The modern submarine fan offshore SW Taiwan: Morphotectonics and development

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Using bathymetry and seismic reflection profiles, this study examined and determined the submarine fan located in the topographically complex slope offshore southwest Taiwan. The Fangliao Fan begins at the mouth of the Fangliao Canyon at a water depth of 900 m and terminates down-slope along a linear escarpment at a water depth of 1100 m where gravity-driven sediment flows are prevented from transporting farther down-slope due to ponding against the bathymetric highs. Sediments from the canyon mouth and upslope are mainly transported by mass movement, filling an intra-slope basin at the upper Kaoping Slope, and forming a ponded fan within the partially filled basin. The Kaoping Fan is located west of the lower reach of the Kaoping Canyon at the lower Kaoping Slope, ranging from 2,200 to 3,000 m in water depths, and has a relatively small areal extent restricted in the topographic lows confined by structural highs due to mud diapiric uplifting and thrust faulting. The seismic patterns suggest that the Kaoping Fan recorded the onset of channelized and overbank deposits in the lower part and layered turbidite facies in the upper part subsequently. The accumulation of sediments and the growth of the Kaoping Fan are primarily controlled by inherited complex paleotopography and the evolution of the Kaoping Canyon. The sediment delivery system of the Kaoping Fan is characterized by lateral supply of over-spilling sediment flows and sediments bypassing to and beyond the base of slope. The Kaoping Fan together with the ponded Fangliao Fan in the topographically complex Kaoping Slope can be used as a type model for evaluating the topographic effects on the development of submarine fans on complex slopes in general.