# Geochemical constraints on two contrasting fluvial sediment routing systems in the East Asian continental margin

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Rivers play a key role in earth surface processes by linking the different spheres. The East Asian continental margin is featured by two major types of fluvial sediment routing systems: the mega-rivers in Eurasian continent, e.g. the Changjiang (Yangtze) River, and the small mountainous rivers in Taiwan Island, e.g. the Zhuoshui River. Multidisciplinary research methods including single mineral chemistry, multiple isotopic proxies are used to trace the fluvial sediment source-to-sink processes in East Asian continental margin, with special emphasis on the weathering mechanisms and environmental signal propagation in these two sediment routing systems across timescales.

The late Quaternary changes of detrital sediment provenances in the East China Sea can be well constrained by lithogenic Sr-Nd-Li isotopes, whereas the millennial variations of monsoon climate in the catchments were hardly reconstructed mostly because of the complex sediment recycling and buffering processes in the lowland basins. Comminution ages estimated by lithogenic (234U/238U) ratios suggest that the residence time (source-to-sink transport or weathering profile to depocenter) of fine siliciclastic sediments in the large Changjiang catchment is much longer than in the Zhuoshui watershed. Overall, the enhanced denudation toward the modern times in the Changjiang River is greatly driven by anthropogenic activities, whereas the extremely high and relatively stable denudation rates in the Zhuoshui River over different timescales are mainly controlled by active tectonics and extreme weather events. The interactive roles of tectonics, monsoon climate and anthropogenic activities govern the sediment production and transport rates in both mega-rivers and small mountainous rivers, and thus constrain the earth surface processes in East Asia continental margin.

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