

Links between Paleoproterozoic glaciations and the Great Oxidation Event

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Knowledge of the timing and causative mechanism of the rise in atmospheric oxygen is important in understanding the evolutions of not only Earth's environment but also life and ecosystem. Although repeated glaciations occurred at the time of oxygen increase (2.4-2.2 billion years ago) in the Paleoproterozoic era, the relationship between atmospheric and climatic transitions remains poorly understood. Here we discuss the linkages between the Paleoproterozoic glaciations and the rise of atmospheric oxygen based on geochemical records of the isotopic composition and abundances of redox-sensitive transition metal osmium, isotopic composition of organic carbon, and abundance of manganese in Paleoproterozoic sedimentary sequences of the Huronian Supergroup, Canada, and the Marquette Range Supergroup, USA. Our findings suggest that the climatic recovery from severe glaciations accelerated the process of atmospheric oxygenation.