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Time scale of riverine sediment transfer in East Asia: from source to sink

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River on the earth surface is like the blood vessel for human body, which transports huge nutrients from the vast continent to the deep ocean. The knowledge of the river transit process leads to better understanding of the continent weathering and earth surface evolution. However, this process, particularly its timescale, is rarely studied due to the poor geological tracer. In this regard, our work aims to reconstruct the sediment transport time in Changjiang (Yangtze River) and Taiwan rivers by mean of "Comminution Age" based on 234U/238U in the lithogenic fraction. As the largest river in Asia, Changjiang is characterized by "Large river/delta + wide shelf + huge input + slower sediment transfer + strong anthropogenic impact", while the Taiwan rivers are featured for "Mountainous river + narrow shelf + huge and rapid sediment transfer + extreme climate event". The distinct geological and topographical features in both river systems result in different sediment "source to sink" processes in terms of time scale. Our calculation shows that the sediment transport time, which is largely depended on basin topography and its weathering condition, in Changjiang basin is much longer (400 ky) than that in Taiwan river basin (120 ky). This work provides the first quantitative constraint on time scale of sediment source to sink process in East Asia, which probably sheds a new insight into weathering regime and sediment recycling in East Asia and northwest Pacific.

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