

BIODIVERSITY AND ECOSYSTEM FUNCTIONING IN DEGRADED AND RECOVERING AMAZONIAN AND ATLANTIC FORESTS

Principal Investigator (PI): Carlos Alfredo Joly

Biology Institute / University of Campinas (UNICAMP)

FAPESP # 2012/51872-5 | Term: Aug 2013 to Jul 2017 | BIOTA-FAPESP Program

RCUK Agreement

UK PI: Jos Barlow (Lancaster Environment Centre / Lancaster University)

co-PIs: Humberto R. da Rocha, Marcos P.M Aidar, Simone A. Vieira, Jorge Y. Tamashiro, Luis Carlos Bernacci, Marco A. Assis,

Helber C. Freitas e Tomas Domingues

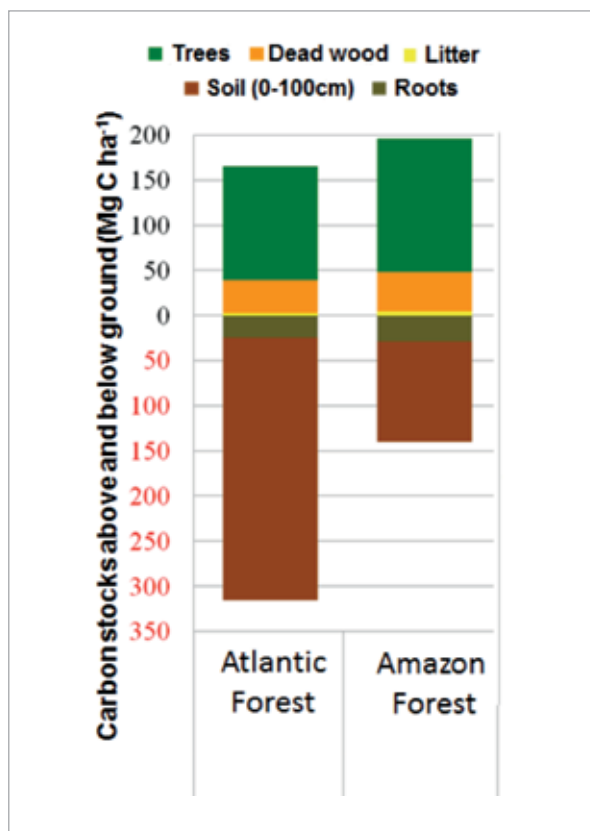


Figure 1. Above and below ground stocks of Carbon in well preserved areas of Atlantic and Amazon Forests

This project aims to deliver a step-change in the understanding of the consequences of forest degradation and regeneration for biodiversity and associated ecological processes and services in Amazon and Atlantic Forests.

The goals are:

- 1) to establish the first intensive network of long-term monitoring sites along a gradient from intact to severely altered forests in the Brazilian Amazon, and significantly enhance the existing network of modified and intact sites in the Atlantic Forest;
- 2) to complement these intensive-sites with a network of extensive study plots across multiple river catchments in the Amazon and the Atlantic Forest, enabling to answer questions about changes in biodiversity, functional traits and carbon stocks at the landscape level; and
- 3) to develop an integrated research framework that links the data and process understanding from both intensive and extensive observations of human-modified gradients to multi-scale ecosystem models. These will provide a platform for testing and informing policy options at the level of municipalities, states and the entire biomes.

The project will conduct sampling in both the Atlantic and Amazonian forests, focussing on four types of forest along a broad disturbance gradient, capturing the endpoints of degradation (from undisturbed forests to those regenerating after clear-felling and farming activities) and the two predominant degradation processes, selective logging and fires. The Intensive study will be performed in two plots set: Biota program plots in the Serra do Mar State Park, South-eastern Brazilian Atlantic Forest; and Santarém-Belterra region, Amazonian Forest. Within the wider Amazon forest, the team will also make use of two existing permanent plots set created in degraded forests to test the generality of the findings in the Santarem region, Acre and Paragominas.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

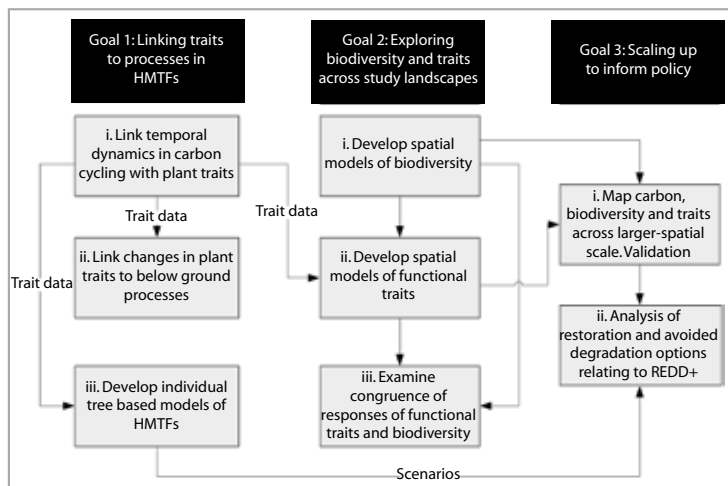


Figure 2. A conceptual model of the work packages to address the three main goals of the project. Arrows denote the flow of data and project outputs between key objectives. HMTFs = Human Modified Tropical Forests; REDD+ = Reducing Emissions from Avoided Deforestation and Forest Degradation

There are two main results to be reported so far:

- the diversity of trees per hectare is much higher in the well preserved areas of Atlantic Forest (up to 180 species per hectare) than in the Amazon Forest (up to 120 per hectare);
- in the well preserver plots of Atlantic Forest the belowground stock of carbon is significantly higher than that registered in the well preserved areas of the Amazon Forest (Figure 1).

Therefore, in the Atlantic Forest, immediate carbon release to the atmosphere will be more sensitive to climate change, with global warming speeding up decomposition of organic matter accumulated below ground, than in the Amazon, where slash and burnt are the major factors affecting immediate carbon release to atmosphere.

Figure 2 summarizes the conceptual model of the work packages to address the three main goals of the project. The expected results will contribute to the development of meaningful hypotheses about the functional consequences of changes in plant and bird communities, used here as biodiversity surrogates, following human-modification of tropical forests.

The project will leave an important legacy, both in knowledge and infrastructure, which will continue to allow improvements in the understanding of HMTFs beyond the end of project, since the studied plots will be converted into long-term monitoring sites across the Amazon and Atlantic Forest.

Within this specific call for proposals, data and results will also be compared with those of the SAFE Project in Malaysia.

Carlos Alfredo Joly

Instituto de Biologia
Universidade Estadual de Campinas (UNICAMP)
Rua Monteiro Lobato, 255
CEP 13083-862 – Campinas, SP – Brasil

+55-11-2065-8135
cjoly@unicamp.br / josbarlow@gmail.com