

The Neoproterozoic Oxidation Event: Trace element chemostratigraphy at the Precambrian/Cambrian transition in South China

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The transition to a fully oxygenated Earth surface environment during the late Neoproterozoic involved major global events such as climatic swings, tectonic reorganisation and biological innovations and had profound effects on biogeochemical cycling. An increasingly oxygenated Earth's surface possibly led to the ventilation of the deep marine environment and to a build-up in the ocean of the redox-sensitive trace metals which are generally more soluble as oxidised complexes, e.g. Mo and V. Because reductive sequestration of these metals results in authigenic enrichment in oxygen-depleted sedimentary facies, ocean anoxic events can affect the budgets of these biogeochemically significant elements [1]. Hence, investigating the trace metal distribution in Neoproterozoic/Cambrian black shales, when a redox stratified ocean [2] and an oxygenated atmosphere coexisted, can shed light on the development and timing of the Neoproterozoic Oxygenation Event (NOE) and enhance our understanding of the Cambrian Explosion. In this study, we present high resolution trace metal data, with a focus on Mo and V, coupled with other paleoredox proxies like iron speciation (FeHR/FeT) and Ce anomaly data as part of a multi-element chemostratigraphic approach across 5 Neoproterozoic-Cambrian sections from the Yangtze Platform, South China. Furthermore, we generate Mo/TOC ratios in order to constrain changes in the ocean Mo budget during the interval [3]. This preliminary dataset shows that the black shales on the Yangtze Platform were deposited under anoxic conditions without evidence for euxinia. Nevertheless, variations in trace-metal enrichment might indicate fluctuating redox conditions from the Upper Ediacaran to the Lower Cambrian and/or an increase in the Mo reservoir triggered by increasing oxidative weathering on land.

The data represents preliminary research which will be expanded by analysing further sections embracing the Precambrian-Cambrian transitional interval. No conclusions can yet be drawn concerning the timing of the Neoproterozoic Oxygenation Event.

[1] Tribovillard et al. (2006) *Chemical Geology* **232**(1-2), 12-32.

[2] Canfield (1998) *Nature* **396**(6710), 450-453.

[3] Algeo and Lyons (2006) *Paleoceanography* **21**(1).