

## **Nature and tectonic implications of uneven sedimentary filling of the South China Sea oceanic basin**

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The IODP Expedition 349 in 2014, for the first time, illustrated significant differences of sediment rate and lithology in the central South China Sea (SCS) oceanic basin. Based on seismic reflection profiles tied to IODP349 drilling data, we investigated characteristics of sedimentary filling of the whole SCS oceanic basin, and examined their implications for tectonics. Results show that sediments fill the SCS oceanic basin mainly in three depositional patterns. Firstly, during the Oligocene to middle Miocene, sediments amassed almost solely and then connected like a band parallel to the continent in a low average sediment rate ( $<10$  m/Myr) in the northern oceanic basin. These sediments were deposited mainly in the form of submarine fans and mass transport deposits. Sediments were predominately supplied by the Red and Pearl Rivers and the Dongsha Islands. The sedimentary characteristics likely reflect the latest early Miocene end of seafloor spreading of the SCS and the first-phase rapid uplift of the Tibetan Plateau. Secondly, during the late Miocene, deposition mainly occurred in the Northwest Sub-basin and extended southeastward with a middle average sediment rate ( $\sim 30$  m/Myr). Sediments were mostly transported by the Red River and Xisha Trough and deposited in the form of submarine fans. The abnormal increase of sediment rate in the Northwest Sub-basin reflects late Miocene slip reversal of the Red River Fault. Finally, since the Pliocene, sediments gradually propagated northeastward in the Southwestern Sub-basin, and accumulated rapidly in the southeastern and northeastern basin, especially in the northern Manila Trench during the Quaternary, in an average sediment rate about 60-80 m/Myr. These sediments were transported mainly by submarine canyons and settled in the form of submarine fans and canyon-overbank deposition. Sediments came from four major sources, including Taiwan, Dongsha Islands, Mekong River, and northern Palawan. The Pliocene to Quaternary explosion of uneven sedimentary filling in the SCS oceanic basin points to the combined action of local and regional tectonics, including the two-phase rapid uplift of the Tibetan Plateau, the Pliocene to Quaternary increased northwestward movement of the Philippine Sea plate and Dongsha event. This study exhibits hitherto most completed observation of sedimentary filling of the SCS oceanic basin and provides new geophysical evidences for the local and regional important tectonics.