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Depositional architecture and evolution of the Late Miocene-Pliocene submarine fan systems in the Northwest Sub-Basin, South China Sea

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Thick submarine fan deposits have developed in the Northwest Sub-Basin, South China Sea. The sediment source of the deposits is, however, a subject of debate. Using high-resolution 2D reflection seismic data, this study indicates that these deposits form a suite of Late Miocene-Pliocene submarine fan systems in the Northwest Sub-Basin. Six seisimic facies within the fan systems are identified: channel complexes, channel-levee complexes, distributary channels, high amplitude reflection packages, distal lobes (or abyssal deposits), and mass transport deposits. More incised channels as well as thicker and more distributed depositional lobes developed in the Late Miocene submarine fans. In contrast, the Pliocene fans are characterized by fewer channels, and limited thicknesses and distribution of lobes. No clear fan lobes were deposited during the Quaternary period. In addition to the tectonic and sea-level change influence on the development of the Northwest Sub-Basin submarine fans, the effects of sediment supply dominantly controlled the thickness and distribution of the fan lobes. Sediments of the Late Miocene fans are interpreted to be originated from the shelf-edge delta at the westernmost domain of the Qiongdongnan Basin, through the Central Canyon. With the disappearance of the Late Miocene shelf-edge delta and the demise of the Central Canyon, the Pliocene fans shrank dramatically due tothe sharp decrease in sediment supply. Thus, the results of this study suggest a distinct sediment dispersal system around the Northwest Sub-Basin of the South China Sea.