



Neogene climate change in southwestern Africa recorded in continental biomineralisations

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The Neogene period was characterized by a series of events that modified global climate with long-lasting impacts on continental biotas. They included major shifts in floral composition, characterised in Africa by shrinking of forests and emergence of C_4 grasses and more open landscapes, and accompanied by large-scale evolutionary shifts in faunal communities. Here we present isotopic evidence obtained from south western Africa concerning the emergence of C_4 grasses. We show that $\delta^{18}O$ and $\delta^{13}C$ values in fossil and modern ratite eggshells collected from aeolianite deposits of the Namib Desert track regional differences and global climate shifts throughout the Miocene and Pliocene. The spread of C_4 grasses occurred only during the Pliocene. Variation in eggshell carbon isotope composition during the Miocene appears to have depended on changes in global atmospheric CO_2 concentrations and pluviometry. Comparisons between the continental Namib data with oceanic data provide a broader global framework for the history of this desert.

Two main phases of aridification have been identified in the Namib: 1] onset of arid conditions during the Middle Miocene (contemporaneous with expansion of the

Antarctic Ice Sheet to continental scales), and 2] intensification of aridity during the Lower Pliocene (related to growth of the Arctic Ice Cap and increased upwelling of the Benguela cold water cells).

These results are compared to palaeontological and geochemical data from other regions of Africa in order to understand the history of the Namib in the context of global climatic change.