



Morpho-sedimentary features and longitudinal sediment transport in the Taiwan-Luzon region

Ho-Shing Yu (1) and Kan-Hsi Hsiung (2)

(1) Institute of Oceanography, National Taiwan University, Taipei, Taiwan, ROC (yuhs@ntu.edu.tw), (2) Institute of Oceanography, National Taiwan University, Taipei, Taiwan, ROC (d96241008@ntu.edu.tw)

The Manila Trench is a distinct morphological feature which occurs along the subduction zone in the Eurasia/Philippine Sea Plate convergence in the east rim of South China Sea in the Taiwan-Luzon region. Examining bathymetry and seismic reflection profiles in the deep-sea region between Taiwan and Luzon we found a major linear seafloor feature, the longitudinal canyon-channel-trench system, in the northern South China Sea. The seafloor of the South China Sea north of 21°N is characterized by two broad slopes: the South China Sea Slope to the west and Kaoping Slope to the east. The prominent Penghu Submarine Canyon is located right along the intersection of these two slopes. This canyon course parallels to the strike of the Taiwan orogen, extends downslope in a nearly N-S direction, continues to the deep-sea channel, and finally merges into the northern Manila Trench, forming a prominent linear sea valley for a distance of more than 300 km long with water depths from 200 to more than 4000 m deep. We used the bathymetry data from the Ocean Data Bank and seismic profiles from R/V Ocean Researcher I, National Taiwan University to present morphological descriptions both in platform and cross-sectional views to show variations of the linear depressed seafloor pattern. Our bathymetric data show the presence of a previously overlooked channel, a transitional pathway from the Penghu Canyon mouth to the northern end of Manila Trench. Our seismic data show that terrestrial sediments from Taiwan are transported seaward, partially trapped in intraslope basins and partially bypassed downslope the Kaoping Slope and accumulated temporarily at the Penghu Canyon/deep-sea channel, and ultimately transported to the northern Manila Trench. The progressive morphological variations in the aligned canyon, channel and trench, indicate that they represent three distinct segments of the same morpho-sedimentary seafloor features between Taiwan and Luzon. We emphasize that the canyon-channel-trench system serves as a longitudinal sediment transport route delivering orogenic sediments from Taiwan to the northern Manila Trench. We determined the location of the northern end of Manila Trench around 20°15'N, 120°15'E where accumulated sediment leads to bathymetry shallower than 4000 m and disappearance of trench morphology. A large amount of sediments masking led to the bathymetry shallower than 4000 meters and disappearance the trench morphology. The sedimentation with longitudinal transport associated with adjacent orogen in trench places can be regarded as the most important way to influence the bathymetric expressions. The Papua New Guinea-Solomon Sea Plate convergent zone appears to be the modern analogy of the longitudinal sediment transport system from the mountain source to oceanic sink of trench, especially in the route of Markham Canyon - Markham Channel - New Britain Trench sediment dispersal.