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NAMING OF THE SUBMARINE CANYONS OFF NORTHEASTERN TAIWAN: A NOTE

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ABSTRACT

Several submarine canyons or canyon-like features in the shelf-slope region off northeastern Taiwan have been known but not fully investigated. Two distinct submarine canyons are recognized by bathymetric data and are named as Chilung Canyon and Huapinghsu Canyon, respectively. The naming of these two canyons is preliminary and may be revised by close scrutiny as some proper names proposed.

INTRODUCTION

The National Science Council of the Republic of China presently has sponsored a joint marine research project studying the Kuroshio edge exchange process (KEEP) along the continental margin off northeastern Taiwan from 1989 to 1994. The KEEP project includes the aspects of physical oceanography, marine chemistry, biology and geology (Chu, 1989). The Kuroshio Current, a major western boundary current with warm (20-27°C), saline (33‰) water, originates from the east of Luzon Island around 15°N, 125°E. The study on the hydrographic properties of the Kuroshio Current flowing along the shelf-slope region off northeast Taiwan has drawn much attention, especially the water mass exchange between the Kuroshio Current and the East China Sea (Chu, 1976; Liu, 1983; Liu *et al.*, 1988).

Yu and Hong (1992) have presented the physiography of the continental margin along the northeastern Taiwan (Fig. 1) to the 3rd KEEP & WOCE conference held at Shito, Taiwan. In their presentation, the presence of several prominent topographic features such as the submarine canyons occurring on the shelf-slope region was mentioned; however, without proper names assigned to these submarine canyons. It is recognized that cold water mass of upwelling is located adjacent to the head of one of these submarine canyons. The relationship between the upwelling and the hydrography of the canyon has not been clearly determined. The KEEP geologic committee recommended that there is a need for the nomenclature of these submarine caynons for further physiographic studies.

PURPOSE

The purpose of this note is to name these sumarine canyons along the continental margin off northeastern Taiwan. These undersea features can then be related to other disciplines. The author is fully aware of the guidelines for naming the undersea features recommended by The Intergovernmental Ocenaographic Commission (IOC), the International Hydrographic Organization (IHO) and the joint IOC/IHO Guiding Committee for the General Bathymetric Chart of

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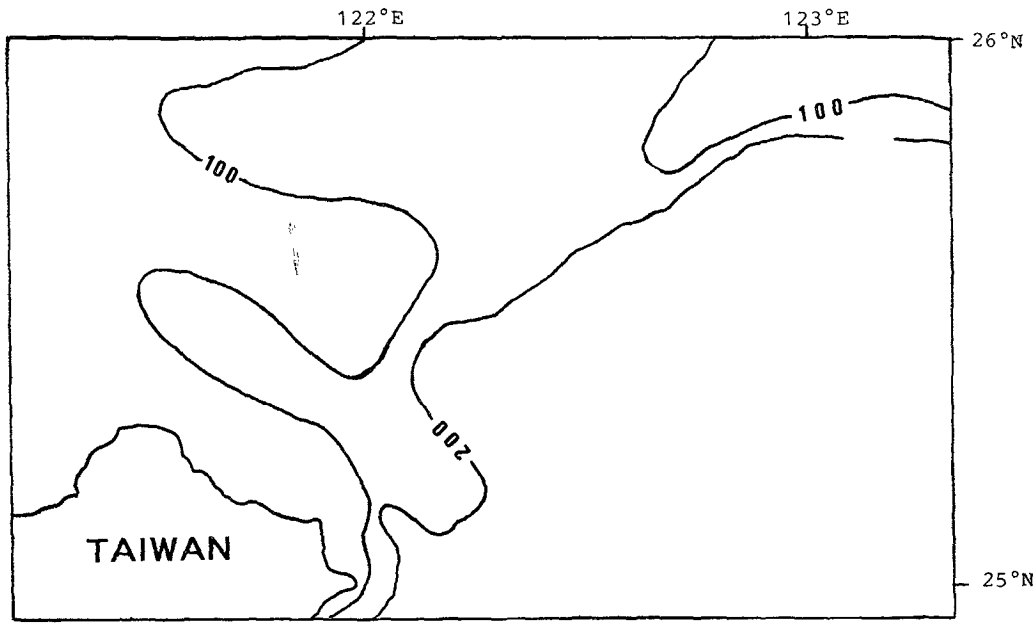

Fig. 4. Bathymetric map of the shallow shelf off northeastern Taiwan. The linear depression paralleling the Taiwan coast was interpreted as a submerged valley (Kimura, 1983). Contours are in meters.

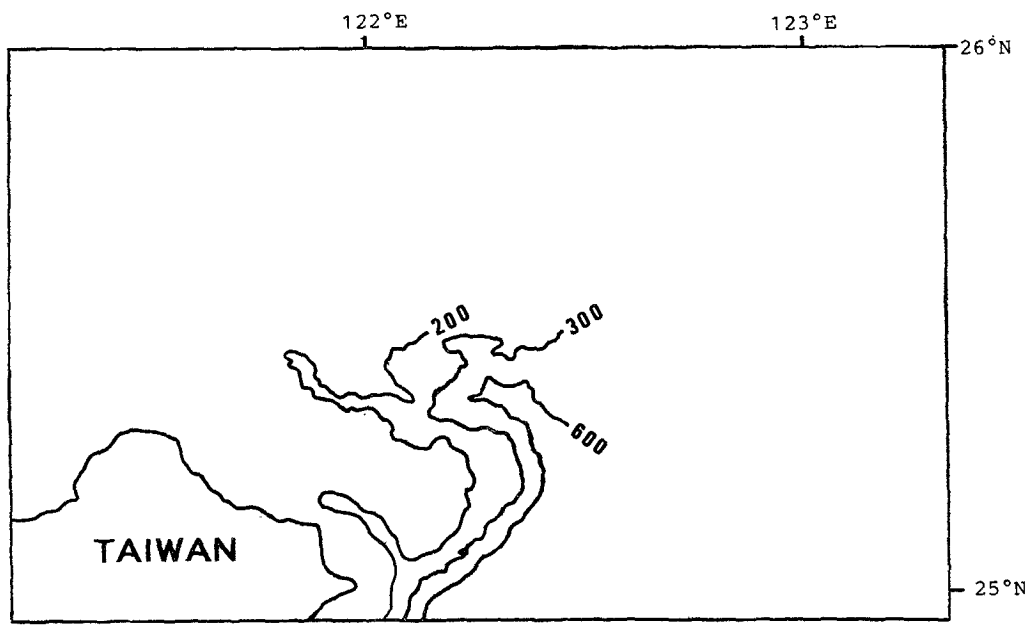

Fig. 5. Bathymetric map clearly showing two distinct submarine canyons indent the shelf off northeastern Taiwan (After Song, 1992). Contours are in meters.

Hilde (1973), for instance, noticed that the continental slope between the East Ehina Sea shelf and the Southern Okinawa Trough is incised by a complex of submarine canyons (Fig. 2). This investigation provided the basic bathymetric information only without further comments. Based on the bathymetric mapping around the Taiwan shelf and slope, Boggs *et al.* (1979) recognized two distinct narrow valleys (submarine valleys) on the shelf off northern Taiwan which extend southeastward into the Okinawa Trough (Fig. 3). The origin of these submarine canyons are probably of subaerial erosion during the low stand in the late Pleistocene (Boggs *et al.*, 1979). As shown in Fig. 4, several relative narrow linear depressions are recognized as submerged valleys which trend approximately northwest/southeast and appear on the broad shelf off the northern Taiwan coast (Kimura, 1983). The submerged valleys imply that the valleys were initiated by subaerial erosion and later were submerged, probably due to the Quaternary transgression, and were preserved. In addition, the bathymetric map of the Okinawa Trough including northern Taiwan offshore regions clearly shows three prominent linear depressions (submarine canyons) appearing on the slope north to the Okinawa Trough (Marssett *et al.*, 1987). In order to provide an accurate and standarized bathymetric chart in the KEEP study area, Song (1992) has completed a bathymetric chart covering the area between 26°50′N, 121°50′E and 24°50′N, 122°50′E off the northeastern Taiwan coast (Fig. 5). Apparently, two distinct submarine canyons indent the shelf in an approximately northwest/southeast direction (Fig. 5). Based on these published bathymetric charts, the presence of

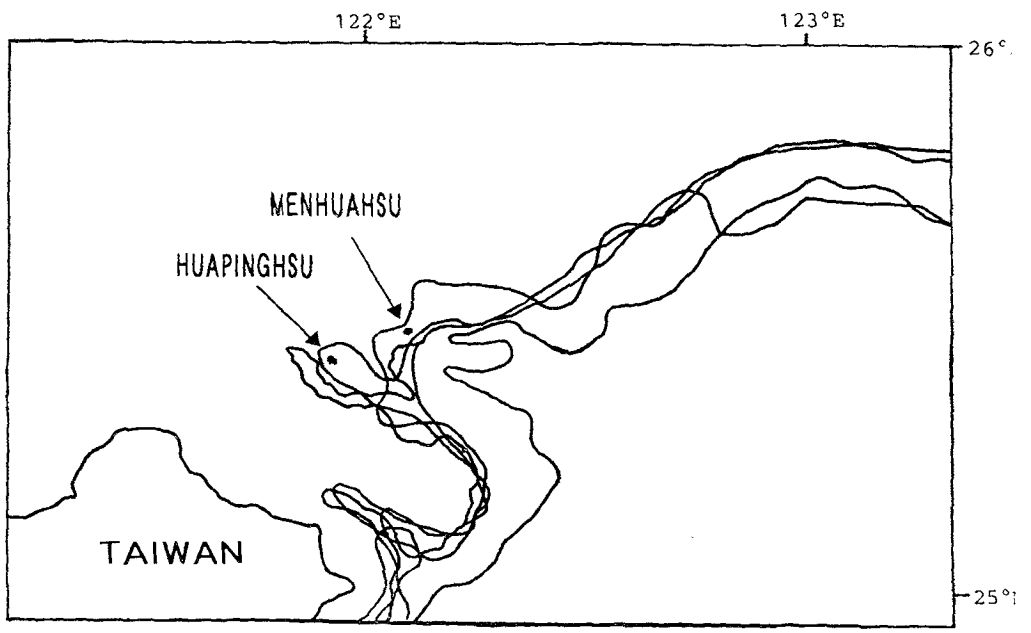

Fig. 6. A superimposed bathymetric map showing that two submarine canyons on the shelf-slope transition can be recognized. The submarine canyon close to the port city Chilung is named Chilung Canyon. The canyon with its head located to the volcanic island Huapinghsu is named Huapinghsu Canyon. The bathymetric data are taken from (Wang and Hilde, 1973; Boggs *et al.*, 1979; Kimura, 1983; Marssette *et al.*, 1987; Song, 1992).

the submarine canyons in the shelf and slope region off northeastern Taiwan is certain, although the locations and dimensions of these canyons are differently presented mainly due to various mapping methods and techniques used. Clearly, the consensus of the courses and dimensions of the these canyons is needed.

Naming

These five bathymetric maps (Wang and Hilde, 1973; Boggs *et al.*, 1979; Kimura, 1983; Marssett *et al.*, 1987; Song, 1992) are superimposed on a base map to show comparative course and size of these canyons. Clearly, there exist two major canyons which cut into the shelf and slope more or less transversely (Fig. 6). These two major canyons away from the northern Taiwan coast are named as follows: (A) Chilung Canyon, and (B) Huapinghsu Canyon, respectively (Fig 6). The criteria used in naming these canyons are the nearby city names and islands appearing on the shelf. For example, Chilung Canyon is named after the major port city Chilung on the northern Taiwan coast. Huapinghsu Canyon is named after the volcanic island of Huapinghsu which is located around the head of the canyon.

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簡論臺灣東北海域海底峽谷之命名

俞　何　興

摘　　要

已知有數個海底峽谷或類似峽谷的地貌，存在於臺灣東北外海的大隆棚坡上，須要進一步地證實。

由水深資料可以明確地認出兩個海底峽谷，分別命名爲基隆峽谷及花瓶嶼峽谷。此峽谷之命名是初步的看法，如有更好的地質證據或意見提出，則可更改其命名。