

UGENT, CIFOR, R&SD, INERA, ERAIFT

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# CONGOFLUX: THE FIRST FLUX TOWER OF THE CONGO BASIN FOREST

## Introduction

Central African forests are poorly studied yet an important component in the **global greenhouse gas balance**. As part of the European YPS project (Yangambi, pôle scientifique au service de l'homme et des forêts), Ghent University is scientifically responsible to set up **the very first eddy covariance flux tower in the tropical forest of the Congo Basin** in the UNESCO MAB of Yangambi, close to Kisangani (Democratic Republic of the Congo). CongoFlux is accepted by ICOS to become an Associated Site and will thus contribute to reinforce the ICOS network.



The very first accurate and continuous data of atmosphere-ecosystem exchange of greenhouse gasses including CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub> and H<sub>2</sub>O of the Congo Basin forest.

CongoFlux tower in construction (Yangambi, DR Congo): The basic structure and infrastructure of the CongoFlux tower will be ready by September 2020. The picture is taken at the 25th of August 2020.

## Scientific background

### Congo Basin

The Congo Basin is the second largest tropical rainforest in the world, with almost 200 Mha of humid forest. This vast ecosystem stores approximately 0.63 tonnes of carbon per year per hectare <sup>1</sup> making it the region with largest carbon uptake per unit of area of the African continent <sup>2</sup>.

### Eddy Covariance method

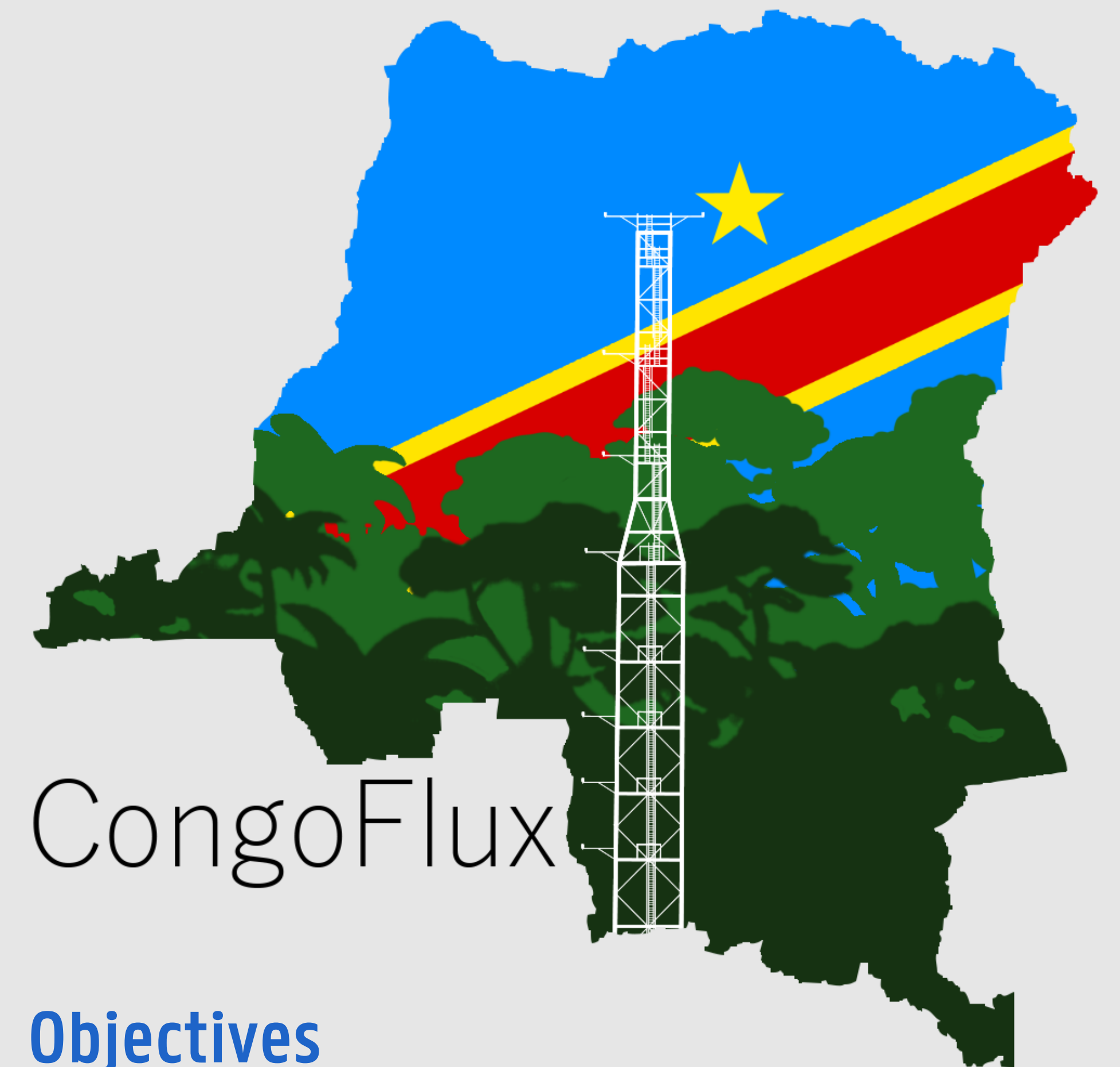
Covariances are calculated from high-speed measurements of vertical wind speed and the gas concentrations above the canopy allowing the quantifications of greenhouse gas fluxes.

### Bibliography

- Hubau. Asynchronous carbon sink saturation in African and Amazonian tropical forests. 27, (2020).
- Palmer, P. I. et al. Net carbon emissions from African biosphere dominate pan-tropical atmospheric CO<sub>2</sub> signal. Nat. Commun. 10, 1–9 (2019).



UNESCO Man and Biosphere reserve of Yangambi (Democratic Republic of the Congo) with indication of the CongoFlux site (red star; coordinates: 0.812556°N 24.483935 °E)



## Objectives

The final purpose of the CongoFlux project, funded through the 10th European Development Fund, via financial support of DGD (Directorate-General for Development Cooperation and Humanitarian Aid) Belgium, is to:

- deliver the **very first accurate and continuous data** of atmosphere-ecosystem exchange of **greenhouse gasses** including CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub> and H<sub>2</sub>O of the Congo Basin forest;
- quantify soil greenhouse gas exchange using **soil-chambers**;
- provide **qualitative and continuous meteorological data** of the site;
- collect ancillary data such as **site characterisation and species composition, tree mortality, LAI, trait and soil data** of several plots within the footprint of the flux tower;
- provide margin for **additional research**.

## Timing

The tower construction will be finished by September 2020. By then, UGent will send a team for equipment installation. The first data should emerge by the end of 2020, while the entire flux tower site will be **fully operational** by the **beginning of 2021**.

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