



Recurrence in climate variability – a comparison of modern climate data from Nakuru, Kenya, with Early Holocene palaeo-climate records

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Modern climate in tropical East Africa is mainly controlled by the Intertropical Convergence Zone (ITCZ) and the African-Asian summer monsoon, both being very sensitive to the El Niño/ Southern Oscillation (ENSO). Climate change and climatic variability are reflected in well preserved lacustrine sediments exposed in basins within the larger rift depression. In the past, ENSO related influences may have changed and led to fluctuations in the mean annual precipitation and the intra- and inter-annual variations of rainfall. In order to study past precipitation variability, we compare the recurrence structure of a laminated lake-sediment sequence from Lake Nakuru, Kenya, with the recurrence structure of modern regional rainfall data.

The recurrence of states is a fundamental behaviour of dynamical systems. A modern technique of nonlinear data analysis, the recurrence plot, visualises and analyses the recurrence structure and allows us to compare different systems using recurrence statistics. The studied lake sediment sequence was deposited immediately south of the equator during the East African humid period between 16 to 6kyr BP. This interval was characterised by 25-30% more precipitation, and eventually a much stronger influence of the summer monsoon compared to the present. A comparison of the recurrence statistics of modern and past climate data help to understand the relative importance of the main drivers of the tropical climate and their behaviour in the course of global climate change.