Applying sedimentary geochemical proxies for paleoenvironment interpretation of organic-rich shale deposition in the Sichuan Basin, China

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Abstract: Depositional environment highly affects the geochemical feature of sediments recording the information of paleoenvironment and its evolution. Geochemical data for Ordovician Wufeng Formation and Silurian Longmaxi Formation black shale deposition in the Sichuan Basin are presented and applied as proxies for deciphering paleoenvironment (detrital influx, redox conditions, paleoproductivity) and providing insight to paleoenvironmental conditions responsible for organic carbon accumulation. These data suggest that siliceous shale in the Wufeng and Longmaxi Formations reveals high TOC content, whereas silty, argillaceous, and limey shale display relatively low TOC contents. Major element and petrological evidences indicate that most of quartz in siliceous shales is biogenic origin (as shown by excess silica concentrations); therefore, Si is an unreliable