

Digital Elevation Model Offshore Taiwan and Its Tectonic Implications

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ABSTRACT

A new 500-m gridded digital bathymetric data set has been produced by compiling available shipboard bathymetric data supplemented by global bathymetric data sets in the area between 18°N and 27°N, and from 117°E to 125°E. Combined with topographic data from GTOPO30, a global land data set in 30 arc-second grid spacing, this new digital elevation model (DEM) reveals the regional as well as local morphology of Taiwan and its offshore area. Spatial resolution of 1 km is achieved in the area off eastern and southern Taiwan where swath bathymetric data are available. In other areas where ship tracks are sparse, a spatial resolution of 4 arc-minute is retained. This DEM provides the best topographic information at present on a regional scale, which helps to reveal many of the morphotectonic features related to the active tectonic processes of subduction and arc-continent collision in this region.

Using 2-D shaded topographic maps and 3-D physiographic diagrams generated from the DEM, the major morphologic features in each tectonic province of the region are presented. The Taiwan Strait is characterized by low relief sea floor with two NE-SW trending depressions and a shallow bank in the center of the strait. Submarine canyons mark the continental slope. In the area off southern Taiwan, N-S trending ridges and troughs are the major morphological features, however, several NE-SW trending lineaments have been identified in the Luzon forearc region. Off eastern Taiwan, submarine canyons and topographic features related to sedimentary processes along the eastern flank of the Luzon Arc are revealed in detail. A prominent N-S trending linear ridge, the Gagua Ridge, located along 123°E on the West Philippine Basin floor is entering the Ryukyu Trench and has produced a big re-entrant at the frontal portion of the Yaeyama Ridge. E-

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