



Interplay between solid Earth and biological evolution

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Major shifts in Earth's evolution led to progressive adaptations of the biosphere. Particularly the emergence of continents permitted efficient use of solar energy. However, the widespread evolution of the biosphere fed back to the Earth system, often argued as a cause for the great oxidation event or as an important component in stabilizing Earth's climate. Furthermore, biologically enhanced weathering rates alter the flux of sediments in subduction zones, establishing a potential link to the deep interior. Stably bound water within subducting sediments not only enhances partial melting but further affects the mantle rheology. The mantle responds by enhancing its rates of convection, water outgassing, and subduction. How crucial is the emergence and evolution of life on Earth to these processes, and how would Earth have been evolved without the emergence of life? We here discuss concepts and present models addressing these questions and discuss the biosphere as a major component in evolving Earth system feedback cycles.