

Geochemical implications of provenance and chemical weathering in the major river sediments of Myanmar and Thailand

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The major rivers in Myanmar (Ayeyarwady and Sittaung rivers) and Thailand (Mekong and Chao Phraya rivers, and their tributaries) originating from the Himalaya-Tibetan orogenic belts, discharging into the Andaman Sea and South China Sea, respectively. The bulk major and trace element compositions, TOC (total organic carbon) and TN (total nitrogen) contents, and TOC/TN ratios of sediments have been used to constrain the provenance, chemical weathering intensities, and sources of organic matter. The UCC (Upper Continental Crust) normalized major and trace elements of the rivers sediments display a significant depletion of Na₂O, CaO, K₂O, Ba and Sr indicate destruction of feldspar during chemical weathering in the source area or in fluvial transportation. Enrichment of Zr, Th, Ce and Y relative to UCC demonstrate the potential influence of heavy minerals of specific size-grades. The results of different discriminant diagrams suggest that the Mekong and Chao Phraya river sediments are primarily derived from the felsic rocks, whereas the Ayeyarwady and Sittaung sediments are derived from the mixing of dominantly felsic rocks and lower mafic or ultramafic sources. The Th/Sc and Zr/Sc ratios imply that the investigated sediments are largely controlled by felsic rocks with composition close to rhyolite, UCC, I- and S-type granites. The CIA (Chemical Index of Alteration) and PIA (Plagioclase Index of Alteration) data reveals that the Ayeyarwady and Sittaung sediments experienced in low to moderate degrees of chemical weathering, while moderate to intense chemical weathering in the Mekong and Chao Phraya river basins. High TOC and TN contents in the finer sediments and comparatively low in the coarser ones represent a potential result of hydrodynamic sorting. However, TOC/TN ratios indicate that organic matter are derived typically from aquatic macrophyte and higher vascular plant to the river sediments.

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