CONGO NETWORK

Workshop Kisangani

12-13 May 2011

CSB-UNIKIS

COBAFISH: From carbon to fishes

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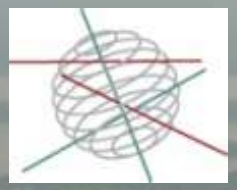

BELGIAN SCIENCE POLICY OFFICE

Research programme
Science for a Sustainable Development (SSD)
“Polar Research, Climate and Atmosphere”
“Africa and African heritage”

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Introduction

The Congo River is one of the most understudied basins in the world.

Second only to the Amazon river basin in terms of drainage area and water discharge, the Congo River harbours the richest known fish species diversity on the African continent, which also represents a resource of critical importance to riparian human population.

In contrast with its importance for local, regional and global biodiversity, its ecology, dynamics and ecosn= ystem functioning are poorly understood simply because it has only seldom been studied.

So far no integrated interdisciplinary studies on the Congo River have been carried out understand the biodiversity and functioning of this ecosystem.

What is known & what should be done

A large number of **conceptual models** have been developed over the past decades to describe the **overall ecological functioning of large river systems**.

The importance of **longitudinal and lateral gradients** were underlined, with **contrasting importance of autochtonous and allochtonous primary production** for fueling the food web in function of spatial and temporal scales.

Unfortunately, these concepts were **validated through observations in temperate or subtropical riverine systems**.

Therefore, we aim to **link terrestrial inputs, primary producers (algae and aquatic macrophytes), invertebrate and fish biodiversity to ecosystem dynamics and functioning** in the Congo river.

Objective: to address four key questions

1. **How diverse are fish communities in two sub-catchments of the Congo River (Lubilu and Lomami) in terms of biodiversity and functional/trophic diversity?**

Objective: to address four key questions

2. **Which factors can be identified in regulating this diversity?**

In order to detect underlying mechanisms, we will provide comprehensive measurements of possible regulating factors, including aquatic primary producer abundance, diversity and production, physico-chemical conditions, nutrient status (linked to aquatic productivity), and organic matter availability and origin.

These data will not only be used to support the work on higher trophic levels, but will also be analyzed in the context of furthering our understanding on carbon and nutrient cycling in the Congo basin.

Objective: to address four key questions

3. **To which extent do fish communities in these river systems depend on autochtonous (aquatic) primary production or on lateral allochtonous (terrestrial) production?**

Objective: to address four key questions

4. **What is the importance of seasonal flood events on global ecosystem functioning?**

   In order to better capture seasonal variability and to have information on carbon sources and basal food sources signatures preceding the larger-scale sampling campaigns, regular monitoring for a selected number of parameters and involving local scientists will be set up at one site on both sub-catchments studied.

Relevance of expected results

In achieving these objectives, we will provide

the first comprehensive and interdisciplinary dataset on the aquatic biogeochemistry and ecology for any part of the Congo River basin

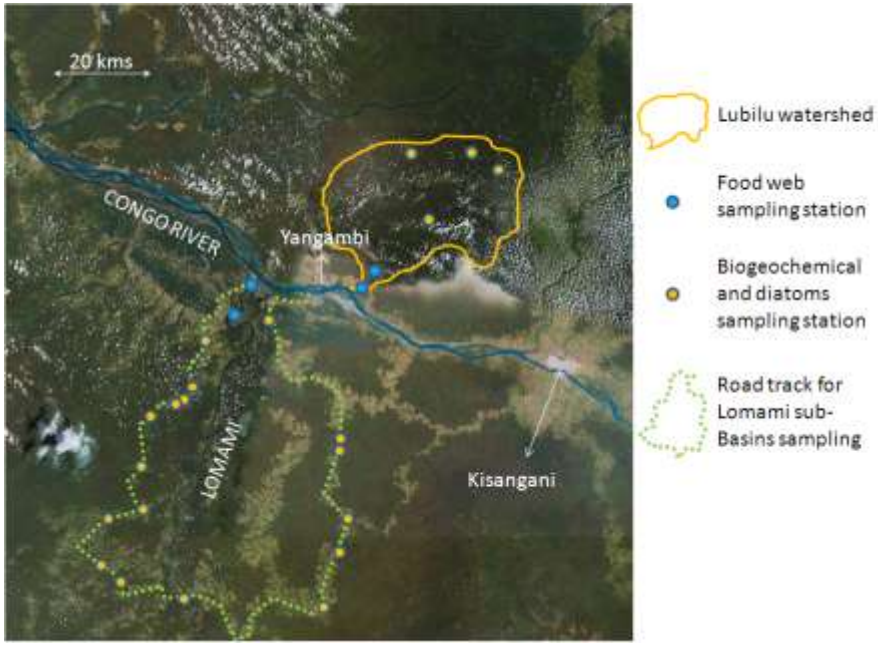
important data to address the underlying fundamental ecological questions needed for the management of the main goods and services provided by the River (fish).

Where?

Two catchments on opposite sides of the Congo river mainstream will be sampled, downstream of Kisangani.

One catchment is the **Lubilu river** which drains water from the UNESCO (MAB) Yangambi Biosphere Reserve**.**

The ecosystem dynamics and functioning observed in the Lubilu basin **will be considered as representative of natural forested area in the Congo basin**.



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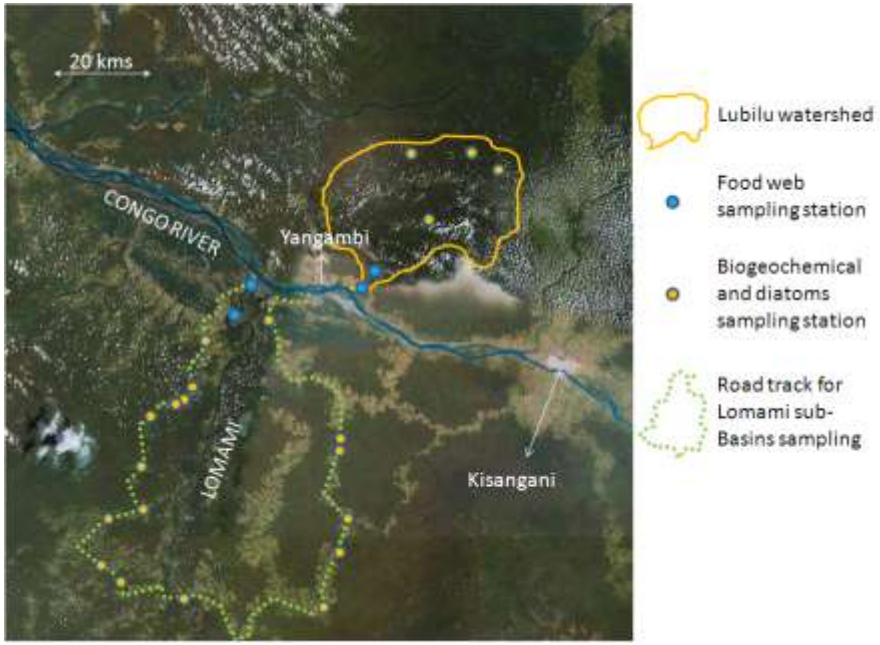
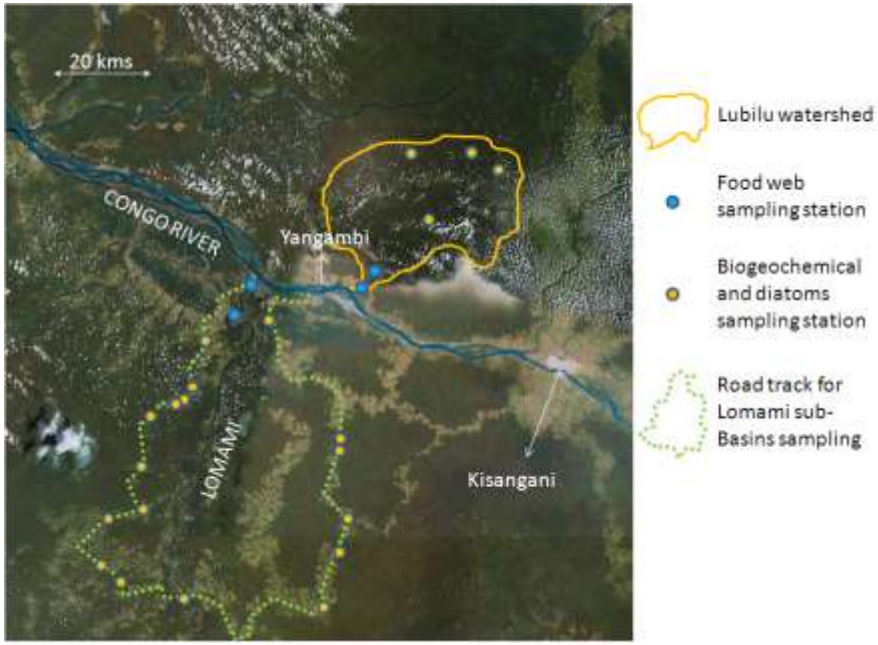
Where?

The second catchment is the **Lower Lomami** as previous observations on the Lower Lomami highlighted an important fish biodiversity.

Contrasting conditions between the Lubilu and Lomami offer us the opportunity to generate a unique **dataset with a large range of biogeochemical, physico-chemical and ecological conditions, allowing to answer our key questions**.



What will be done?



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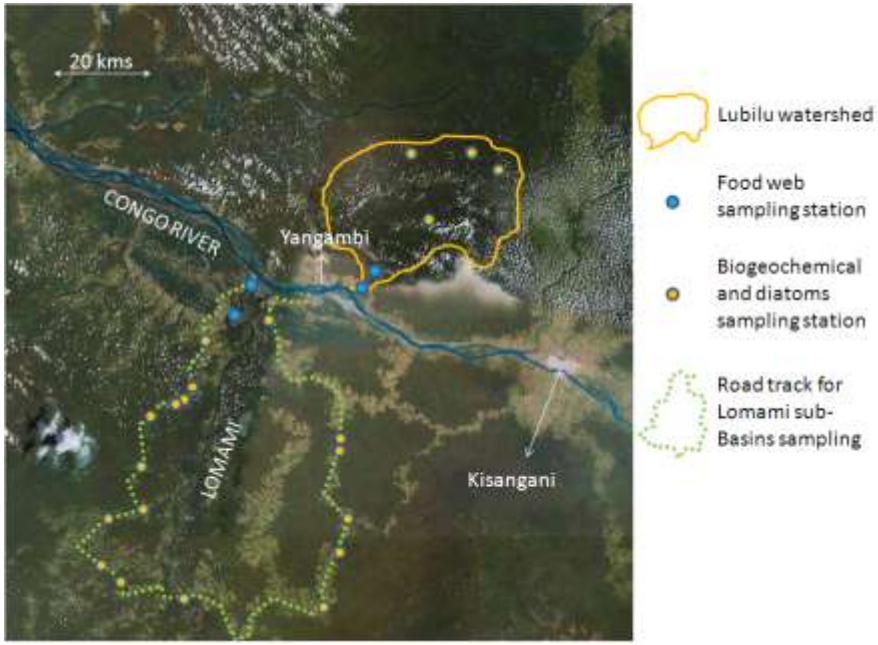
WP1: Carbon sources, cycling and aquatic metabolism

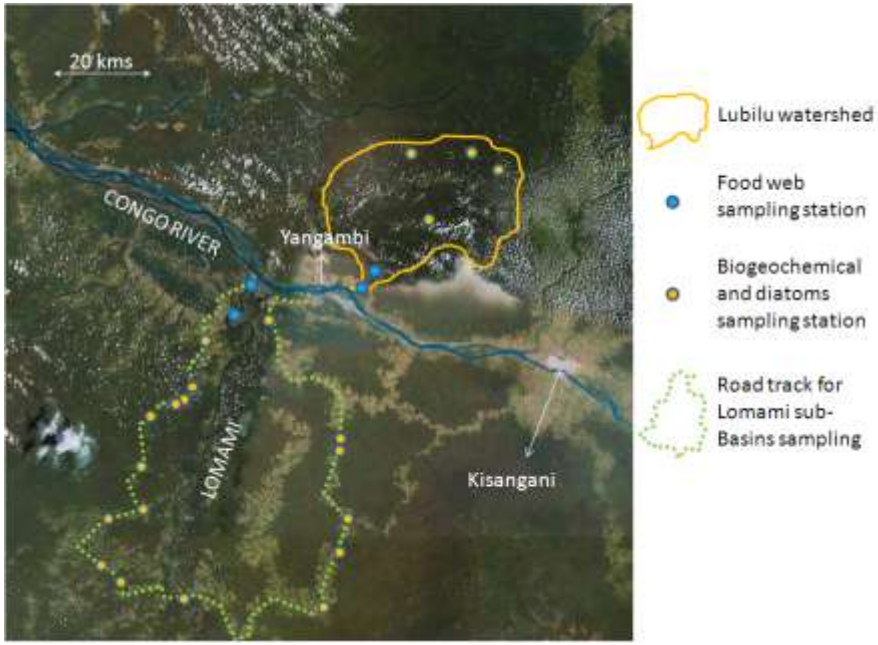
Task 1.1: Relative contributions of allochthonous and autochthonous production to aquatic C reservoirs (KUL, ULg)
Task 1.2: Aquatic primary production, respiration, and net community metabolism (ULg, KUL)
Task: 1.3: Identification of Si sources as nutrients and the contribution of diatoms to primary production (MRAC, NBGB)

(seasonal campaigns and routine monitoring).



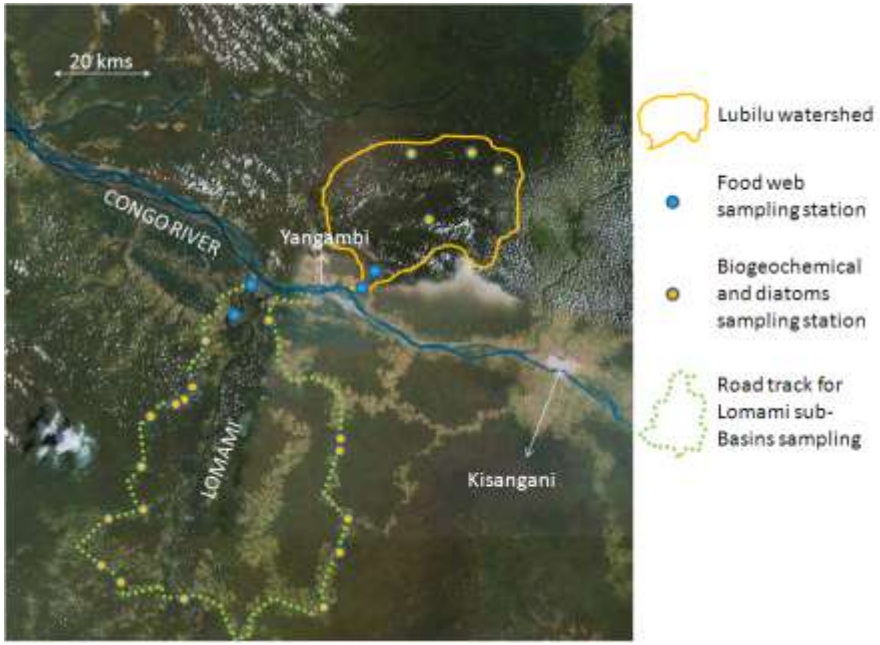
WP2: Aquatic floral and faunal diversity

Task 2.1: Qualitative and quantitative diversity of aquatic primary producers (ULg, NBGB)
Task 2.2: Trophic diversity of macroinvertebrate communities (RBINS)
Task 2.3: Qualitative and quantitative diversity of fish communities (RMCA, RBINS)



WP3: Ecosystem trophic structure (foodweb analysis)

Task 3.1: Fish stomach content analysis (RMCA, RBINS, NBGB)
Task 3.2: Isotopic foodweb analysis (KUL)



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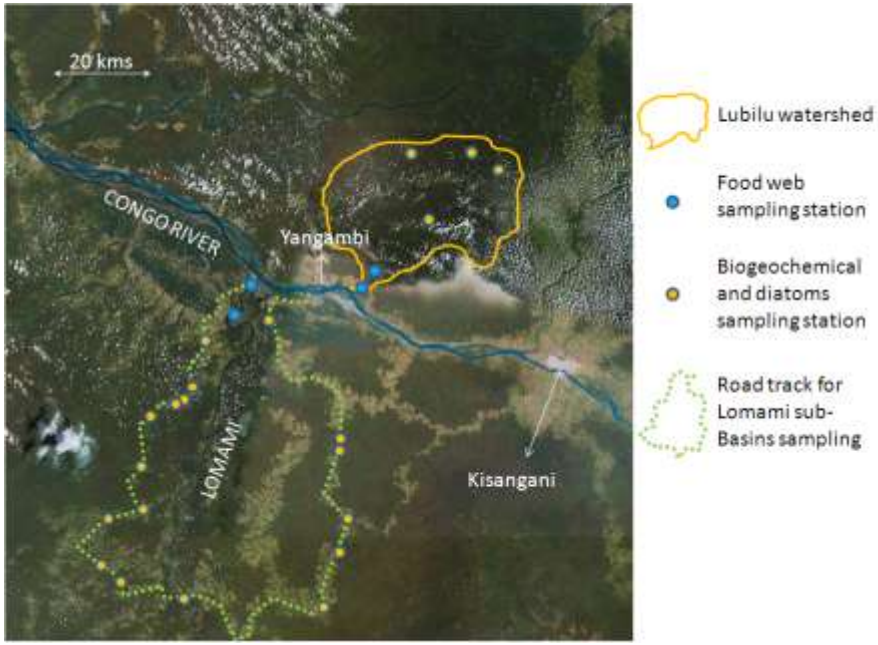
WP4: Network integration and coordination

Task 4.1: Preliminary analysis of existing data – optimizing sampling strategy

Task 4.2: Fieldwork preparation and coordination in collaboration with local partners

Task 4.3: Organisation of workshops & meetings

Task 4.4: Reporting and dissemination of results.



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Workpackages & Tasks	Sampling sites & frequency	Partners involved
1.1. Carbon sources **1.2. Aquatic metabolism** **1.3. Si studies on diatom productivity** **2.1. Primary producers**	-monitoring on Lomami and Lubilu (monthly) -dry and wet season sampling in main sampling points and selected sites in catchment.	-local partner for monitoring, in collaboration with P2 and P3. -P2, P3, P4, P5
2.2. Macroinvertebrates **2.3. Fish communities**	-dry and wet season sampling in main sampling points and selected sites in catchment.	P1, P2, P5 in collaboration with local partners.
3.1. Trophic structure **3.2. Allochtonous vs. Autochtonous support**	-dry and wet season sampling in main sampling points and selected sites in catchment.	P1, P3, P4, P5, in collaboration with local partners
WP 4: network integration and coordination		All partners, in collaboration with local partners and follow-up committee.

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Thank you for your attention