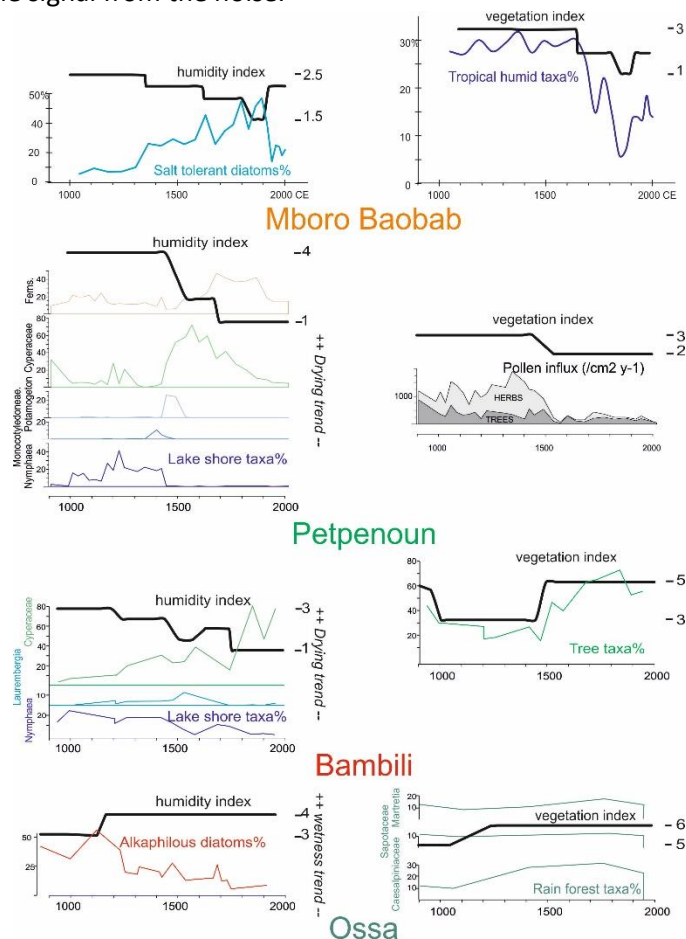


Supplementary information: the construction of the indexes from the paleo data

Our approach is based on a *qualitative* description of regional environmental and climate conditions. The indexes synthesize data from various proxies types (e.g. pollen percentages or influxes, diatom percentages...) from which the main features indicative of aridity are extracted based on a step-scale. The supplementary figure illustrates the method with an example from each of the major vegetation zones considered in the paper: the sahel (Mboro-Baobab), the savanna zone (Petpenoun), the mountain forest (Bambili) and the lowland evergreen forest (Ossa). The index is drawn manually from original data. It shows that we relied on proxy such as salt-tolerant diatoms concentration (e.g., at Mboro-Baobab site) which allows identifying the development of aridity based on the salinity levels of lake waters. We also relied on several pollen taxa (such as at Petpenoun), where the development of aridity is derived from the transition from plants typical of open water (Nymphaea) to plants typical of lake edge (ferns).

The purpose of these step-scale indexes is to homogenise the information provided by the heterogeneous and complex original data sets. The step-scale is built to capture the major transitions to allow distinguish the signal from the noise.



Supplementary Figure : Index versus proxy data for paleoenvironmental reconstruction. The index can be derived from one or more proxies types allowing for a synthetic analysis at the sub-continental scale.