

The Penghu Submarine Canyon off Southwestern Taiwan: Morphology and Origin

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ABSTRACT

The main course of the Penghu Submarine Canyon extends along the intersection of the Kaoping Slope and the South China Sea Slope in a nearly north-south direction. It is about 180 km long from its head below the shelfbreak of the Taiwan Strait Shelf to its mouth merging into the Manila Trench. This canyon consists of two distinct parts: an upper reach and a lower reach.

Three major tributary canyons join into the main course to form a fan-shaped upper reach of the canyon. It mainly occupies the upper slopes extensively cut by tributary canyons and gullies and has a maximum width of about 80 km opened up by tributary canyons. The upper reach shows high relief, steep walls and V-shaped cross sections, showing typical canyon morphology. The lower reach is characterized by a single course without tributary canyons. It shows broad trough in cross section and relatively small relief between edges and bottom of the canyon without characteristic canyon morphology.

The floors of the Penghu Canyon show a gentle continuous inclination with an average slope angle of about one degree. A knick point about 2500 m deep separates the canyon into the upper reach with a steep slope angle of 1.42 degrees and the lower reach with a gentle slope angle of 0.5 degree. Canyon relief along its course changes from its head to the mouth considerably and ranges from about 54 to 845 m.

Downward excavation by downslope sediment flows and slumping and sliding on the canyon walls are the major forming processes in the canyon head and upper part of the canyon. Diapiric intrusions are mainly responsible for the high relief of the lower parts of upper reach of the canyon. The lower reach of the canyon is mainly formed by low-intensity downward erosion and mild structural uplift by thrust faults.

(Key words: Submarine Canyon, Penghu, Taiwan, Morphology, Origin)

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