

The significant of the sedimentary system in the southwest Ryukyu Trench in terms of Source-to-Sink

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The southwest Ryukyu Trench near Taiwan is an ideal place for source-to-sink studies because the linkage between the terrestrial sediment source of Taiwan and the marine sink in Ryukyu Trench within a short distance can be determined. This study aims to improve our understanding of the oceanic trench sedimentary system. Using bathymetry, seismic reflection data and cored samples in the southwest Ryukyu Trench areas, we determine distinct features of the submarine canyons, trench wedge, bathymetric ridges and fore-arc basins which are linked together to form two sediment dispersal systems. Two sediment dispersal systems can be identified. First, the trench end sediment dispersal system is characterized by the longitudinal sediment dispersal to the southwestern end of Ryukyu Trench via the Hualien Canyon with additional lateral sediment supplies from the Taitung Canyon merging into the lower Hualien Canyon. This system allows Taiwan orogenic sediments transported far-field and to feed sediments longitudinally to the southwest Ryukyu Trench end. This type of longitudinal sediment dispersal demonstrates a link of sediment of land drainage (source) to the far-field deep oceanic trenches (sink) via networks of submarine canyons. Sediments derived from Taiwan orogen mainly transported downslope by submarine canyons are blocked by the Gagua Ridge. Second, the forearc sediment dispersal system consists of the transverse sediment dispersal from the Ryukyu islands down-slope to forearc basins including Hopping, Nanao, East Nanao and Hateruma. Most of the down-slope sediments from Ryukyu islands are blocked by the W-E trending Yaeyama Ridge along the trench slope break and trapped sediments in the forearc basins. The Yaeyama Ridge is considered as a sediment barrier for sediments sourced by the Ryukyu Islands to be transported to the Ryukyu Trench.

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