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Recent fieldtrips include Peru and Venezuela

Venezuela 2012 Fieldwork in Caatinga Forest

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**Field Campaigns 2012**

- **August-September 2012 – Manu, Madre de Dios, Peru**
  Over 8 weeks, Abel Monteagudo (Jardín Botánico de Missouri, Perú - RAINFOR), led a team of 7 Peruvian’s: Víctor Chama Moscoso, Nadir Pallúqi Camacho, Yuri Huillica Aedo, Dayana Suni Mendoza, José Luis Mateo Miguel and Adolfo Kapeshi. The team re-measured 10 permanent 1-2.25ha plots, located in forests surrounding el Estación Biológica de Cocha Cashu and then at Vigilancia de Pakitza (central Parque Nacional del Manu). Field work involved taking many boat trips along Rio Manu and setting up camp for several weeks at a time in order to access the more remote plots Altos de Confield, Cocha Otorongo and Cocha Salvador. In addition to the re-measurement of permanent plots and strengthening of established training methodologies, botanical specimens were collected from trees requiring revision of their identification. These collections are currently being dried prior to identification at the herbarium at Oxapampa (HOXA). Data is soon to be made publicly available in the database ForestPlots.net.  

Abel Monteagudo  
Photographs: Abel Monteagudo, Yuri Huillica, Jose Luis Mateo

Venezuela 2012: our colleague Gerardo Aymard (UNELLEZ-Guanare) reports back on two field campaigns from earlier this year. Please visit the website for the full reports.

- **November 2011 and February 2012- Puerto Ayacucho, Amazonas**
  With support from RAINFOR, 4 permanent plots of 1 Ha were established in forest close to Puerto Ayacucho, Amazonas, Venezuela. The team was lead by Gerardo Aymard (UNELLEZ-Guanare), and included José Farreras (UNELLEZ-Guanare), Franklin Molina (Ministry of the Environment), Michael Schwarz (RAINFOR), and a group of young indigenous men from the Piaroa ethnic group. These forests are found at the transition between the Llanos and the Amazon forest, in a region characterised by long periods of seasonal drought and heat. In spite of these climatic conditions, the forest communities here include numerous evergreen species. South of Puerto Ayacucho (Sector Venecia) the forest is found on plains, with ultisol soils of moderately good drainage, and in some locations have undergone selective extraction of two Erisma species for their wood. There are emergent trees (30-35m) of Buchenavia parvifolia (“Cumello”), Eschweilera pedicellata, Hymenolobium petreum (“Berraco”) and Erisma uncinatum (“Salado”). North of Puerto Ayacucho the forests grow on oxisols, with poor to adequate drainage. This community is characterized by the presence of emergent trees of Parkia pendula, Brosimum utile and Sloanea brevipes.

- **February 2012- Upper Rio Negro, Amazonas**
  After completing the work in the 4 Puerto Ayacucho plots, Gerardo Aymard and Franklin Molina travelled to San Carlos de Rio Negro in a small plane, over the isolated forests of the Venezuelan Amazon. Here they met with Pedro Maquirino and his team to remeasure 2 permanent plots in the IVIC research zone. These plots, established 40 years ago, are among the oldest in the RAINFOR network, and interesting for their floristic composition and slow growth. The region of the upper Rio Negro contains a great complexity of vegetation types, among which the Amazon caatinga stands out, representing stunted forests situated on sandy spodosols of very poor drainage above rocks, with Micrandra sprucei, Eperua leucantha, Compsonorea sprucei and Micropholis maguirei all co-dominant. Other unique forests in this area are dominated by Eperua purpurea (“Yevaro”), found on raised areas with ultisols and spodosols. These communities have emergent trees, a high density of stems, and are typically well-stratified.

- **September-October 2012: Manaus, Brazil GEM**
  2 plots were set up within baixio and plateau forest in the Reserva Florestal Adolfo Ducke (RFAD), Brazil. These plots represent the beginning of 10 permanent sample plots which will be monitored by INPA researchers/students. Fieldwork is lead by Flavia Costa and Beto Quesada (INPA). Data collection was carried out by INPA students Erick Oblitas, Karina Melgaço and Hellen Santana, with training provided by John del Agulla Pasquel (IIAP Researcher). We have installed experiments for below-ground, above-ground NPP monitoring and CO2 efflux measurements. The research goals are to understand the effects of soil, topography, weather and watersheds position on the carbon cycle in these forests.

Jhon del Agulla Pasquel
There is an urgent need for comprehensive and dynamic methods for monitoring tropical forests in order to understand and mitigate the impact of climate change and to conserve this biodiversity. The maximum height and allometry of forests varies across the moist, lowland tropics. Using height and diameter data of 20,497 trees from forest plots in South America, Africa, Asia and Australia, the study, led by Lindsay Banin, shows that forests tended to be tallest in Asia followed by Africa, South America and Australia, and differed similarly for height at a given diameter. Environmental conditions, forest structure and wood density explain some of this variation, but differences across the tropical regions remained even when these were accounted for.

The research also examined whether the trees belonging to the dominant family in Asia, the Dipterocarpaceae, were driving the great height of these forests. Surprisingly, the dipterocarps did not differ significantly from the remaining families in terms of vertical structure; instead they may be conditioning the structure of the forest and precluding species which do not grow similarly tall.

These spatial patterns in vertical structure impose important implications for estimating biomass stocks and fluxes. The findings also raise new questions about other ways trees may be compensating for these architectural differences.

Demétrius was a Moore Foundation Master Fellow and has just received his Masters on INPA’s Postgraduate Programme, supervised by RAINFOR’s Flávio Luizão, Beto Quesada and Ted Feldpausch.

What are your main research interests?
Understanding the mechanisms that affect ecological processes in local and global scales. Such aspects were addressed in my masters thesis where I tried to understand the main drivers of necromass stocks variation in different soil types across Central Amazonia. I tested relations hips between necromass, soil and forest structure. 79 plots of 0.5 ha were assessed along a transect spanning ~700 km over a one-year period (2010–2011) in undisturbed forests from north of the Rio Negro to south of the Rio Amazonas. The field work took place in the state of Amazonas in Brazil. A great amount of the plots were located across the Purus – Madeira interfluvial zone on a ~600 km transect established along the Manaus – Porto Velho road (BR-319).

I also estimated the density of dead wood debris and evaluated soil physical properties by digging 2m deep pits following the standard protocol of RAINFOR. Vegetation data were obtained from permanent plots. We concluded that soil physical properties are likely to influence forest structure and dynamics which in turn affect necromass production and stocks.

What are your future plans?
At the moment I am working to increase the soil sampling coverage to describe the pedological features of soil and also assessing the relationships between diameter and heights in the Purus - Madeira interfluvial area. After finishing the current project I hope to apply for a PhD in my research interest area. I found studying the Amazon to be spectacular and I expect to still be doing it in the next years in my PhD.
**People**

Beatriz Schwantes Marimon  
University of Mato Grosso (UNEMAT), Campus of Nova Xavantina, Brasil

*When did you first work with RAINFOR?* March 2008, during field work in northeastern Mato Grosso.

*What are your main research interests?*

I am interested in working with structure and dynamics of different vegetation types of the southern Amazon boundaries in Central Brazil. I conducted my masters and doctoral research on the dynamics of mono-dominant and seasonal forests, and coordinated other ecological research in additional vegetation types in the transition zone between cerrado and Amazon Forest. My current work focuses on ecology and the management of forests in the transition zone between cerrado and Amazon forest biomes, and currently I have great interest in understanding changes in tropical plants communities as a result of climate change and human impacts.

*What projects are you currently involved in?*

I’m involved in “Assessing the impacts of the 2010 drought at the Amazon forest-savanna zone of tension”, coordinated by Prof. Oliver Phillips; “Niche evolution of South American Trees and its consequences” coordinated by Prof. Toby Pennington and I co-ordinate the project “Transition Cerrado/Amazonia: ecological and socio-environmental basis for conservation”. I’m currently visiting Leeds University revising and analyzing data from several projects already concluded and writing papers about the dynamics of the vegetation of the transition Cerrado/Amazonia, the distribution of species in flooding fields in Central Brazil and on structure and species composition of floodplain forests of the southern Amazon border.

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**- Pan-tropical study featured in Nature**

Nature “Research Highlights” featured results from a new paper led by Dr Ted Feldpausch and colleagues from international projects RAINFOR, AfriTRON, TROBIT, and AMAZONICA, which was recently published in Biogeosciences. Research shows that incorporating tree-height data into calculations of aboveground carbon stored in tropical forests reduces estimates by ~13%.

“We collected data on forest structure from 327 tropics-wide plots, as well as estimating tree height for 42,656 trees across the tropics. Results show that information on tree height was crucial for accurately estimating biomass, and that calculated reduction of carbon storage in trees due to tree height varied by region. These results help to improve the accuracy of pan-tropical biomass estimates, are important for integration with remote-sensing, and are vital to policy instruments such as REDD+.”


**- October 2012**

**- Tree rings reveal past Amazon rainfall**

BBC, BBC Mundo and Planet Earth online featured results from a new paper led by Dr Roel Brienen (University of Leeds). Roel and colleagues measured the ratios of two oxygen isotopes found in the tree rings of lowland tropical *Cedrela odorata* to quantify 100 years of rainfall patterns over the Amazon basin.

Isotopic signatures from just 8 cedar trees from a site in northern Bolivia gave insight into rainfall not just for that site, but for the whole Amazon catchment area. The isotope records were so sensitive that it provides the most promising proxy for reconstruction of rainfall over the Amazon basin so far. For example the extreme 1925-1926 El Nino year clearly stands out in the record.

This method may provide a new path towards obtaining more insight into the hydrological cycle of the basin and indicate it is changing in a warmer world.

For more information:
- BBC News / BBC Mundo
- Planet Earth Online


**- Launch of new RAINFOR website**

We invite you to visit our new version of the website and welcome any thoughts or suggestions for improvement. Please continue to send us your updates, news and photographs. If you have not already done so, please check your contact details on the Partners page.

We would also like to update the map to include cluster specific images and links. Please send us the photograph you would like to be used for your plots or plot clusters, and your project websites. Please send any responses and photos to Georgia Pickavance (G.C.Pickavance@leeds.ac.uk)
Introducing 2 new RAINFOR associated projects aiming to extend the monitoring of forest processes across the tropics:

**T-FORCES and GEM**

- **Contribution from Dr Cécile Girardin (GEM):**

  **GEM: An innovative approach to science**

  The Global Ecosystem Monitoring network (GEM) is an international effort to measure and understand forest ecosystem functions and traits, and how these will respond to climate change. Since 2009, the GEM team has been establishing a network of intensive carbon monitoring plots in South America, Africa and Asia. We measure the main components of net primary productivity and respiration to estimate gross primary productivity and carbon use efficiency. We aim to improve our mechanistic understanding of the carbon cycle and its interaction with environmental variables. The protocols used are based on those developed by the RAINFOR-GEM network and are explained in detail in the RAINFOR-GEM manual.

  Capacity building is a key element of the work carried out by the GEM. In October 2012, we held an interactive training workshop in Libreville, Gabon, for the Agence Nationale Parks Naturels and ENEF teams. We covered the key theoretical concepts of the research, carried out many practical demonstrations of methods in the forest and introduced the first stages of data analysis with exercises.

  The GEM website is an innovative approach to science. The GEM team is now spread over three continents. We are using the GEM application as a tool to coordinate our efforts through science networking. GEM field researchers regularly post questions and updates on the site. This site also allows us to stay in touch with the rest of the tropical ecology community: from the corridors of Oxford University to the remote terrains of the rainforest, get our latest scoops, communicate directly with the team, and delve into our photo diaries: [http://gem.tropicalforests.ox.ac.uk/](http://gem.tropicalforests.ox.ac.uk/)

- **Contribution from Professor Oliver Phillips (University of Leeds):**

  **T-FORCES: Tropical Forests in the Changing Earth Systems**

  The new five year ERC funded project **T-FORCES** aims to determine the changing role of tropical forests in the global carbon cycle. T-FORCES will address four questions:

  - How are tropical forests responding to atmospheric change?
  - What processes and drivers are involved?
  - What are the risks to their long-term sustainability posed by climate change?
  - How will these changes affect the overall carbon balance of the biosphere?

  To tackle these questions we will build and interrogate a pan-tropical observatory of tropical forest function. T-FORCES will build on the success of current and new networked initiatives in tropical forest monitoring, working with our colleagues in RAINFOR, and also AfriTRON, TROBIT, ForestPlots.net and GEM. The scientific approach of T-FORCES will be to take advantage of geographical contrasts that offer opportunities for ‘natural experiments’. We aim to determine forest dynamics and change along environmental gradients within continents to assess current transient responses, and where possible these will be complemented by elevational transects as space-for-time treatments to assess long-term temperature sensitivity. Continents (Africa, South America, Asia) will also provide replicates for global-scale tests of the generality of longer-term changes, as well as being independent ‘climate laboratories’ to investigate effects of natural climatic extreme events.
- Contribution from Bill Laurance (James Cook University, Australia):

Will tropical protected areas sustain their biodiversity?

In a recent paper in Nature, we found enormous variability in the biological health of tropical protected areas.

Around half of the reserves we surveyed are doing okay, but the rest are suffering. They have declines in top predators, their largest animal species, amphibians and reptiles, freshwater fish, epiphytes and old-growth trees, among others. The suffering reserves don’t have enough on-the-ground protection, but the habitats around them are also under assault: 85% of the reserves we studied had lost surrounding forest cover in recent decades (see photo).

This is bad news for parks. Isolated habitats tend to lose species whose small, fragmented populations are cut off from life-giving immigration and gene flow. Moreover, threats outside protected areas tend to leak inside them. Protected areas are like mirrors—reflecting, to a degree, the health of their immediate surroundings.

It is the conspiracy of external and internal hazards that is most dangerous for biodiversity. The bottom line is that we can’t simply set aside nature reserves and forget about their surroundings.


Latest RAINFOR publications:


Please contact us if you would like a pdf copy of an article or visit our website.
Rosa Maldonado using a floating chamber to measure CO2 flux of a small stream. Attached to the bridge poles is a floating chamber used for accumulation of outgassed methane that was sampled from the headspace.

Leena Vihermaa attaching the stem flow collection system on a tree. Samples of stem flow were collected for DOC analysis immediately after rain events and the total volume determined.

Manu. Madre de Dios, Peru (photo: Monteagudo / Huilica / Mateo 2012)

Liana (photo: Bia Marimon)

AMAZONICA NEWS:

- **Update from the University of Glasgow**

The final field campaign at the Tambopata National Reserve, Perú, was successfully completed by Leena Vihermaa (March-June 2012). The sampling campaign completed the data collection for dissolved inorganic carbon (DIC) and dissolved organic carbon (DOC) as well as direct measurements of CO2 fluxes that have been measured during all three field campaigns. Some new experiments were also set up during this trip. A stationary floating chamber was deployed in the small streams and swampy areas to measure the flux rate of methane. In order to understand source of organic carbon samples of stem flow, throughfall and overland flow were collected. In addition to that outgassed CO2 samples were collected from the studied streams and rivers for 14C dating to establish the age of the carbon.

The active field work has now been completed but automated data collection from one of streams continues using a pressure sensor (water level measurement) and a Troll 9500 (pH, conductivity, dissolved oxygen, water temperature, atm. pressure) until the end of this year. Fabian Limonchi (PUCP), is taking care of the data download and maintenance.

The majority of the samples collected during the final field trip have been analysed and the analysis of DIC samples will be completed soon. This autumn the focus will be on data analysis, interpretation and preparation of publications.

Results of DIC work were presented by Susan Waldron at EGU general assembly 2012, Vienna, Austria and at the ASLO summer meeting, Lake Biwa, Japan. Results based on the direct CO2 flux measurements were presented by Leena Vihermaa at the ASLO summer meeting.

Leena Vihermaa (University of Glasgow)

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