The upper reach of Men-Hua Canyon is characterized by prolonged bottom echoes with very rugged morphology, indicating down-cutting of sandy canyon bottom. The presence of a large asymmetrical sand waves field (5 to 30 km wide, 50 km long) in shelf northwest of Taiwan indicates that bottom currents are strong enough to move sand-size sediments on the sea floor. The general asymmetrical form of sand waves suggests that the bottom currents may flow from south to north.

(Key Words: 3.5 kHz Echograms, Sedimentary Features, Shelf, Taiwan)

INTRODUCTION

The continental margin off northeastern Taiwan consists of East China Sea Shelf, East China Sea Slope and Okinawa Trough (Fig. 1). The sea floor of the broad East China Sea Shelf is generally flat and nearly featureless (Emery et al., 1969). However, the shelf north of Taiwan, a small part of the East China Sea Shelf, is featured with low-reliefed ridges, volcanic intrusions, channels and canyons despite its overall relatively flat platform morphology (Boggs et al., 1979, Yu and Hong, 1993, Yu and Shyu, 1994, Song and Chang, 1993). Locally, the shelf immediately north of Chilung, the coastal city of northern Taiwan, is called Chilung Shelf which is bounded by the Men-Hua Canyon to the north (Fig. 1). The Chilung Shelf is cut by the Chilung Valley which extends from west to the continental slope for approximately 30 km and ends around 200 m isobath on the East China Sea Slope (Song and Chang, 1993). West of Chilung Shelf lies the Kuanyin Shelf which occurs northwest of the Tatun Volcano Group (Lee et al., 1973). The boundary between the Chilung Shelf and Kuanyin Shelf has not been determined yet. Yu and Shyu (1994) and Ma (1995) pointed out that the Chilung Shelf is different from the shelf north of Men-Hua Canyon in water depth and morphology of shelf break.

Boggs et al. (1979) suggested that both Chilung shelf and Chilung Valley may be of relict origin. They speculated that the Late Pleistocene Tamshui River located northwestern Taiwan

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