



Charcoal records reveal past occurrences of disturbances in the forests of the Kisangani region, Democratic Republic of the Congo

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Past disturbances have modified local density, structure and floristic composition of Central African rainforests. As such, these perturbations represent a driving force for forest dynamics and they were presumably at the origin of present-day forest mosaics. One of the most prominent disturbances within the forest is fire, leaving behind charcoal as a witness of past forest dynamics. Quantification and identification of ancient charcoal fragments found in soil layers (= pedoanthracology) allows a detailed reconstruction of forest history, including the possible occurrence of past perturbations.

The primary objective of this study is to present palaeoenvironmental evidence for the existence of past disturbances in the forests of the Kisangani region (Democratic Republic of the Congo) using a pedoanthracological approach. We quantified and identified charcoal fragments from pedoanthracological excavations in the Yangambi, Yoko, Masako and Kole forest regions. Charcoal sampling was conducted in pit intervals of 10 cm, whereby pottery fragments were also registered and quantified. Floristic identifications were conducted using former protocols based on wood anatomy, which is largely preserved after charcoalification.

14 excavations were conducted and charcoal was found in most pit intervals. Specifically, 52 out of 56 sampled intervals from the Yangambi forest contained charcoal, along with 47 pit intervals from the Yoko forest reserve, 34 pit intervals from the Masako forest and 16 from the Kole forest. Highest specific anthracomasses were recorded in Yoko (167 mg charcoal per kg soil), followed by Yangambi (133 mg/kg), Masako (71,89 mg/kg) and finally Kole (42,4 mg/kg).

Charcoal identifications point at a manifest presence of the family of Fabaceae (Caesalpinioideae). This family is characteristic for the tropical humid rainforest. The presence of charcoal fragments from these taxa, associated with pottery sherds on different depths within the profiles, suggests past occurrences of anthropogenic perturbations in these forests.

Insights in past forest dynamics and the relative roles of climatic and anthropogenic disturbances enhance our overall understanding of present and future forest dynamics.