

The modern Kaoping transient fan offshore SW Taiwan: Morphotectonics and development

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Using seismic reflection profiles and bathymetry, this study examined and determined the Kaoping transient fan located in the topographically complex slope offshore southwest Taiwan. The main body of the Kaoping Fan is located west of the lower reach of the Kaoping Canyon, 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 fan deposits consist of three main seismic facies: layered high-amplitude reflections in the upper section and stratified, parallel to sub-parallel low-amplitude reflections with variable continuity and channel fill facies in the lower section. The development of the Kaoping transient fan can be divided into three stages in terms of canyon activities and fan-feeding processes. Initially, the Kaoping Fan developed as a slope fan, mainly fed by a point sediment source at the apex of the fan. The proto-fan deposits are mainly built up by channel fills. Secondly, the Kaoping Fan maintained as a slope fan, mainly fed laterally by over-spilled sediments from the canyon course rather than by a point source. Finally, the Kaoping Canyon completely passes through the Kaoping Fan and supplies over-spilled sediments laterally to feed the Kaoping Fan continuously, forming a typical transient fan with two major characteristics: canyon incision and sediment by-passing.

The Kaoping Fan can be considered one variant of transient fans in topographically complex slopes and integrated into a large-scaled transient fan model. The Kaoping Fan together with the ponded Fangliao Fan on the Kaoping Slope can be used as a type model for evaluating the links between seafloor topography, deformation and formation of submarine fans on complex slopes elsewhere. The results of this study help better understanding of fundamental processes for forming a transient fan, as well as provide insights into the topographic effects on the nature of the transient fans on complex continental slopes with similar settings elsewhere.

Keywords: Kaoping Fan, transient fans, complex continental slopes