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Sr and Nd Isotopic Compositions as Tracers for Source-to-Sink Pathways of Sediments in the Taiwan Strait

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Sr and Nd isotopes are excellent tracers for various geochemical processes, in particular for provincial identification. The sediments source-to-sink pathways and the spatial variation of lateral fluxes in Taiwan Strait have been an important issue for past decades.

Surface sediments provide useful diagnostic details among ocean currents, sources and transport processes. In this study, more than 20 surface sediments collected from the Taiwan Strait including near estuary stations in western and southwestern coast of Taiwan, as well as Pearl River and Yangtze River in China. To simplify the mixing scenario, carbonate and adsorption phases of sediments were chemically removed before acid digestion. Concentrations of major and trace elements and Sr, Nd isotope of the residual solids were measured by ICP-MS and MC-ICP-MS, respectively.

The $^{87}Sr/^{86}Sr$ results show distinct four end-members mixing, including sediments from Taiwan Island, Penghu Island, Pearl River and Yangtze River. The samples near the southeastern coast of China show higher, ratios, 0.7234 to 0.7273, indicate mixing between sediments derived from Pearl River and Yangtze River. On the other hand, most of the Taiwan Strait stations show lower $^{87}Sr/^{86}Sr$ (0.7178 to 0.72048) and also smaller variations in both concentrations and isotopic ratios, indicating contribution from Taiwan and Penghu. The contribution of Yangtze River to northwestern Taiwan Strait is estimated to be higher than 60%, whereas the Taiwan Strait stations show higher contribution from Taiwan. Further systematic in Nd and Sr isotopic results will provide constraints to quantify various source contributions in spatial and temporal variation.