

Consequences of Late Cretaceous uplift of Africa on continental weathering systems and global climate

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The African continent, most notably its margins and the southern tip, have experienced a significant uplift throughout the Late Cretaceous (roughly 100Ma to 70Ma). This event coincides with a decline of CO₂ level, and global cooling. Evidences of this uplift include quantification of sediment volumes in oceanic basins, thermochronological dating, and inland geomorphological observations. In addition, new geochemical data from sediment cores – including clay mineralogy and the Lu-Hf/Sm-Nd proxy, for which data acquisition is still ongoing – indicates a contrasted and asynchronous response of continental weathering systems to this uplift.

Here we used the modelling framework GEOCLIM to simulate the response of continental weathering and global geochemical cycles to the Cretaceous African uplift. We developed an uplift scenario based on marine sedimentary data around the African continent, and reconstruction of paleo elevation and lithology. This scenario is used as input by GEOCLIM, that computes weathering fluxes (including silicates, petrogenic organic carbon and phosphorus), and the evolution of global carbon cycle (both organic and inorganic part). This framework allows us to quantify the global cooling that may have resulted from this tectonic event.