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Modern sedimentation and sediment dispersal pattern off southwestern Taiwan

Sheng-Ting Hsu, Chih-Chieh Su, Po-Hsuan Tsai, and Yiya Cheng
Institute of Oceanography, National Taiwan University, Taipei, Taiwan

Taiwan is located at the collision zone between the Eurasian and Philippine Sea Plates and also on the Western North Pacific corridor of typhoons. Every year, three to four typhoons will invaded Taiwan and brought heavy rainfall. The active tectonic setting and climatic conditions create the extremely high sediment yield and export to the ocean.

Our study area is located offshore southwestern Taiwan which is mainly composed of a narrow Gaoping Shelf and broad Gaoping Slope. Four major submarine canyons, the Shoshan Submarine Canyon, Kaohsiung Submarine Canyon, Gaoping Submarine Canyon, and Fangliao Submarine Canyon, extended into deep sea, through Penghu Submarine Canyon and subsequently merged into north terminus of Manila Trench. Over 50 box and gravity cores were collected by using R/V Ocean Research 1, 3 and 5 from 2005 to 2014. The cores were split and conducted core description and surface photographs at the Core Laboratory of the Taiwan Ocean Research Institute (TORI). The following analyses, including X-radiography, bulk density, particle size, Pb-210 chronology, were accomplished at the Marine Radioactivity and Sedimentology Lab at the Institute of Oceanography, National Taiwan University.

The grain size analysis result shows a finer trend from coastal to deep water , except for the lower Fangliao basin which the grain size is larger than the expected value. According to the previous studies on the Pingtung Earthquake induced submarine geohazard, the Fangliao Submarine Canyon and the Lower Fangliao Basin is an important conduit for gravity flow which triggered large scale submarine cable breakages and left coarse sediments on the passage. By using the excess Pb-210 derived sediment accumulation rates, Huh et al. (2009) suggested the depocenter off the southwestern Taiwan is located at the flank of the Gaoping Canyon over the upper slope with the highest rate >1 cm/yr. In this study we integrate the Pb-210 inventory data which covered the area from the Fangliao Submarine Canyon to the Tsengwen River mouth and discovered besides the depocenter which proposed by Huh et al. (2009), the Lower Fangliao Basin is another main depocenter off southwestern Taiwan.