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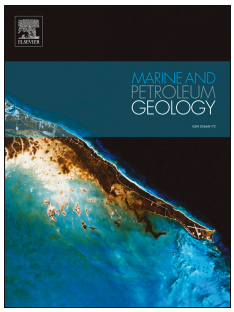

Influence of sedimentary environment on organic matter enrichment in shale: A case study of the Wufeng and Longmaxi Formations of the Sichuan Basin, China

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Influence of sedimentary environment on organic matter enrichment in shale:

A case study of the Wufeng and Longmaxi Formations of the Sichuan Basin, China

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ABSTRACT

As two essential controls on the formation of organic matter (OM)-enriched shales, both paleoproductivity and preservation models remain controversial for the Wufeng and Longmaxi shales in the Sichuan Basin, southwest China. This study provides geochemical parameters as proxies for the paleoproductivity characteristics (Ba, P/Al, and (Ni+Cu)/Al), bottom water redox status (U/Th, V/(V+Ni), V/Cr, and Mo), and terrigenous clastic flux (Th and Al) of the Wufeng–Longmaxi Formations in the Sichuan Basin, a back-deep basin in a foreland basin system in southwest China. Combining these data with total organic carbon (TOC) content and sedimentation rate data obtained from graptolite zones allowed us to discuss the validity of these popular indices and to identify the main factors that controlled OM enrichment in the formations. TOC contents exceed 4 wt% in the upper Wufeng Formation to the bottom part of the Longmaxi Formation (LM1-3), which are the most OM-rich intervals. The average P/Al ratio for well JY2 in the Jiaoshiba area is 0.009, which is lower than those for well YY1 (0.028) in the Yongchuan area and well DY1 (0.02) in the Dingshan area, indicating the lowest productivity levels were in the Jiaoshiba area. Based on the redox proxies, the samples from well

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