Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.35670

Reassessing Continental Sediment Fluxes at a marginal Sea Gateway: Quantitative Provenance of the Korea Strait Shelf Mud (KSSM)

MINJI SEO[1], HOI-SOO JUNG[1], JEONGWON KANG[1], MOONSOO LIM[2], SUNHEE HWANG[2], SEOK JANG[1] AND BYUNGCHEOL KUM[1]

[1]Korea Institute of Ocean Science & Technology
[2]Marine Research Corporation

The Korea Strait Shelf Mud (KSSM), located in the Korea Strait, is a major fine-grained sediment depocenter formed at a key marine gateway connecting the northeastern East China Sea and the East/Japan Sea. It serves as a sink for sediments supplied by rivers of China and the Korean Peninsula and records the redistribution of monsoon-driven terrigenous materials into the semi-enclosed East/Japan Sea. Thus, the KSSM provides an important archive for understanding sediment dispersal and continent–marginal sea interactions in the western Pacific.

Interpretations of KSSM sediment provenance have varied depending on analytical methods and proxies. Lee et al. (2025) proposed that more than 60% of sediments were derived from the Nakdong River based on depositional patterns and accumulation rates. In contrast, Xu et al. (2014) suggested dominant (~100%) contributions from Chinese rivers using isotopic and rare earth element (REE) tracers. Um et al. (2015) estimated ~70% contribution from the Changjiang River based on REE signatures but did not independently distinguish the Huanghe contribution. These discrepancies underscore the need for a quantitatively constrained multi-proxy reassessment.

Here, 114 surface sediment samples were analyzed for REEs and major elements (Fe_2O_3 and Al_2O_3). For the fine-grained fraction (<20 μm; n = 91), UCC-normalized LREEN (La–Nd)/HREEN (Er–Lu) ratios were combined with the relatively environmentally stable major-element proxy Fe_2O_3/Al_2O_3 ratio and applied to a mass-balance mixing model to quantify contributions from the Changjiang, Huanghe, and Nakdong rivers. Results indicate average contributions of 51 ± 9% from the Changjiang, 33 ± 12% from the Huanghe, and 17 ± 12% from the Nakdong River. These findings demonstrate that Chinese rivers dominate over the geographically adjacent Nakdong River.

Although broadly consistent with Um et al. (2015) in identifying Chinese dominance, our results explicitly partition the total Chinese contribution (~84%) into distinct Changjiang and Huanghe components. By independently quantifying each source using complementary geochemical proxies, this study provides a robust, source-resolved quantitative framework for tracing continental sediment fluxes through this major marginal-sea gateway. It improves understanding of sediment redistribution within the East Asian monsoon–western Pacific system.