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Earth's long-term biogeochemical evolution: the view from the upper crust

Mass exchange into and out of Earth's sedimentary reservoir impacts not only our understanding of Earth history but it also governs the long-term biogeochemical evolution of the surface environment. Here I use a comprehensive stratigraphic database, augmented with information extracted by a machine reading system from the published literature, to test long-standing assumptions about rock cycling and the drivers of atmospheric oxygenation during the past 3.5 billion years. Unsteady growth and changes in the composition of the continental sedimentary reservoir have exerted a first-order control on the evolving Earth system.