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Chirp echo characters and Late Quaternary sedimentation offshore Southwestern Taiwan: the comparison of sedimentary process in the passive and active continental margin

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Chirp (2-7 kHz) subbottom profiles collected from offshore Southwestern Taiwan were analyzed to study the sedimentary process of the Late Quaternary. The study area, where is the collision of the Philippine Sea plate and the Eurasia plate, is unique because it includes passive and active continental margin in a small area. Morphologically, the passive continental margin consists of the South China Sea Shelf and the South China Sea Slope. The active continental margin, the accretionary wedge, consists of the Kaoping Shelf and the Kaoping Slope. Sub-seafloor acoustic echoes in our study were classified into four types based on the nature and continuity of the echoes, subbottom structure, and seafloor features. They are distinct echoes, indistinct echoes, hyperbolic echoes and irregular echoes. The distinct echoes were distributed on the South China Sea Shelf, the lower South China Sea Slope, the Kaoping Shelf and intraslope basin of the upper Kaoping Slope. Indistinct echoes were occurred in the troughs and depressions of the Kaoping Slope. The Hyperbolic echoes, which could be the seismic reflection results of the outcrops, were observed on the submarine ridge with a high slope gradient on both margins. The irregular echoes, which implied the gassy sediments or gas hydrate dissociation, were distributed in some deep-sea area. We observed lots of submarine landslide in the upper continental slope and turbidities in the lower continental slope on the passive margin. In contrast, accretionary wedge is characterized by fill and spill process in the intraslope basin of the upper Kaoping Slope and small submarine landslide in the canyons. The sediment source and the tectonics play important roles offshore southwestern Taiwan.