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Reconstructing paleoclimate in the Kasaï Basin leading to the African Rainforest Crisis 3000 years ago

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The second largest rainforest biome on Earth lies in the Congo Basin in central Africa. However, due to slash-and-burn farming practices as well as climate change, the rainforest is quickly contracting. Interestingly, former studies have found evidence for a similar so-called “African Rainforest Crisis” taking place in the late Holocene around 3000 years ago [1,2]. There are indicators assigning this crisis to the expansion of the Bantu people, who are believed to have migrated to this area to pursue extensive farming at this time. Pollen records, on the contrary, speak for a shift towards a drier climate as the primary mechanism inducing the crisis. Since data from this area are scarce, more information is needed to resolve the exact causes of the African Rainforest Crisis, especially as it is a likely analog for ongoing and future rainforest contraction.

To provide such information, we collected over 19 m of core from in sum 11 lakes along the rainforest-savannah boundary in the Kasaï Basin, Democratic Republic of Congo, which constitutes the southwest portion of the Congo Basin. Here, we will show first insights on the developed age models of the sediment records based on bulk and microfossil radiocarbon measurements. By using clay mineralogy (i.e., XRD measurements) and triple-oxygen isotope analysis as paleoclimate proxies, we expect to draw conclusions on the hydrology and weathering conditions throughout the late Holocene, including the role of climate change as a trigger of the African Rainforest Crisis.

This work is part of a larger project which is the first to study the erosion dynamics from source to sink in the Kasaï region. The ultimate goal is to combine data from the uplands, floodplains, rivers, and lakes to further constrain estimates of this ecosystem’s net carbon balance through time and to better predict how the Congo rainforest will respond to today’s land use- and climate-triggered challenges.

References:

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[2] Garcin, Y. et al. (2018), *PNAS* 115, 3261–3266.