

Geochemical compositions and provenance discrimination of the central Yellow Sea sediments

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Abstract

Geochemical compositions and sedimentation rates of the central south Yellow Sea sediments were analyzed for the identification of sediment origins. The accumulation rates measured by Pb-210 geochronology were estimated to be 0.21 to 0.68 cm/yr or 0.176 to 0.714 g/cm²·yr in the central south Yellow Sea, with decreasing rates from the west part to the central part. Calcium carbonate and total organic carbon are more enriched in the western muddy sediments towards the China side than in the east part with sand dominant. The concentrations of major and trace elements of the central south Yellow Sea sediments vary between those of Chinese rivers (Changjiang and Huanghe) and Korean river (Keum River) sediments. Elemental ratios of Sc/Al, Th/Al, Ti/Al and Cr/Th were used as provenance proxy indicators to identify the sediment origins of the central south Yellow Sea. The discrimination diagrams clear show that the sediments in the west and central parts of the central Yellow Sea are ultimately sourced from Chinese rivers, especially from the Huanghe, whereas the sandy sediments in the east part might come from the Korean rivers and deposited during the postglacial transgression but now exposed in the sea floor. The REE distribution pattern of the central Yellow Sea sediments are relatively enriched in most LREEs than the Huanghe sediment and depleted than that in the Keum river, but Ce/Ce* ratios are similar to the Huanghe sediments. The Eu/Eu* ratios ranged from 0.598 to 0.630 (av. 0.613) are slightly higher than the Huanghe and Keum sediments, indicating possible the mixture of the sediment from these two rivers and the material from other sources. The oceanic circulations play a key role in the sediment distribution patterns of the central south Yellow Sea, which should be highlighted and considered fully in the provenance and sedimentation studies later on.