Radiocarbon studies of organic matter in different size fractions of the Yellow River transported particles and Yellow Sea sediments

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Clay minerals play important roles in incorporation, transport and preservation of organic matter in marine sediments. In this study, we investigated the fate of organic carbon in different size fractions in the particulate matter transported by the Yellow River, the second largest river in China, and in the surface sediments of the Yellow Sea. The riverine particles were separated into five size fractions (< 8μm, 8-16μm, 16-32μm, 32-63μm and > 63μm) by hydrodynamic sorting method and surface sediments were separated into four size fractions (5-63μm, 63-100μm, 100-200μm and 200-500μm) by wet sieving method. Carbon isotopic ($\Delta^{14}C$ and $\delta^{13}C$) compositions were measured for OC in each size fractions.

The values of $\delta^{13}C$ of OC in different size fractions ranged from -19.3‰ to -24.8‰ for the river particles and -20.2‰ to -24.5‰ for the surface sediments. The values of $\Delta^{14}C$ ranged from -325‰ to -691‰ for the river particles and -172‰ to -706‰ for the surface sediments, corresponding to the ^{14}C ages of 3,100 to 9,360 years for the river particles and 1,460 to 9,760 years for the surface sediments. The Yellow River transports very old particulate organic carbon (POC) to the Yellow Sea. No clear systematic patterns were found for ^{14}C ages of OC associated with different size fractions in both river particles and surface sediments but large ^{14}C age variations exist for OC in the surface sediments in the Yellow Sea. The source of OC inputs and possible causes of the observed $\Delta^{14}C$ variations in the river particles and surface sediments are discussed.