

CongoPeat

Newsletter # 2

September 2019



Welcome to new CongoPeat staff

The CongoPeat team continues to grow: technician Genna Tyrrell (U. of Leicester, working with Dr Arnoud Boom) joined in June, leading sample preparation and analyses to reconstruct the past climate of the region and PhD student Selena Georgiou (U. of Edinburgh, supervisors Dr Ed Mitchard, Prof Paul Palmer & Dr Sofie Sjögersten) started in September, looking at CH₄ and CO₂ fluxes from the Congo (and Amazon) peatlands.

CongoPeat Project Meetings

Action points from previous meeting: Please check the minutes of the May meeting, located in Files area of MS Teams, for your action points.

Next meeting: Wed 27th Nov – Thu 28th Nov, in Leeds.

Agenda items: please send to admin@congopeat.net

DR Congo Expedition, Jun-Aug 2019

Botanical Exploration of the Peat Forests



DRC expedition. Credit: Corneille Ewango

Joseph Kanyama (CongoPeat PhD student at U. of Kisangani) and Pierre Bola and Ovide Emba (ISP-Mbandaka), supervised by Prof Corneille Ewango (U. of Kisangani), are leading on work to understand the vegetation of central African peatlands. During the 10-week CongoPeat expedition exploring the interfluves of the Ruki river, a floristic survey was undertaken over four 6-10 km transects, covering different habitat types. The

survey aims to document, evaluate and compare species composition and richness. Relatively little is known about the herbaceous plant community in the peat forests. By documenting plant distribution patterns we can assess both the contribution of the herbaceous layer to the diversity of tropical peat forests and gain insights into how herb and tree species are able to coexist in this landscape.

In previous expeditions it was clear that hardwood peat forests and palm swamps were compositionally different from each other as well as from other forest types. During this expedition a large expanse of rattan *Eremospatha laurentii* De Wildeman vegetation was identified, extending more than 2 km in the first transect. In the final transect *Raphia laurentii* De Wild. covered more than 4 km of the transect length. Such habitats have not been documented in other sites, meaning we still have more to learn as we explore new areas of the peat forest. Few species appeared to be endemic to the peatland. Instead, it was largely characterized by a distinctive combination of generalist species and species previously thought to be specialists of other habitats, especially seasonally inundated forests.

We still have little understanding of why the differing swamp vegetation occurs where it does. To date, the area is so little studied that we have yet to obtain a confirmed scientific name for the most extensive tree species occurring, *Raphia* palm. We have little understanding of what controls the species found within the landscape and even classification into vegetation types is uncertain. Therefore, we are setting out to discover, document and understand the distribution of vegetation types within the peatland area of the central Congo Basin. Once the work is complete, it will contribute to building the first comprehensive plant database for the peatlands flora of this vast and intact African peat forest. The work is also building capacity among researchers in the DRC, with scientists from the Higher Institute of Pedagogy, Mbandaka now exploring new research opportunities around peatlands' vegetation and ecology.

Professor Corneille Ewango
University of Kisangani

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Carbon, Palaeo, Gas and Hydrology



DRC expedition team. Credit: Corneille Ewango

The DRC expedition up the Ruki river has been very successful. Most of the new sites that were visited contained peat as predicted by the peatland distribution map, up to a maximum depth of ca. 6 m. In addition, a handful of very useful falsifications of the existing map were collected as well. This will help to create an updated version of this map and to better constrain the current uncertainties in carbon stocks.

Besides the botanical studies carried out by our Congolese colleagues (see above), the UK team (Greta Dargie, Nick Girkin and myself) managed to return to Leeds with almost half a tonne of peat samples from across 5 transects. These include dozens of surface samples for nutrient and hydrological analyses, 22 cores to estimate peat carbon stocks, as well as 15 cores for palaeo studies. Rain, river and pore water samples were collected from different sites along the Ruki river to help inform our understanding of the hydrology and nutrient status of these peat swamp forests. Nick Girkin (U. of Nottingham) was able to successfully collect thousands of gas samples from across our 3 main transects to estimate greenhouse gas fluxes. And several hundred measurements of peat surface hydraulic conductivity were taken as well. We now have lots of data to be processed, which will give us a better understanding of this very different part of the Cuvette Centrale peatlands.

Bart Crezee, PhD student
University of Leeds

Republic of Congo Expedition, Jun 2019

GEM Plots

The GEM plot data collection continues with twice monthly litterfall collections and monthly gas flux measurements. Simon Lewis visited the team in June for the 3 month data collection, and was impressed by how smoothly the palm

leaf production, dendrometer band (for tree growth) and flux measurements went. However, the root ingrowth core measurements look like they may not give good estimates, so alternatives are being investigated to estimate fine root production.

Professor Simon Lewis
University of Leeds/UCL

Palaeo Work in Republic of Congo



Pollen traps. Credit: Donna Hawthorne

For the palaeo work, we collected sediment cores at different points along the transect to pick up changes in vegetation and hydrology across the peatland. We also collected surface samples from a range of locations, which will help calibrate the long-term palaeo records and increase our understanding of palaeoecological taphonomic processes. Finally we set up pollen traps in all three plots which will enable us to see if there's any seasonal variation in the pollen rain and whether or not that's similar to the surface peat samples. This is important when we seek to understand the palaeo records going down the core, and gauge the level of accuracy that can be achieved if we reconstruct the vegetation from 10 000 years ago.

Dr Donna Hawthorne
University of St Andrews

Reporting and ResearchFish

Remember to add the grant number, NE/R016860/1, and CongoPeat to the acknowledgments of any relevant papers you're writing. And keep a list of public engagement/ other impacts that our research generates.

Items for March 2020 CongoPeat Newsletter:

Please send items to Helen Plante by 26 Feb 2020, email: admin@congopeat.net