# Tracing fluvial sediment routing systems in East Asia

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Tectonic movements and climatic changes during the Cenozoic have governed the evolution of surface landscape and river systems in East Asia, which eventually exert significant impacts on the land-sea interaction and material cycling in various catchments. East Asia continental margin is thus featured by two major types of fluvial sediment routing systems: one being represented by mega-rivers in Eurasian continent, e.g. the Changjiang (Yangtze) River, and the other by small mountainous rivers in Taiwan Island, e.g. the Choshui River. Here, we attempt to investigate and compare the sediment source-to-sink processes in these two river systems by multiple sedimentological and geochemical approaches, and particularly the weathering mechanisms and environmental signal propagation in these two sediment routing systems across timescales will be discussed.

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 (ca. 400-600 kyrs) than in the Choshui watershed (ca. 0-150 kyrs). The millennial-scale denudation rates estimated by in-situ 10Be in the large Changjiang and small Choshui catchments are relatively lower than their river gauging data that yields the average erosion rates in recent decades. Overall, the enhanced denudation over the last century in the Changjiang River is greatly drived by anthropogenic activies, whereas the extremely high and relatively stable denudation rates in the Choshui 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. Due to the different sediment transfer rates in these two river sediment routing systems, the magnitude and frequency of external forcing such as monsoon climate changes in the late Quaternary yield different preservation in sedimentary records in the estuarine and marginal seas.