
Long-term savanna functioning revealed by a multi-proxy approach

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Résumé

Savannas are persistent tree-grass mixtures maintained by a combination of climatic, edaphic, fire and herbivory influences. The heterogeneity of ecological processes allowing tree-grass coexistence on the long term has led to different ecological models of savannas but no comprehensive theory. In addition, a major concern about the different models of savannas is the time scale of their validity because most of them are validated against a few years of data. The aim of this study is to develop paleoenvironmental proxies in savannas to draw a long-term perspective on how climate and land use changes have impacted savanna ecosystems. Six herbaceous swamps were cored in a mosaic of forest and savanna in the middle of the equatorial forest (Lopé National Park in Gabon). Multi-proxy analyses of the sediments are in progress: X-ray fluorescence core-scanning measurements, stable isotopes, phytolith, charcoal and pollen analysis. The first results show that the functioning of each swamp has a strong influence on the signal of each proxy recorded over the last 2000 years. At the local scale, the savanna tree-cover is well recorded by phytoliths and $\delta^{13}C$ and seems to be fire-dependent. Pollen assemblages are more related to a regional signal. The results permitted an investigation into the spatial scale resolution of each studied proxy by comparing inter-site signals within a restricted area of less than 50 km² and the intra-site signals that correspond to the replicability and variability of the records. Finally, the reason for a simultaneous swamp starting up almost 2000 years ago within the six studied sites is discussed through a regional point of view.

Mots-Clés: Paleoecology, savanna, multi, proxy, Congo Basin forest, Lopé, Gabon

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