Characteristics and distribution of organic matter in surface sediment of the East China Sea

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The East China Sea (ECS) is a convergence region of terrestrial and marine organic matter (OM). The behaviour of OM is quite complicated in this area. In this study, eight surface sediment samples from the Yangtze River and ECS are selected and each divided into 8 fractions (1-8Φ: >250μm, 250~125μm, 125~63μm, 63~25μm, 25~10μm, 10~5μm, 5~2 μm, <2μm). Palynofacies and organic carbon isotopic ($\delta^{13}C_{org}$) are used to investigate the source and distribution of OM in the these regions.

Results show that samples nearby the land are characterized by high content of structured OM (about 80%) and low $\delta^{13}C_{org}$ (-25.29~-24.06‰), while samples from the offshore areas have abundant amorphous organic matter (AOM, 36~52%) and high $\delta^{13}C_{org}$ (-23.05 ~-21.85‰). It is indicated that the types of OM and their sources vary in different regions, which may be influenced by the Kuroshio and coastal rivers developed in the study area.

OM types and their proportion as well as $\delta^{13}C_{org}$ are different according to the size of fractions. The fine size fraction(8Φ) is dominated by AOM (63.7~100%), while coarser ones (3-1Φ) are high in structured OM (57.6~ 99.1%). In addition, $\delta^{13}C_{org}$ is related to particle size and region. In the estuary of the Yangzte River, $\delta^{13}C_{org}$ was heavier in 8-7Φ fractions by 2.5~5‰ than that of coarser ones, and the gap increases when it approaches the mouth. In northern and eastern ECS, $\delta^{13}C_{org}$ increases slightly (-24.63~-22.41‰) with particle size. However, it is more depleted in coarser fractions in Zhemin Coast area. Therefore, the type and per-centage of OM as well as $\delta^{13}C_{org}$ change with size and dis-tribution range. It may be resulted from different protection mechanisms so that different types of OM are in different evolution degree.

Hence, OM adsorbed and protected in different fractions is not consistent. So it is insufficient analyzing sedi-mentary OM with only bulk samples. The aggregation, deposition and preservation mechanisms are complicated, thus the fates of each type of OM in carbon cycle would be different.

This work was supported by National Natural Science Foundation of China (Grant No. 41372130) and Independent Fund Project of State Key Laboratory of Marine Geology (Grant No. MG20130103).