Provenance and source-to-sink transport processes of fluvial sediments in the South China Sea

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The South China Sea (SCS) offers an excellent case for studying source-to-sink transport processes of fluvial sediments among the global marginal seas. This study synthesizes existing clay mineralogical and geochemical data from the seafloor and surrounding rivers combined with deepwater mooring observation results [1]. Source-to-sink sediment transport from the river mouth to the continental shelf and then to the abyssal basin is investigated. The results show the high diversity of clay mineralogical and geochemical compositions in riverbed surface sediments surrounding the South China Sea through chemical weathering controlled principally by the East Asian monsoon climate and subordinately by tectonic activity and specific lithological character. The basin-wide distribution of clay mineral assemblages combined with neodymium and strontium isotopic compositions reflects strong provenance control and differential settling effects. Through combining clay mineralogical distributions on the seafloor with observed oceanic current systems, the modern transport pathways can be well established. (1) In the northern SCS, smectite derived from Luzon is transported mainly by surface current with significant influence of the Kuroshio Current intrusion, illite and chlorite from Taiwan are mainly carried by the deep SCS Contour Current, while kaolinite from the Pearl River is clearly transported by the eastward Guangdong Coastal Current. (2) In the eastern SCS, the distinctive smectite content may be produced through chemical weathering of volcanic ash on the seafloor. (3) In the western and southern SCS, the transport pathway of clay minerals is difficult to identify because of highly homogenized clay–mineral distributions due to mixing by surface current systems.

[1] Liu Z. et al. (2016) *Earth-Science Reviews* **153**, 238-273.