



## **2011 FIELD REPORT**

# **Climate Change in Brazil's Atlantic Forests**

### **Background Information**

Lead PI: Robson Capretz

Project scientists: Robson Capretz and Julio Cezar Majcher

Report completed by: Robson Capretz

Period Covered by this report: Jan 2011 - Dec 2011

Date report completed: 12<sup>th</sup> January 2012

Research site: No. Reserva Natural do Rio Cachoiera



Hello volunteers,

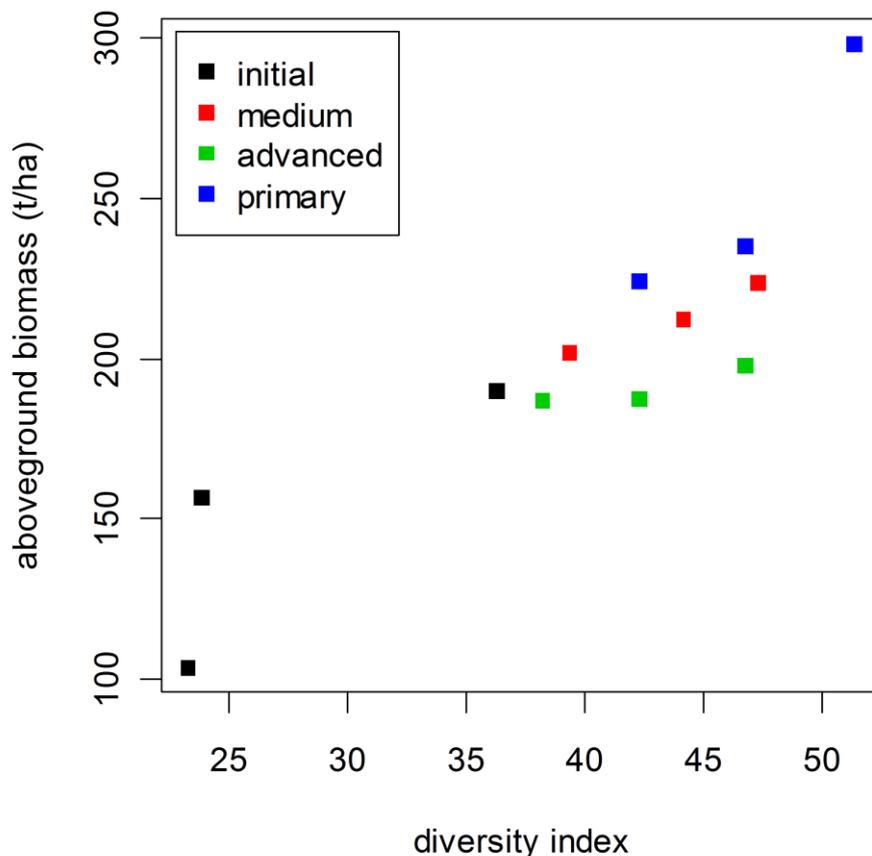
First of all, thank you very much for all your work. Without you, it would be impossible to run this research. We are very proud to have worked with you for the last 42 months. In the first 12 months, we measured more than 22,000 trees and 370 tree species. All trees with Diameter at Breast Height (DBH) > 5cm were identified (Myrtaceae, a particularly difficult group of trees, is awaiting identification by a botanical specialist), mapped and measured. In the following 38 months, which includes the 2011 field season, we measured 1,200 dendrometer bands from 56 tree species, we collected litterfall from 300 traps on the field, and measured 60 bees' hives. The first analysis showed differences among the very initial forest stages, with less than 30 years since anthropogenic disturbances, from the others (50 years, 80 years and almost undisturbed areas). All 12 plots were placed in natural regeneration areas, none of them had completely removed forest before. The analysis of growth, litterfall and bees showed seasonal differences according winter and summer. The very young forest stages showed increased growth rates if compared with the other plots. The number of tree species also increased with the age since anthropogenic disturbances. The information will be published soon, and we will let you know about the papers, the results and the answers of the scientific community. Once again, thank you very much for your commitment.

Best wishes,  
Robson Capretz

## SECTION ONE: Scientific research achievements

### Top highlight from the past season

In the last season we have discovered that initial secondary forest stands grow faster, but with fewer tree species and lower biodiversity and complexity than the older stands (Fig 1). The ecological processes in such forest types are far less complex than the older types. We have also found that the native stingless bees we've been studying are very sensitive to climate change (mortality was high with the severe winter of 2010), and that they are very important to the forest community due their pollination activities.



**Figure 1:** Aboveground biomass against diversity index indicates that initial secondary forest stands grow faster, but with fewer tree species and lower biodiversity and complexity than the older stands.

### Reporting against research objectives

**Objective 1: To quantify carbon stocks and fluxes in Atlantic Forest along a gradient of disturbance, through censuses and ongoing monitoring in permanent sample plots.** The programme has completed its objectives through initially mapping and measuring all trees (more than 5 cm diameter) in 12 plots, made up of three replicates each in forests

with four levels of human disturbance; this initial work was completed in 2010, and provided the basis for subsequent work. This has been followed up by two year re-censuses of plots, monthly measurements of dendrometer bands on a subset of trees in each plot, leaf litter collection and sorting. All work planned for 2011 has been completed, and the programme as a whole has met the objectives. Data are currently being checked and cleaned up, before data analysis begins.

**Objective 2: Investigate pollination services provided by native stingless bees in the Atlantic Forest.** This objective has been achieved; there is now a full year of data from monitoring the 60 hives of jatai bees, that were established in 2010. We are currently working with the data from these hives. Despite efforts throughout 2010, the target 60 hives of tubuna bees could not be established, as it was found that in the summer they frequently move around between hives, and have high mortality in the winter.

## **SECTION TWO: Impacts**

### **Partnerships**

Federal University of Parana. Experts at the university have assisted with identification of tree species when sorting leaf litter, for particularly difficult species. In addition, we have worked with Masters students from the university to help them design and conduct their research projects within our network of plots.

### **Contributions to conventions, agendas, policies, management plans**

#### **Local**

Our research is conducted within the Rio Cachoeira Natural Reserve. The outcomes of our research will feed directly into management of the reserve, and will be communicated with visitors to the site.

### **Developing Environmental Leaders**

We currently have two MSc students from Federal University of Parana who have been researching growth patterns, dendrochronology and tissue structures of tree species within our plots. Their studies should be completed by March 2012.

### **Conservation of Habitats**

We work in the Mata Atlantica (Atlantic Forest) of south eastern Brazil. The initial censuses of the forest and subsequent studies in our network of plots provides important baseline data for typical habitats in this forest, and have contributed to knowledge of carbon stocks and cycling in this type of forest. In addition, we have restored some small areas of the forest through planting seedlings of appropriate tree species.

### **Ecosystem Services**

Pollination services of native stingless bees have been studied, by capturing and then establishing hives within study plots. Hives are weighed regularly to track progress through year, and pollination activity of bees is monitored. The pollination services that the bees provide are thus maintained.

## **Impacting Local Livelihoods**

We work with CooperGuará, a local ecotourism initiative and Acriapa, the local beekeepers association, sharing knowledge from our research with them. At the end of our programme, the bees with their hives will be donated to Acriapa, on the understanding that they will report the amounts of honey produced from each hive at the end of the season. Acriapa therefore benefit directly, through the donated bees, and also become engaged with our research through their participation.

## **Dissemination of research results**

### **Scientific peer-reviewed publications**

We have two publications in preparation, which should both be published in 2012.

## **SECTION THREE: Anything else**

### **Acknowledgements**

We would like to thank all the volunteers who have visited us over the course of the project for their hard work, and funding from HSBC under the HSBC Climate Partnership that has supported the project.