

## **Did sediment accumulation reshape crustal nutrient inventories?**

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The prevalence and behavior of life on Earth is strongly related to the physical and chemical reprocessing of crustal rocks. Quantifying that relationship over time is challenging. Here, we use the lithological and chemical evolution of Earth's crust to constrain availability of limiting elements for oxygen production versus consumption over time (P, Mo; Ni, Fe). Using a combined geo-spatial, -temporal, and -chemical record of igneous and sedimentary rock evolution over time, we show that sedimentary rocks began to accumulate within upper continental crust (UCC) at 3 Ga, undergoing a steep uptick at ~ 2.5 Ga. Using these data in conjunction with compositional constraints on P, Ni, and Mo, we explore the consequences of sediment accumulation for nutrient availability during weathering and the size of oxidisable iron reservoirs. We will present evidence that sediment accumulation within Earth's UCC, perhaps more so than igneous geochemical evolution, represents a plausible driver for major changes observed in the lead up to, during, and after the Great Oxygenation Event (2.45 Ga).