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The geochemical characteristics and factors controlling the organic matter accumulation of the Late Permian marine black shale from the Middle Yangtze area, South China

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Organic-rich black shales, located in the Western Hubei Basin from the Late Permian, is considered an excellent source rock in South China. The preservation and formation conditions of this resource are discussed by its geochemical characteristics in this study. Based on the results of total organic matter (TOC), the black shales from the Dalong Formation has high TOC contents (2.1%-9.3%), whereas mudstone samples contain low TOC contents (0.25%-0.87%). In the black shale deposition many redox indices, including V/ (V/Ni) ratios, V/Cr ratios, U/Th ratios, and relationship of U and Mo suggest that anoxic and enuxic environment predominated during the black shales accumulation. In contrast, ventilated and oxygenated marine conditions pervaded the western Hubei Basin during deposition of Mudstone. The primary productivity indices (P/Al, Ba/Al, Cu/Al and Ni/Al) suggest that high paleoproductivity occurred in Later Permian, especially during the transgression period. However, weak/negative relationship between TOC contents and P/Al ratios and Ba/Al ratios, demonstrates that the organic matter accumulation was not mainly controlled by primary productivity but the anoxic to an enuxic environment. Results of the study stress that the tectonic movements and volcanic events plays an important role in organic matter accumulation and preservation. The depositional model shows that the Western Hubei Basin was a semi-restricted basin system influenced by the depression and transgression. Some factors, such as clastic fluxes, stratified seawater, high fresh water inflows and higher oxygen consumption by producers decomposed during the black shales implies that oxygendepleted bottom water of the basin favored the accumulation and preservation of sedimentary organic matter, resulting in the formation of organic-rich black shale.

Key words [U+FF1A] Black shale Geochemical characteristics Organic matter accumulation Upper Triassic Middle Yangtze basin

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