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Room:104

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Ecosystem and environments 2.5-2.7 Ga ago: Geochemical Records from the Hamersley Basin, Western Australia

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Through interactive evolutions of the Earth system throughout its long history, i.e., co-evolution of atmosphere, hydrosphere, lithosphere, and biosphere, microbial ecosystem and metabolic pathways have experienced complex evolution. From iron and carbon isotope compositions of 2.7-.5 Ga old drillcore black shales in Hamersley Basin, Western Australia, we tried to constrain the evolution of microbial ecosystem and environments. Near-shore sedimentary rocks are characterized by C isotope compositions of organic matter that are suggestive for C cycling that involved various aerobic and anaerobic metabolism of methane, and their Fe isotope compositions with limited variations suggest rather inactive redox cycling of Fe. On the other hand, deep-facies shales have intra-basin variations such that proximal shales presumably under oxic conditions have heavier Fe isotope compositions and distal shales deposited in anoxic environment have much lighter Fe isotope compositions. Such variations are consistent with the Fe-shuttle model driven by Fe reduction by Fe-reducing bacteria.

Keywords: Black Shales, Iron reducing bacteria, Sulfate reducing bacteria, Australia, Continental Drilling, Iron Isotope