西南日本、紀伊半島の四万十テレーンの地球化学進化と後背地及び白亜紀－始新世の日本周辺の運動

Geochemical evolution,provenance of the Shimanto terrane, Kii Peninsula, and displacement at the Cretaceous-Eocene Japan margin

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Cretaceous-Miocene Shimanto terrane sandstones from Kii Peninsula, SW Japan, display marked contrasts in chemical composition related to changes in provenance, source weathering, heavy mineral concentration, and recycling. Pre-Maastrichtian units largely reflect felsic volcanic source in the inboard Ryoke arc. Rapid increase in SiO2/Al2O3 ratio, weathering indices, and shifts in immobile element ratios in the Campanian-Maastrichtian Nyunokawa Formation reflect influx of more weathered granitic detritus from unroofing of source Ryoke granitoids. Similar source and chemical characteristics prevailed throughout deposition of the Paleocene-Eocene Otonashigawa Group. Eocene-Miocene Muro Group sandstones are distinguished by increase in Zr/Sc, La/Sc and LaN/YN ratios, which are attributed to heavy mineral concentration, source maturation, and limited recycling. Modelling of siderophile element abundances suggests 7-13% of Muro detritus could be derived from recycling of uplifted inboard Sambagawa, Chichibu-Kurosegawa, and older Shimanto lithologies. These features are combined with existing modal and geological studies to produce a translocation model for the SW Japan margin. This proposes derivation of Nyunokawa Formation from granitoids first extensively exposed in west Honshu, with subsequent sinistral displacement of the entire Outer Zone along the Median Tectonic Line, in tandem with coeval west to east denudation of the Ryoke source in the Inner Zone. The model infers total displacement of 180-200 km between the Maastrichtian and latest early Eocene, at an average rate of ~ 5.1-5.7 mm/year. Ridge subduction is not required, but subduction of a leaky transform could account for the occurrence of rare in-situ MORB-signature basalts within Shimanto sediments.