



Life as a geological process on the Archean Earth

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Life originated on a geologically active planet, and it is commonly assumed that geochemical processes were ultimately translated into biochemistry. However, planetary imprints on further biological evolution are rarely discussed. Here I propose that throughout the Archean eon (> 2.5 Ga) life was perhaps more strongly tied to geological phenomena than it is today. New data and models suggest that prior to the onset of oxidative weathering around 2.5 Ga, hydrothermal vents and volcanism may have been major sources of metabolic substrates that were essential for sustaining the biosphere. At the same time, the growth of continental crust may have played a vital role in biological diversification by creating niche spaces with distinct physicochemical properties. Collectively, these results have implications for the habitability of the early Earth and possibly other worlds.