Zn isotope compostions of the Ediacaran Carbonates, Yangtze Block

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The sedimentary sequences of the Ediacaran Doushantuo Formation in the Yangtze block are mainly composed of alternating siliciclastic and carbonate rocks and yields abundant preserved animal fossils, thus it is critical for deciphering the evolutionary history of life during the time interval. Zn isotope fractionations are controlled by the biological processes in seawater (Maréchal *et al*., 2000; Pichat *et al*., 2003). Thus it can be used to track the evolution of primary productivity in the Ediacaran Period.

The δ^{66}Zn values of carbonate rocks in the whole Doushantuo Formation vary from 0.18‰ to 0.81‰ (relative to JMC3-0749L), with an average of 0.48‰, displaying enrichment in Zn heavy isotope. The carbonates δ^{66}Zn values of the Doushantuo Formation which comprises the four members have some positive and negative shifts. The δ^{66}Zn in the Member 1 increases from 0.41‰ at the base to 0.81‰ at the middle, and declines to 0.34‰ in the upper. The δ^{66}Zn of Member 2 increases to 0.65‰ at the base, and decreases to 0.18‰ at the middle. At the upper of the Member 2 and the base of Member 3, the δ^{66}Zn values fluctuate around 0.21‰~0.57‰. The δ^{66}Zn at the middle of Member 3 begins with an increase from 0.38‰ to 0.80‰, and decrease to 0.32‰ at the uppermost.

Those compositions are significantly higher than average continental crust (~0.2‰–0.3‰; Maréchal *et al*., 2000; Archer and Vance, 2004). This may suggest that due to biological process control of the Zn isotope composition (Maréchal *et al*., 2000), Zn light isotope is removed from the surface ocean by primary producers and transported to the deep ocean (Maréchal *et al*., 2000; Bermin *et al*., 2006). In that case, the Zn isotope ratios measured in carbonates may record the fluctuations in primary productivity during Ediacaran Period.

Distribution of cadmium and its main influencing factors in the surface sediments from five typical bays in eastern coastal areas of Guangdong Province, South China

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In recent years, with the rapid economic and social development in eastern Guangdong, South China, the environmental state of the coastal waters has aroused great attention by the people. Cadmium (Cd) is a heavy metal with biological non-essential and highly toxic effects, and its special chemical and geochemical properties determines its high degree of risk and difficult to control in the natural environment.

The contents of Cd were determined for 64 surface sediments collected from five typical bays in eastern coastal areas of Guangdong Province, and the distribution characteristics of Cd in surface sediments and their main influencing factors were discussed. Meanwhile, the potential ecological risk indexes were calculated referring to the background value of the continental shelf of South China Sea. The results showed that content ranges of Cd were 0.04~0.58mg/kg, 0.06~6.63 mg/kg, 0.06~0.11mg/kg, 0.04~0.20 mg/kg and 0.08~0.15mg/kg respectively in Zhelin Bay, Shantou Bay, Shanwei Bay, Daya Bay and Dapeng Bay, and different distribution trend appeared in different bay. In Zhelin Bay and Shantou Bay, the Cd content presents a high value in aquaculture areas and in the waters near of Sanbaimen dam and Cape of Good Hope, as well as the end of the Sediment Retention embankment waters, and low Cd content presents in the rest of the waters, close to or below the background values of the continental shelf sediments in the South China Sea. The Cd contents increased from inshore to offshore, west to east in Shanwei Bay, and the high levels of Cd generally appear in the Bay outside in Daya Bay and Dapeng Bay.

Organic carbon and fine-grained component of sediments are not the main factors to control the content and distribution of Cd in the study area. Cd distribution was more influenced by the heavy metal input and hydrodynamic effects, and the aquaculture was also a way to change the depositional environment, so that the spatial distribution of Cd changed.

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