Nitrogen isotopic characteristics and marine redox conditions: Comparing Niutitang , Wufeng , Longmaxi Shales in the Yangtze Platform , South China

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This study selected three typical marine shales of Yangtze region in southern China: Longmaxi shales ,Wufeng shales and Niutitang shales. We measured δ^{15}Nbulk, organic carbon isotopes ($\delta^{13}C_{org}$), total organic carbon (TOC) , total nitrogen (TN) and trace elements from the core of the three formations. The experimental results show that the Longmaxi shales ,Wufeng shales and Niutitang shales samples were characterized by very different δ^{15}N values, Longmaxi shale core nitrogen isotopes (average$\delta^{15}N_{bulk}$ =4.9 ± 0.8‰) higher than Wufeng core nitrogen isotopes (average $\delta^{15}N_{bulk}$=4.4 ± 0.8‰), Niutitang nitrogen isotope (average $\delta^{15}N_{bulk}$ =2.1 ± 0.8‰) values of the lowest. Comparing the $\delta^{15}N_{bulk}$ with other geochemical proxies and core description in order to excepted the relationship between δ^{15}N and redox condtions. We found that Niutitang formation is belongs to the strong reducing sedimentary environment, the bottom influenced by hydrothermal sedimentary become extreme anoxic environment, which in favor of preservation of sedimentary organic matter, then TOC and TN values are higher. Wufeng formation is the reductive environment and deep-water shelf deposit. Longmaxi formation is the weak reductive sedimentary environment, the sea level is reduced and increased water oxygen content. We propose that sedimentary environment is a key factor of nitrogen isotope distribution difference in three formations shales cores samples. Nitrogen isotope distribution with sedimentary water redox conditions exist obviously correlation, and can be used as an index indicating depositional water oxidation reduction characteristics.