



Geodynamics and the Archean carbon cycle

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We present a minimal model for the global carbon cycle of the Earth containing the reservoirs mantle, ocean floor, continental crust, continental biosphere, the kerogen, as well as the aggregated reservoir ocean and atmosphere. This model is coupled to a parameterised mantle convection model for describing the thermal and degassing history of the Earth. We take into account lower continental area and higher heat flow and spreading rates in the past. In this study the evolution of the mean global surface temperature, the biomass, and reservoir sizes are investigated. We find that the parameterisation of the hydrothermal flux and the evolution of the ocean pH in the past has a strong influence on the atmospheric carbon reservoir and surface temperature. The different parameterisations give a rather hot as well as a freezing climate on the early Earth (Hadean and early Archean).