**Metal isotopes in oceanography and paleoceanography: what are they good for?**

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There has recently been a burgeoning of interest in the potential of the isotope systems of the transition metals to help us understand key biogeochemical processes in the present and past oceans. For example, these metals often limit primary productivity in the ocean, so that the biological cycling could provide constraints on their impact on the efficiency of the oceanic biological pump. In deeper time, contrasting requirements for these metals by different organisms could be reflected in the geochemistry and isotope geochemistry of ancient sediments. On the other hand, the solubility of these metals is very closely tied to redox, particularly sulphur chemistry, so the biological constraints may be confounded.

This talk will summarise some aspects of the modern ocean geochemistry and isotope geochemistry of trace metals. Contrary to many expectations (very much including those of this author), data from the modern oceans strongly suggest that isotope fractionation during uptake into phytoplankton is often limited. The presentation will put forward the view that, at least in the modern ocean, the isotopic systems of many of these metals are controlled by redox, and particularly sulphide. It is the redox chemistry of the past oceans that they can help us understand.