CHARCOAL ARCHIVES REVEAL HOLOCENE FIRE-VEGETATION-CLIMATE LINKAGES IN CENTRAL AFRICA

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Understanding the role of different drivers of past African climate and vegetation change may contribute significantly to our understanding of forest dynamics observed over the last decades and of trends expected for the near future. Wetland ecosystems and lakes provide high-quality sedimentary archives which integrate over large regional scales. Unfortunately, wetlands and lakes with useful stratified sediment layers are absent in large parts of Central Africa, impeding our knowledge of pan-African past climate and vegetation dynamics. We therefore use another archive that can be highly complementary to the more established fields of lake and wetland sediment analysis: charcoal from terrestrial soil layers. Central African charcoal archives have hardly been explored, mostly due to the lack of straightforward identification techniques coping with species-rich environments. Therefore we recently developed a transparent charcoal identification procedure for Central Africa. Moreover, we illustrated how combining imaging techniques can provide optimal visualization of charcoal anatomy, enabling evaluation of specific difficulties encountered during charcoal examination. This eventually leads to high-level identification of charcoal taxa.

Here we present how these techniques resulted in charcoal records demonstrating a direct temporal link between Holocene palaeofire, vegetation change, climate and humans in the Democratic Republic of Congo.

We find three distinct periods of local palaeofire occurrence linked to well-known Holocene drought anomalies: the 8.2 ka BP event, the third millennium BP rainforest crisis and the Medieval Climate Anomaly. Charcoal identifications show increased occurrence of pioneer and woodland savanna taxa during and just after these disturbance periods. Furthermore, first results from the Central Congo basin indicate that disturbance through increased burning by humans after 0.5 ka BP could be at the origin of present-day patchy distribution patterns of long-lived secondary forest stands. An example is a forest type dominated by the famous flagship species *Pericopsis elata*. These results support the notion of a dynamic forest ecosystem at multi-century timescales across the central African rainforest.