

The sediment source to sink processes of tidal-influenced mountainous rivers in subtropical East Asia

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The sediment source-to-sink processes of large river systems (e.g. Changjiang/Yangtze River, Huanghe/Yellow River) in East Asia have been well investigated, while the small mountainous rivers, except for those in Taiwan, are less concerned. The small coastal rivers in southeast China generally drain tectonically stable terranes with relatively simple source lithology and subtropical monsoon climate regimes. The strong tidal influence in their estuaries and intense typhoon impacts make the sediment source-to-sink processes of these small coastal rivers much different from those large rivers, although they all supply terrigenous sediments to the East China Sea and have developed unique muddy and sandy sedimentary systems on the wide shelf.

This study takes the Mulanxi River in Fujian Province as an example, and presents the data of sediment characters (lithology and grain size), microfossils (foraminifera and Ostracoda) and geochemistry proxies (element ratios and Sr-Nd isotope) from the core MLX-S located in the estuary. By comparing the sedimentary records from the adjoining coastal and inner shelf areas, we aim to investigate the evolution of river sediment source-to-sink processes in subtropical southeastern China coast during the Holocene. The data suggest the initial inundation of Fujian coast started at ca. 9 ka, later than in Zhejiang coast (ca. 10 ka), probably indicating the influence of neotectonics. The depositional environments and sediment sources of core MLX-S evolved from fluvial environment with source from weathering debris in the catchment in early Holocene to a tidal influenced estuary and shallow marine environment with sediment mostly from inner shelf in mid-late Holocene. Sea level variation is the dominant factor for the change of sediment source-to-sink process, while the East Asian monsoon also played an important role. The East Asian Summer Monsoon significantly controlled the basin erosion and weathering intensity, while the East Asian Winter Monsoon influenced the intensity of coastal currents and corresponding alongshore drift. In addition, tidal force and anthropogenic activities especially the dam construction can also greatly regulate the sediment source-to-sink processes in small coastal river systems.

