MRp | SE

NewsLetter

Monitoring and Research Platform | South Ecuador

Issue 2 | November 2014

One of the research results focusses on animal communities at the roadside in Cajas National Park. Photo: Pedro X. Astudillo

In this Issue

Coordinators' Corner

News Since Spring 2014

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A report about the status of research and funding of the Ecuadorian and German projects opens the Newsletter. The coordinators describe their latest tasks, inform about the first Status Symposium and the first joint member assembly of the Research Platform. The coordinator met the director of the Ecuadorian national weather service. This section concludes with the event of the Ecuadorian Embassay in Germany.

Recent Developments of the Platform Projects

By post-approval the German Research Consortium now encompasses 16 projects granted by the German Research Foundation DFG, while one is still pending. Having been working for almost one year, some of the German projects can already communicate first results.

Due to fiscally problems funding of the Ecuadorian Platform projects by the Ecuadorian National Secretariat for Higher Education, Science and Technology (SENESCYT) is still pending. Therefore, much of the stay of the German coordinators in Ecuador in September and October was occupied by discussions with various actors to find an expeditious solution of the problem (**Figure 1**, next page). During various discussions with the persons in charge at ETAPA and the affected Ecuadorian universities – the Universidad Técnica Particular de Loja (UTPL), the University of Azuay (UDA), and the University of Cuenca (UC) – we pinned the problem down to the transfer of public money from ETAPA to private universities (which are legally treated as private companies by Ecuadorian law). Since there is no legal way without public tender the Ecuadorian Platform projects are now waiting for more than one year for the granted means. The members of the

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Figure 1: During a joint dinner the rector of the University of Cuenca, Ing. Fabián Carrasco (right), discussed the SENESCYT funding dilemma with the coordinator of the German group, Prof. Jörg Bendix. It is worthwhile to stress that the meeting took place on the evening of Carrasco's birthday underlining the urgency of this issue and the importance our Ecuadorian partners attribute to the problem. Photo: Felix Matt

Platform agreed that an immediate solution for the transfer of the money within the next three months is essential for the successful operation of the entire Platform program. Several options were discussed where the most promising ones seemed to be (i) that ETAPA straightaway elaborates a legal solution for the money transfer to private universities, (ii) SENESCYT directly transfers the money to the universities without involving a lead partner and (iii) that the University of Cuenca, the only public university in the SENESCYT Research Consortium, takes on the function of the lead partner and transfers the money from one university to another university.

On 26th September the German coordinator visited the new administration of GPL (Gobierno Provincial de Loja). The new prefect, Rafael Dávila, is much in favor of the Platform program and the two accompanying knowledge transfer projects "Nuevos bosques para Ecuador" (see Transfer News Section in this Newsletter) and "Radar Net Sur" (see 1st MRp|SE Newsletter: doi: http://dx.doi.org/10.5678/lcrs/pak823-825.cit.1260), in which GPL acts as non-university partner. Particularly, the interest for an extension of the Radar Net Sur project was underpinned by a written declaration of the prefect. On the same day, a discussion with the Platform's non-university partner FORAGUA (the Southern Ecuador Water Fund) revealed that the first four climate stations for which funding was promised still this year by FORAGUA's partner, the city of Loja, could unfortunately not be implemented because of changes in municipal priorities, after the failure of the former mayor in the recent elections. At the moment there is no clear plan on the horizon how to proceed. A first meeting at the local office of the national weather service INAMHI in Loja seems to open the possibility of additional climate stations in South Ecuador funded by the national Ministry for Civil Protection, thus compensating for the lacking installation by FORAGUA. On 29th September, the coordinators met with Nicolay Aguirre of the National University of Loja UNL to discuss how to proceed with the pending Memorandum of Cooperation and how to bring UNL closer to the Platform during the remaining time of the current phase, which is an important precondition of any application for an extension of the Platform.

First Status Symposium

Our first Status Symposium of the Platform which took place on 2nd and 3rd October 2014 at Universidad del Azuay (UDA) attracted much interest from academia but also from Cuenca and the countryside (**Figure 2**). More than 200 scientists, students and stakeholders listened on the first day to 18 talks held in English (2nd October). A guided poster session where 19 contributing scientists briefly introduced their work in front of their posters, triggering vivid discussions, completed the impressing program. On the second day the symposium was continued by ten particular overview talks about the Platform in Spanish language, mainly targeting at comprehensive information of relevant stakeholder groups on the scientific goals, approaches and first results of research and knowledge transfer in South Ecuador. It was a pleasure to see the major progress the research activities made since the last planning meeting in October 2013, even of those Ecuadorian projects who had the possibility to gain some university grants. It should be stressed that also other scientists beyond southern Ecuador (e.g. from the Pontificia Universidad Católica de Ecuador at Quito PUCE) attended the symposium and contributed with interesting presentations on research activities outside the Platform. This clearly underpins the meanwhile supraregional visibility of our activities. We herewith take the opportunity to cordially thank the organizers from UDA, Edwin Zarate, David Siddons and their team, for a perfect organization of the successful event.

First Joint Member Assembly of the Platform

The first joint member assembly in the afternoon of 3rd October had to deal with an

Figure 2: Announcement of the Platform's first Status Symposium at the entrance of the venue, the auditorium of the Universidad del Azuay. Photo: Jörg Bendix

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Figure 3: Coordinator Jörg Bendix (left), the project leader and two members of the local advisory met Carlos Naranjo, the director of the national weather service INAMHI (third from right), and his team. Photo: Felix Matt

extremely comprehensive agenda. Major topic was the discussion of the SENESCYT funding dilemma where Manuel Morales, the successor of Alfredo Martinez and the person in charge at ETAPA, announced a potential solution for the transfer of the SENESCYT funds by ETAPA to the Ecuadorian universities. All members agreed to pursue now the same (and most promising) option in the discussions with SENESCYT to warrant a money transfer as soon as possible. However, short before his leave to Germany, the German coordinator was informed that the most likely option now favoured by SENESCYT would be the money transfer via the University of Cuenca (UC), which would imply a change of ETAPA to UC and a change of the Ecuadorian deputy coordinator from Morales back to Martinez. We will all keep our fingers crossed that UC will be successful in instantly taking on this juridically difficult task.

In another major agenda item, the subprogram speakers informed about results and ongoing activities in their fields. The same held for the chairpersons of the working groups. **Working group 1** (Local Administrative Body) is not yet implemented but the infrastructure providers (ETAPA, NCI) have agreed to take over the station booking and information tool which was developed by project C12, after an introductory workshop by the local coordinator Jörg Zeilinger. **Working group 2** (Nina Farwig, David Siddons) reported on the progress of implementing the core plot system (see 1st MRp|SE Newsletter: doi: http://dx.doi.org/10.5678/lcrs/pak823-825.cit.1260), while **working group 3** (data management, Jörg Bendix, David Siddons) informed on the activities in the Data Warehouse development. A copy of the German Data Warehouse has been installed at UDA, now expecting data from Ecuadorian Platform projects (for details see Data Warehouse News section). Also the German Data Warehouse is still waiting for the first data from the German projects. A milestone of the member assembly was the establishment of **working group 4** on implementing knowledge transfer as promised in our joint proposal. Our non-university partner Nature and Culture International NCI (Bruno Paladines) has agreed to immediately start with a workshop for the Ecuadorian stakeholders to define how and which knowledge gained by the research activities should be transferred and implemented with high priority.

Meeting with the Director of the National Weather Service

On 7th October the German coordinator met with the director of the national weather service INAMHI, Carlos Naranjo, who made the way to Loja for the only purpose to discuss a future contribution by his organization to our knowledge transfer projects (**Figure 3**). He underlined that INAMHI and also the Ministry for Civil Protection (Secretaría Nacional de Gestión de Riesgos) would be very much interested in entering an extension project of the Radar Net Sur consortium, which at the same time would imply that the Platform would get access to the planned additional climate stations in southern Ecuador by the agreement. Naranjo stressed that instructions for INAHMI employees regarding radar meteorology and climate / weather projections / forecast for southern Ecuador from the German side would be highly appreciated.

SENESCYT Event at Berlin

On 18th October, the German coordinators participated in the 3rd Forum for Ecuadorian students in Europe, held at the Technical University in Berlin and organized by the Ecuadorian Embassy in Berlin on behalf of SENESCYT (**Figure 3**). In a round table discussion addressing the topic "Bioknowledge" we could discuss the achievements and developments of our research in Ecuador, following an introductory talk by Professor Bendix. We where very impressed by the interesting research subjects and results presented by selected Ecuadorian PhD students, who are working in different European universities. Along the event, the German coordinator used the opportunity to briefly talk to SENESCYT minister Rene Ramirez, who apologized for the delay of the Ecuadorian Platform part, again stressing the legal problems and promising, to work on a solution of pending SENESCYT funds as soon as possible. While respecting the juridical snares of the endeavor to pass on public funds to private universities, we hence expect an expeditious solution and a speedy start of the projects of the Ecuadorian consortium of the Platform.

Figure 4: Coordinator, Prof. Jörg Bendix (left), and deputy coordinator, Prof. Erwin Beck of the German Research Consortium DFG-PAK 823-825 in front of the exhibition "*La Mano Sucia de Chevron*" along the 3rd Forum for Ecuadorian students in Europe. Photo: Organizer

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Science News

The Spreading of Logging Band Dendrometers

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To be able to monitor environmental change impacts on forest ecosystems we plan to measure growth dynamics in trees. As first steps we decided which trees to monitor in which of the three ecosystems under investigation and where to install the plots in the Laipuna Reserve.

Within the framework of the past projects of Research Units FOR 402 and FOR 816, our group has installed a considerable number of high-resolution electronic point dendrometers in the Reserva Biológica San Francisco (RBSF) and in the dry forest of Laipuna Reserve to analyze species-specific growth dynamics and responses of cambial activity to climate fluctuations. In the new **project A2** called "TRENCH", we intensified and extended this monitoring effort to obtain a more complete picture of tree growth dynamics along environmental gradients in three forest ecosystems under investigation.

In a first step, we installed 40 Logging Band Dendrometers (LBDs) with a built-in thermometer (DRL26, EMS Brno) in the seasonally dry forest ecosystem of Laipuna in April 2014. They were mounted on four different tree species (*Bursera graveolens, Eriotheca ruizii, Erythrina smithiana,* and *Ceiba trichistandra*) at three different altitudes. Four of each species were implemented with dendrometers at approximately 650 m a.s.l., divided in two plots (P1.1 and P1.2, **Figure 1)**. At higher elevations of 850 m a.s.l. (P2) and 1100 m a.s.l. (P3), only *Eriotheca, Erythrina* and *Ceiba* were furnished with instruments because *Bursera* trees are absent. The lowest, separated plot parts (P1.1 and P1.2) are located inside of the designated coreplots 1 and 3.

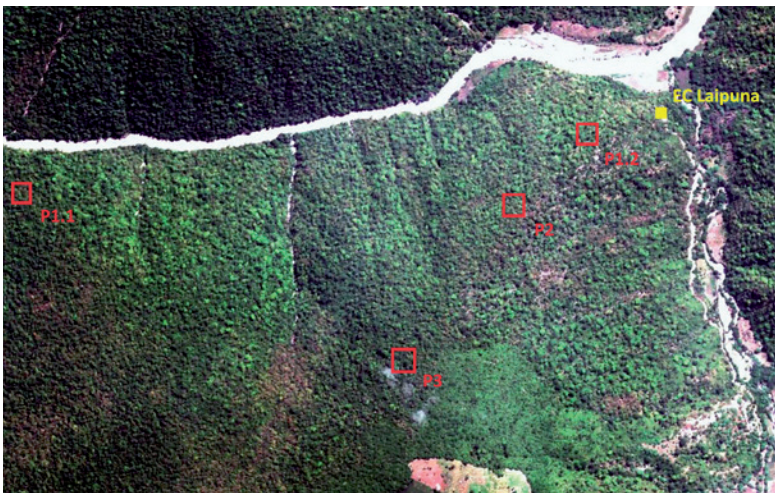

Figure 1: Location of our plots in the Laipuna area. Graph: Raffelsbauer, modified after [1]

Figure 2: Logging Band Dendrometer on *Ceiba trichistandra*. Photo: Volker Raffelsbauer

Usually, dendrometers are attached in breast height of a stem. However, for *Ceiba* stems showing the formation of characteristic buttress-roots we had to mount them at approximately two meters stem height to ensure that the bands enclose the complete stem circumference (**Figure 2**). The trees were selected in close cooperation with project C5 (Water consumption and carbon capture by trees of an evergreen and a dry forest in the Andes of South Ecuador as functional indicators of slow environmental changes) to equip identical tree individuals with sap-flow devices and non-invasive dendrometers.

In collaboration with project B3 (Improvement of forest management key strategies: a contribution to conservation and sustainable land use), eight dendrometers were installed in October 2014 on different *Pinus patula* plots near Cuenca at elevations of 3200 m a.s.l. and 3700 m a.s.l. In addition, in the station forest of the San Francisco valley we installed LBDs on eight trees with running sap-flow measurements. The aim is to extend the available data between the observation towers in cooperation with the projects C5 and C6 (Development of area-wide functional indicators using remotely sensed data). The reviewed species here are *Vismia tomentosa, Tapirira guianensis, Graffenrieda emarginata* and *Podocarpus oleifolius.* The latter two are especially interesting to us since they interlink our ongoing research with the former project phases.

The high-resolution data we are going to acquire are an important contribution for studying the impact of hydroclimate on tree water relations and growth activity and support our further research on cambial dynamics, functional wood anatomy, and stable-isotope analysis.

Reference

[1] Satellite image by project C6, Philipps-University of Marburg

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Nutrient Additions Impact Arbuscular Mycorrhizal Abundance and Molecular Diversity in the Tropical Montane Forest

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We studied responses of arbuscular mycorrhizal fungi to nutrient additions, concerning their abundance but especially species richness and community composition. The latter were investigated in depth by 454-sequencing, revealing a diverse community strongly affected by fertilizer additions.

Arbuscular mycorrhizal fungi (AMF) represent a monophyletic group of fungi associated with roots of more than 80% of land plants, also representing the dominant mycorrhizal form in the tropical montane forest in southern Ecuador [2]. As their main function AMF facilitate nutrient uptake especially of phosphorus (P) and nitrogen (N).

As part of the **NU**trient **M**anipulation **EX**periment (NUMEX) [3] we tested the hypothesis that P and N additions would decrease AMF abundance, reduce species richness and shift the community towards AMF lineages favored by fertilized conditions. In **project A4** we took soil cores at the NUMEX plots located at 2000 m a.s.l. Roots were stained with Trypan Blue to determine the percentage of AMF root colonization microscopically. AMF community structure was analyzed by 454-sequencing, targeting the nuclear ribosomal large subunit of DNA gene (LSU).

Overall, root colonization rates (on average 37%) were comparable to studies conducted in other tropical forests [1]. Species richness (in total 74 operational taxonomic units) was quite high, though still comparable to numbers reported from temperate areas. The abundance of AMF structures in roots decreased solely following N additions. In contrast, the number of AMF species present in roots decreased significantly in every fertilization treatment, with the strongest decrease (39%) caused by combined NP additions (**Figure 1**), especially affecting rare species. Interestingly, the two dominant orders, Glomerales and Diversisporales, responded differentially to N and P additions, with Glomerales richness affected by P and Diversisporales richness by N additions (**Figure 1**). This differential response might cause the significant shift in AMF community structure detected in presence/absence community data (**Figure 2**). In summary, these data point to a strong impact of nutrient additions especially on AMF richness, but also on the ratio of the two dominant AMF lineages. Subsequent interactions with plant community shifts and other processes are worth further investigations.

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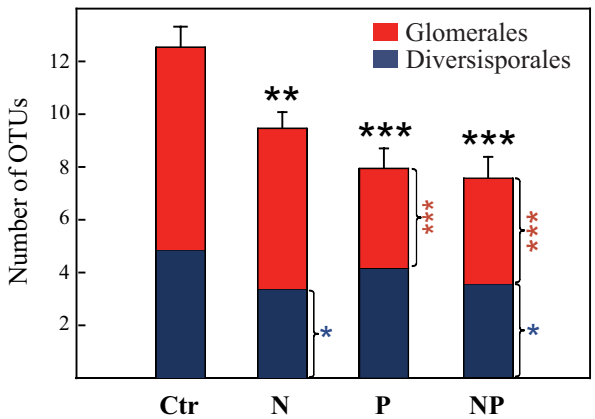

Figure 1: Effects of nitrogen (N) and phosphorus (P) additions on arbuscular mycorrhizal fungi richness. Bars represent the mean numbers of OTUs (operational taxonomic units) per treatment, error bars represent the respective standard error. The average number of OTUs assigned to Glomerales (red) and Diversisporales (blue) is illustrated within every bar. Asterisks on top of bars represent significant differences of the total number of OTUs compared to the control treatment, asterisks adjacent to group stacks the respective richness assigned to the phylogenetic group compared to the respective control values (one-way linear mixed effects models, $p < 0.05$). Graph: Tessa Camenzind. Reproduced from [1] with kind permission from Wiley

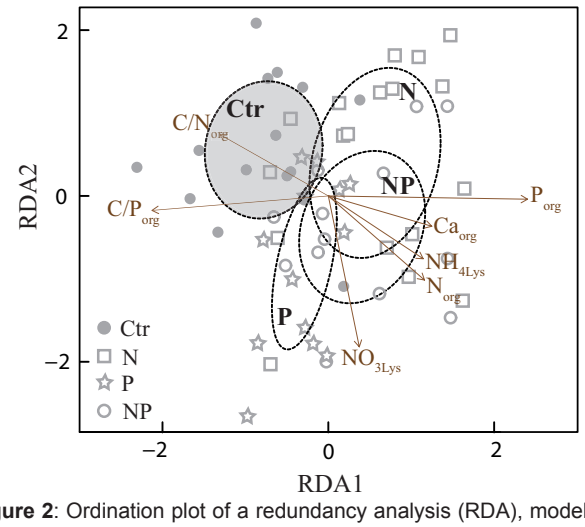

Figure 2: Ordination plot of a redundancy analysis (RDA), modeling the effect of nitrogen (N), phosphorus (P) additions and a combination of both (NP) on the presence/absence OTU (operational taxonomic unit) matrix, including spatial eigenvectors as conditional parameters. Dispersion ellipses of standard deviations of point scores of every treatment are included. Environmental variables were fitted to the ordination, vectors significantly correlated to the data are presented as arrows ($p < 0.05$). Graph: Tessa Camenzind. Reproduced from [1] with kind permission from Wiley

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Phosphomonoesterase Activities in the Organic Layer are Modified by Nutrient Addition in the Tropical Montane Forest

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We studied the effect of fertilizer on phosphatase activity at the NUtrient Manipulation EXperiment NUMEX plots of Reserva Biológica San Francisco. First results reveal differences between activity levels of the organic layer of the different treatment plots, but not in mineral soil.

Continuously increasing atmospheric input of nitrogen (N) into tropical rainforests influence biogeochemical cycles [1]. Not only the N cycle but very likely also the phosphorus (P) cycle might be affected. An increase in biomass production caused by N input [2] will result in an increased demand for other nutritional elements such as P. Therefore, one might expect an increase in P mobilization, e.g. by enhanced enzyme activity that releases inorganic P from organically bond P. Our objective in **project A7** was to study phosphatase activity in the NUMEX experiment comprising a control plot as well as treatment plots with moderate rates of additional N, P, and a combination of N+P as fertilizer to simulate increased atmospheric deposition.

In October 2014, we sampled the organic layer and the mineral soil (triplicates per plot combined to a composite sample resulting in n = 4 per treatment) of the control, N, P, and N+P fertilizer addition treatments (**Figure 1**). Within 48 h after collection, we determined the activity of phosphomonoesterase after Tabatabai & Bremner [3] in the laboratory at the Estación Científica de San Francisco (ECSF). The enzyme activities were derived from the amount of p-nitrophenyl phosphate transformed per time unit.

Phosphomonoesterase activity in mineral soil was negligible as compared to the organic layer and did not significantly differ among treatments (**Figure 2**). In the organic layer, enzyme activity was significantly lower than the control if only inorganic P was added (**Figure 2**). An increased supply of inorganic P by fertilization reduces the need to synthesize enzymes for P mobilization [4]. In contrast, N fertilization stimulates growth and thus generates the need to mobilize P [4]. However, our results did not corroborate this hypothesis maybe because of the low amounts of fertilizer added and the small effects observed so far. In conclusion, phosphomonoesterase activities did respond only if P was fertilized indicating that atmospheric N deposition rates might be too small to induce changes in enzyme activities involved in the P cycle.

Figure 1: Karla Dietrich, Emmanuel Münch and Elena Spoeri (f.l.t.r.) taking soil samples in the forest at the NUMEX site of Cajanuma. Photo: Elena Spoeri

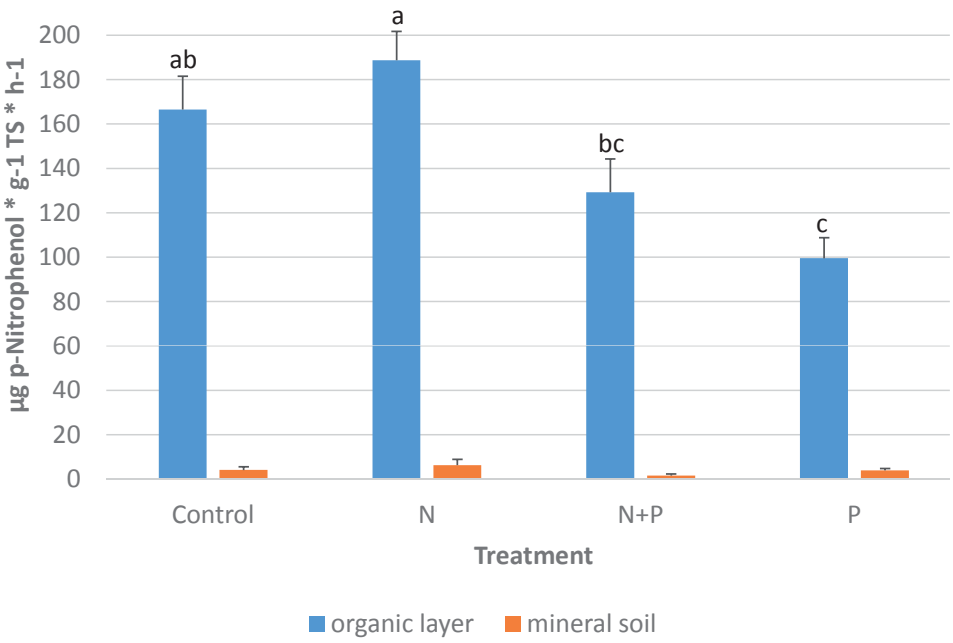

Figure 2: The activity of phosphomonoesterase of different treatments in the Control = no fertilizer added; N, P, and N+P = addition of the respective nutritional elements and a combination of both, respectively. Different lowercase letters indicate significant differences (ANOVA, $p < 0.05$).

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Progress in Developing Andean Functional Biodiversity Indicators

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We aim to develop a remotely sensible, spatial explicit indicator system to predict biodiversity measures at larger scales. In preliminary studies, we found a strong correlation between remotely sensed indicators and the regional bird community. These results are promising in terms of future analyses with comprehensive bird, ant and plant data.

Measuring biodiversity within forests is challenging since they harbor different plant and animal species with varying life strategies related to multiple vegetation layers. Species distribution depends on habitat characteristics and can change rapidly especially along altitudinal gradients. In our **project C2** we assess remotely sensed indicators derived by Light detection and ranging (Lidar) surveys and high resolution multi-spectral Quickbird imageries as proxies for different habitat characteristics to model spatial patterns of plant and animal species richness. Both remotely sensed data sources are particularly capable to indicate inter- and intra-habitat heterogeneity by their dependence on horizontal and vertical vegetation structure (**Figure 1**).

By making use of bird data collected by Detlev Paulsch in 2002 [1] we could demonstrate a particularly strong correlation between texture indicators derived from multi-spectral images and the bird community composition (**Figure 2**) and moderate correlations between avian species richness and combinations of Lidar and Quickbird indicators. These findings point to the high potential of remotely sensed data to compensate for very costly biodiversity assessments at larger spatial scales.

Currently, we are collecting field data in the recently established CORE-Plots (see 1st MRp|SE Newsletter doi: 10.5678/lcrs/pak823-825.cit.1260) as well as in twelve additional plots at intermediate altitudinal levels. In the following steps, we seek to apply remotely sensed indicators to model again bird, but also ant and tree diversity. First results of our bait experiment on ants show relationships between the number of caught ants and altitude as well as differences in bait preferences across the study area (**Figure 3**). With regard to the development of spatial-explicit functional indicators, we focus on the central biotic interactions predation, herbivory and decomposition. Our results will play a key role in developing a spatial-explicit indicator system for biodiversity and functional processes applicable to large spatial scales based on remote sensing data.

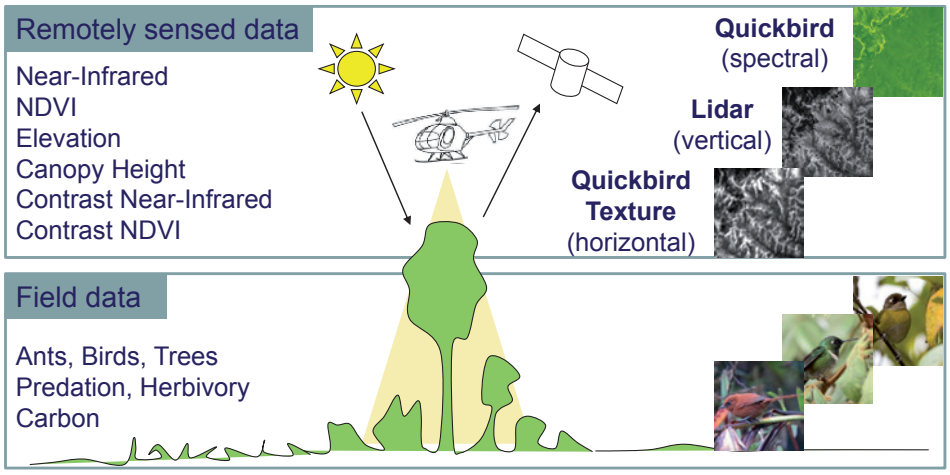

Figure 1: Approach to develop spatially explicit functional biodiversity indicators. NVDI = Normalized Difference Vegetation Index. Image: Christine Wallis

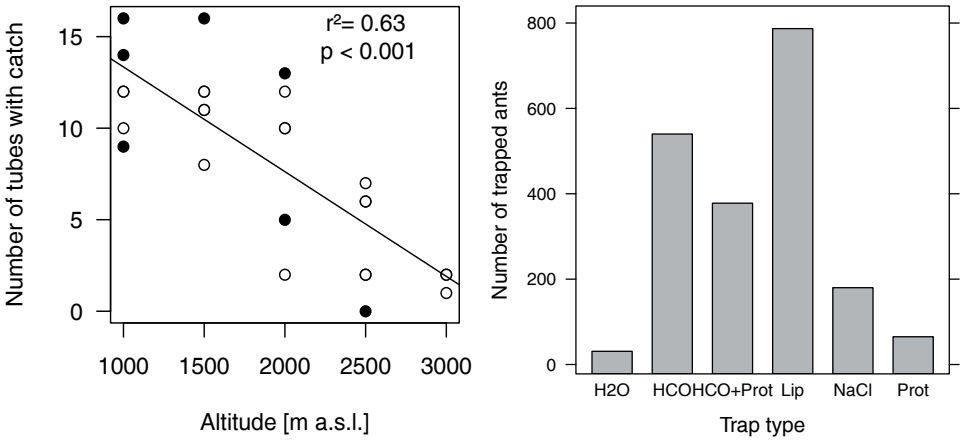

Figure 3a: Relationship between the number of tubes with ant catches and altitude. Dots show number of tubes with catches in disturbed (black) and undisturbed (white) plots. **3b**: Number of trapped ants in relation to bait type: H_2O = water, HCO = sugar solution, HCO + Prot = sugar + glutamine solution, Lip = olive oil, NaCl = salt solution, Prot = glutamine solution. Graphs: Yvonne Tiede

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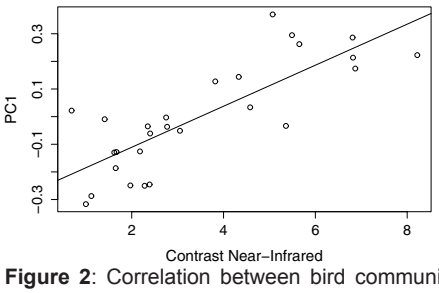

Figure 2: Correlation between bird community composition (PC1) and image contrast of the near-infrared channel accounting for structural differences in the canopy. Pearson's product-moment correlation, r = 0.80; $p < 0.0001$, n = 27. Graph: Christine Wallis

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Leaf Phenology and Tree Water Use in the Dry Forest of Laipuna

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We report first results on sap flow measurements with the Granier method (TDP), leaf phenological observations by hemispherical photography and a line transect sampling of evergreen tree species in the dry forest of Laipuna.

Introduction

Tropical dry forests such as the Reserva Laipuna receive low rainfall volumes, which are often strongly seasonally distributed. Trees have different strategies to cope with seasonal droughts, which may include a reduction of foliage, deep soil water uptake and the use of internal stem water reserves. Most species are drought deciduous and shed their leaves with the onset of the dry season (**Figure 1**). However, changes in rainfall patterns may shift tree abundances; e.g. evergreen species may become more abundant with higher rainfall. The aim of the present study in **project C5** was to investigate the change of leaf phenology during the transition period from the rainy to the dry season, as well as to assess the abundance of evergreen tree species along altitudinal gradients. Furthermore water consumption of deciduous and evergreen tree species was assessed from June 2014 onwards during the ongoing dry season.

Methods

Within three plots (90 x 90 m) at three altitudes (710, 860, 1100 m a.s.l.) research was conducted regarding:

(1) Tree water use by applying sap flow measurements with thermal dissipation probe (TDR) and heat deformation field (HFD), and a deuterium tracing experiment on the species *Capparis scabrida* (evergreen), *Eriotheca smithiana* (decidous), *Erythrina velutina* (decidous) and *Ceiba trichistandra* (deciduous and stem succulent), with a total n = 36 individuals so far.

(2) Leaf phenology using hemispherical photography to monitor the change of foliage at nine sampling points per plot at three altitudes.

(3) Abundance of evergreen tree species by the means of a line transect sampling, covering altitudes of 600 - 1100 m a.s.l..

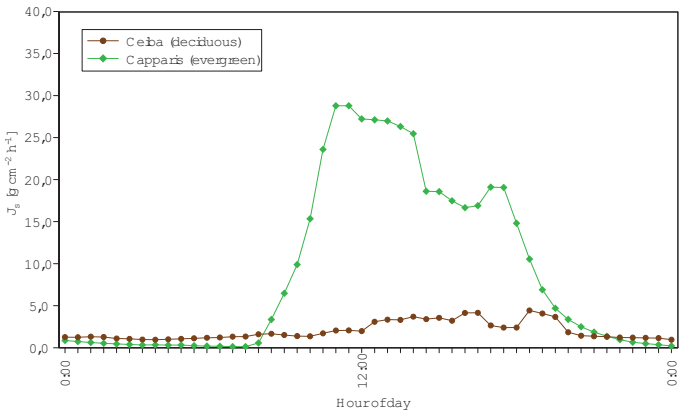

Figure 2: Daily course of mean sap flux density (Js) of an evergreen (*Capparis scabrida*) and a deciduous species (*Ceiba trichistandra*) on a sunny day (22nd July 2014; 4 trees per species) at 670 m a.s.l. Graph: Philipp Butz

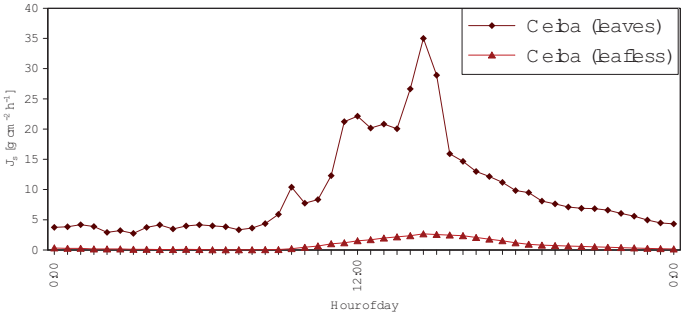

Figure 3: Daily course of mean sap flux density (Js) of the deciduous species *Ceiba trichistandra* after a rain event on a sunny day (9th May 2014; two trees per species) at 670 m a.s.l.. Graph: Philipp Butz

Preliminary results

(1) Sap flow of the evergreen species *Capparis* shows a normal daily course, whereas *Ceiba* (deciduous and leafless at this time) is not transpiring any water (**Figure 2**). This

Figure 1: Change of vegetation cover in the transition period from rainy (April 2014, left, over May 2014, middle) to dry season (June 2014, right) in the valley of the Catamayo river close to the Laipuna research station. Photos: Hannah Bettac

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holds also true for the other species. An interesting phenomenon appeared after an unusual rain event in July 2014, during which some *Ceiba* trees re-foliated and consequently transpired (**Figure 3**). Samples of the deuterium tracing experiment are still being processed as well as the HFD data.

(2) Percentage foliage increased towards higher altitudes and leaves were shed much earlier and faster at lower altitudes. At 710 m a.s.l. higher dynamics and variability of leaf shedding were observed compared to the higher altitudes. Towards the end of the study period, the highest plot had twice as much foliage as the lowest plot (**Figure 4**)

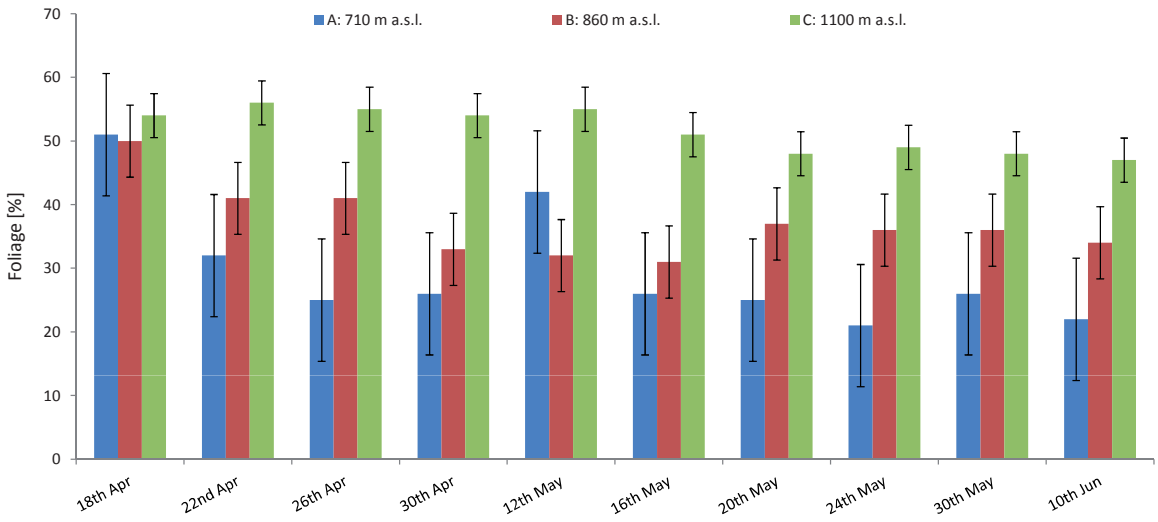

Figure 4: Change of foliage [%] at altitudes of 710 (A), 855 (B) and 1082 m a.s.l. (C) during the study period. Graph: Hannah Bettac

Table 1: Number of evergreen tree individuals recorded in each altitudinal range along the transect

Altitude [m a.s.l.]	600 - 700	700 - 800	800 - 900	900 - 1000	1000 - 1100
Individuals [ha^{-1}]	23	54	65	79	65

(3) Number of evergreen tree species per ha increased with increasing altitude (**Table 1**). The dominating evergreen species were *Capparis scabrida* and *Geoffroea spinosa* (**Figure 5**). In total nine evergreen species were recorded.

Discussion and Outlook

Higher and constant moisture in upper altitudinal ranges leads to denser foliage and less variability in defoliation. Therefore a higher abundance of evergreen species and different species composition can be observed towards higher altitudes.
Considering the next rainy season, we are planning an additional plot on a disturbed site, a repetition of deuterium tracing and an investigation of the abundance of natural occurring deuterium in soil and plant water. This will yield more in-depth information on water uptake and storage of trees in a seasonally dry forest.
Hemispherical photography will be continued to observe the transition from the dry to the rainy season (November – February).

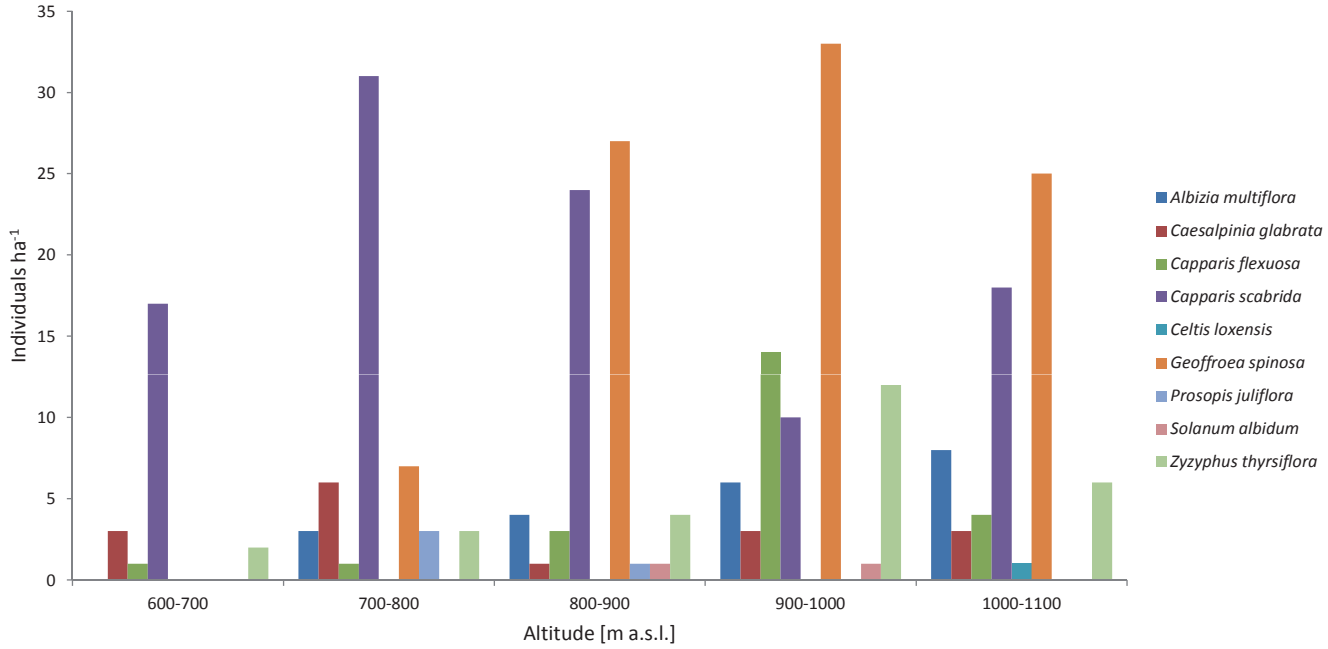

Figure 5: Abundance of evergreen tree species in each altitudinal range. Graph: Philipp Butz

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RendezWUE in the Rain Forest: Leaf Gas Exchange in the Canopy and its Relation to Landscape Evapotranspiration

Simone Strobl[1], Brenner Silva[2], Michael Schorsch[3], Johannes Knüsting[3], Renate Scheibe[3], Jörg Bendix[2], Erwin Beck[1]
[1]University of Bayreuth, Germany – members of the DFG-PAK Research Consortium
[2]University of Marburg, Germany – members of the DFG-PAK Research Consortium
[3]University of Osnabrück, Germany – associated members of the DFG-PAK Research Consortium

A novel method combination is applied in the tropical mountain forest to unveil water use and carbon uptake of trees and its relation to landscape evapotranspiration.

Measurement Setup

After successful experiments with the novel combination on the pasture (see 1st MRp|SE Newsletter: doi: http://dx.doi.org/10.5678/lcrs/pak823-825.cit.1260) and building of a twin tower construction in the natural forest, the *RendezWUE* approach was established in the forest of the Reserva Biológica San Francisco (RBSF) reserve. Laser scintillometer and sapflow sensors are operating since March 2014 along a 90 m observation stretch. The technical system has been continuously improved since then and first results are now available for the mountain rain forest. Additional measurements of leaf water and carbon exchange by means of porometry started in October to complete the *RendezWUE* approach, which refers to the simultaneous use of different instruments to measure the water use efficiency (WUE) at individual tree and landscape levels.

The setup in our **projects C5 und C6** in the forest consists of two towers (30 and 36 meters) with two platforms each (**Figure 1**). The towers were constructed in a distance of 90 meters in the natural mountain forest at 1950 meters a.s.l.. On the top of the towers, a laser scintillometer measures heat flux and evapotranspiration above the forest canopy. The first platforms (9 and 11 meters above ground) reach into the middle of the crowns, which is partially shaded. The second platforms (14 meters above ground) reach the top-of-the-canopy (sunlit canopy area). Portable photosynthesis measurements systems have been installed on the platforms for the first measurement campaign during October and November 2014, targeting on leaf water

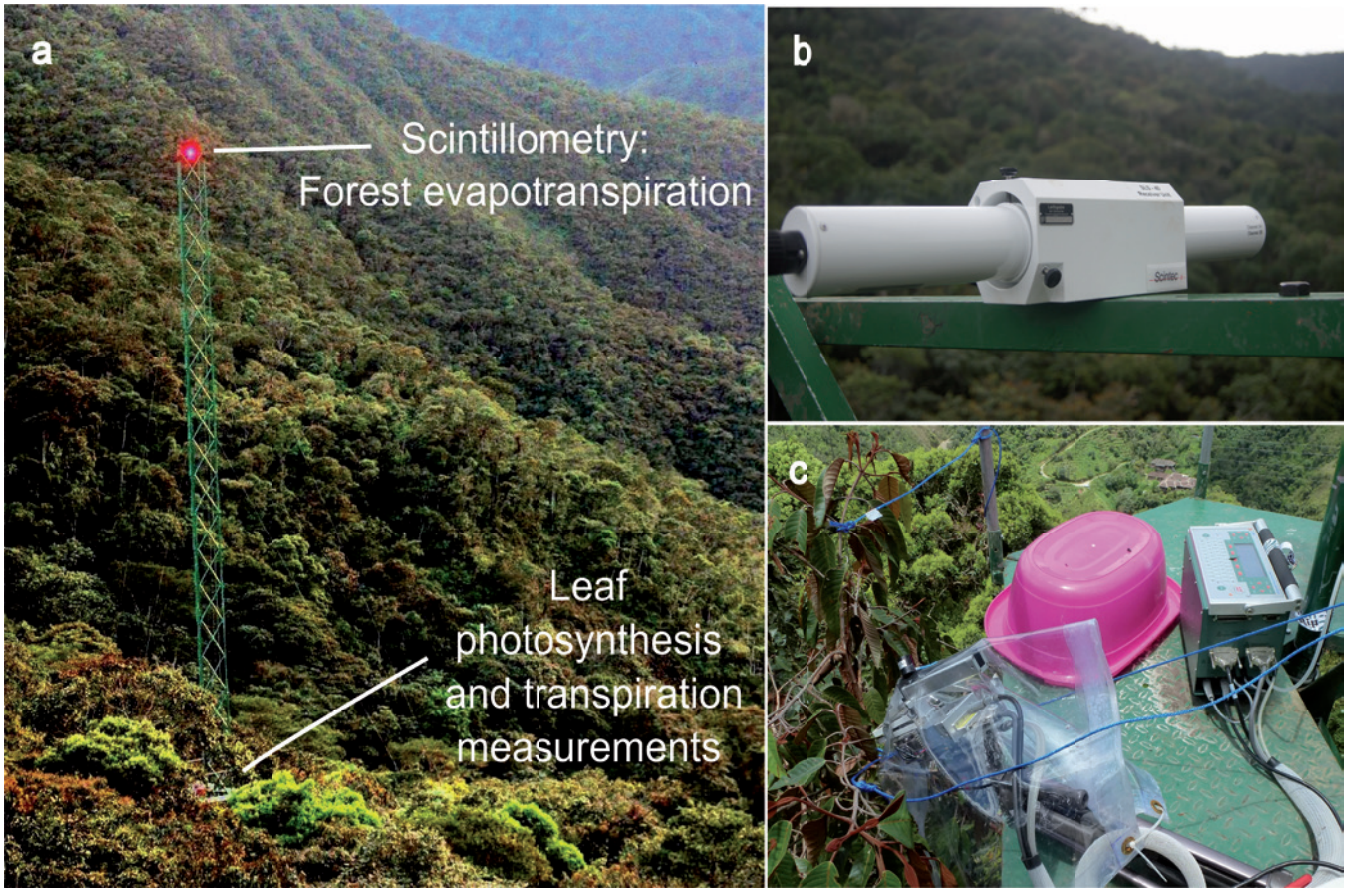

Figure 1: Twin-tower at the western endpoint of the investigated 90 m long plot in the mountain rain forest of the RBSF, showing the (**a**) scintillometer laser beam and the upper platform, (**b**) the scintillometer receiver, and (**c**) the photosynthesis measurement system. Photos: Brenner Silva, Simone Strobl, Volker Raffelsbauer

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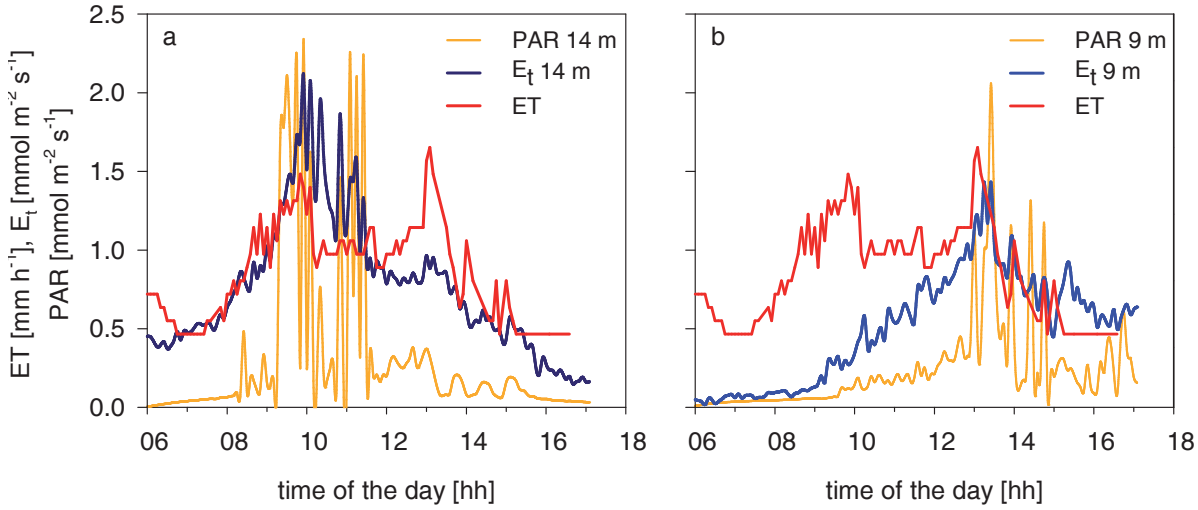

Figure 2: Daily course of landscape evapotranspiration (red) together with solar radiation (yellow) and transpiration (blue) of **a:** top-of-canopy leaf (14 m height) and **b:** mid-canopy leaf (9 m height) of *Vismia tomentosa*. Graphs: Simone Strobl, Brenner Silva

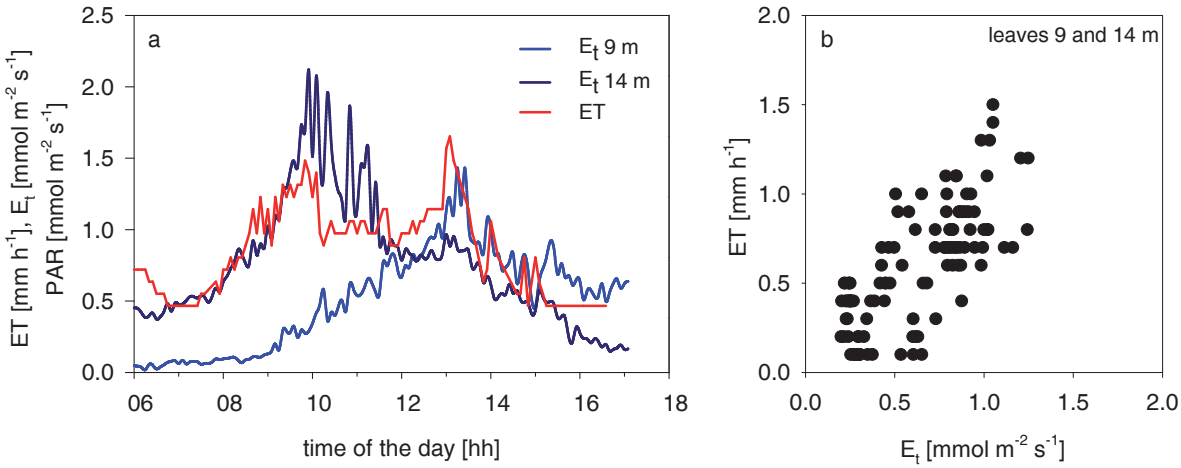

Figure 3a: Daily courses and **b:** relation between leaf transpiration (E_t) and evapotranspiration (ET). Landscape evapotranspiration (red) is shown together with transpiration of top (14 m height) and mid-canopy leaves (9 m height). The scatterplot shows average of top and mid-canopy transpiration (Et) and evapotranspiration (ET). Graphs: Simone Strobl, Brenner Silva

and gas exchange of top and mid-canopy leaves. Altogether, 1 laser scintillometer, 1 automatic climate station (11 sensors), 4 photosynthesis measurements systems (porometer), and 63 sapflow sensors (21 trees) have been installed. In cooperation with project A2, automatic dendrometers have also been installed at 8 trees. In the first week of measurements, we observed an individual of *Vismia tomentosa* and interesting insights could be gained.

Results

First results from a dry day show the daily course of landscape evapotranspiration (ET) together with photosynthetic active radiation (PAR) and transpiration (E_t) of a *Vismia tomentosa* leaf in the (sunlit) top canopy (**Figure 2, left**). Leaf and landscape measurements agree well in the morning, but transpiration ceases in the afternoon, which is due to a quick drop in radiation. In contrast, transpiration of the mid canopy leaf (**Figure 2, right**) increased throughout the day and reaches a maximum in the afternoon. Daily courses of top and a mid-canopy leaves reveal details on canopy-light interactions and on the contribution of different leaves to the total evapotranspiration in the forest.

Figure 3 overlays the two daily courses of top and mid-canopy leaves with landscape evapotranspiration. Two peaks were observed in the landscape evapotranspiration. The first peak (around 10:00 h) correlates well with transpiration at the top of the canopy, while the second peak (around 13:00 h) correlates with the leaf at the mid-canopy. Assuming top and mid-canopy leaves having equal shares of the foliage a correlation of r^2 = 0.65 was calculated with landscape evapotranspiration. These observations shows that canopy-light interactions regulate transpiration in the canopy and that crown leaves are the main driver for landscape evapotranspiration.

First measurements in the forest *Rendez-WUE* approach cast light in gas exchange and its relation to irradiation in the forest canopy. In the future, water relation and carbon uptake will be observed under different climate conditions also covering other tree species at the study site.

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The Impact of Roads on the Avifauna of Páramo Grassland in Cajas National Park

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[1]Philipps-Universität Marburg, Germany – members of the DFG-PAK Research Consortium

[2]Universidad del Azuay, Ecuador, [3]Stony Brook University, USA; [4]National Aviary, Pittsburgh, USA

Cajas National Park is a representative area for Andean avifauna in the southern Andes of Ecuador. We evaluated the effect of roads and habitat characteristics on the bird community composition. Habitat-specialized birds such as shrubby páramo species were found to have reduced abundance at the roadsides. Thus, habitat modification caused significant shifts in the bird community.

The introduction of the non-native plant *Polylepis racemosa* is changing the natural configuration of páramo grassland at roadsides. Here, generalist bird species and a few páramo specialist birds are attracted by the new conditions, while shrubby páramo bird specialists are found far from the road (**Figure 1**).

Our findings [1] suggest that road construction may facilitate the spread of non-native *P. racemosa*, which is attracting a few mostly generalist species but largely reduces the abundance of shrubby páramo specialist. We emphasized the importance to monitor constantly avifauna at the community level to reveal a better understanding changes bird habitat groups as response to habitat modification associated with stressors like road construction in the páramo landscape (**Figure 2**).

Reference

[1] Astudillo PX, Samaniego GM, Machado PJ, Aguilar JM, Tinoco BA, Graham CH, Latta SC, Farwig N (2014) The impact of roads on the avifauna of páramo grasslands in Cajas National Park, Ecuador. *Stud Neotrop Fauna Environ* 49(3): 204-212. doi: http://dx.doi.org/10.1080/01650521.2014.960778

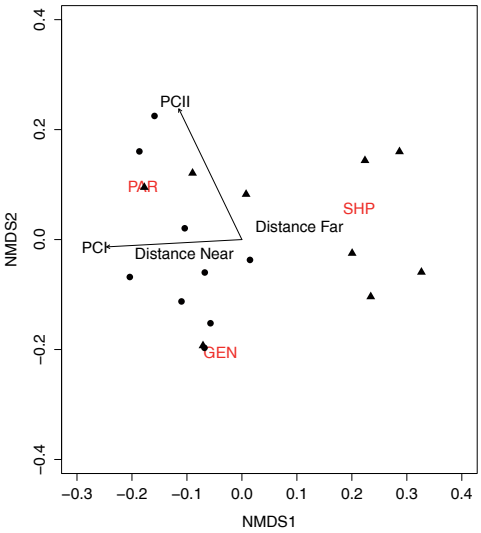

Figure 1: Non-metric multidimensional scaling biplot of bird habitat groups. Triangles = 9 transect located ~ 250 m; circles = 9 transects located ~ 25 m from the road. PCI = Increasing proportion of non-native plants; PCII = Increasing proportion of woody native plants; PAR = páramo specialist; SHP = shrubby páramo specialist; GEN = generalist. Graph: Pedro X. Astudillo

Figure 2: The Cuenca-Molleturo-Naranjal road passes through 15 km of the páramo grassland ecosystem which was investigated. Photo: Pedro X. Astudillo

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Transfer News

Recent Advances in the Forestry Transfer Project "Nuevos Bosques para Ecuador"

Baltazar Calvas (local project coordinator)
Technische Universität München, Germany – member of the DFG funded Transfer Research Project

In this project we develop methods that support local institutions to improve forestry decision making in Ecuador. Scientific results are transferred to local institutions and forest owners. We conducted several training courses in different areas. The environmental minister praised our work and committed efforts to continue pilot projects also in other regions of Ecuador.

The Transfer Project "Nuevos Bosques Para Ecuador - Facilitation of biodiversity in montane ecosystems by large-scale conversion of monocultures into mixed forests" funded by of the German Research Foundation (DFG) has made significant and unexpected achievements in the last month which I will briefly summarize.

Scientific Research

With the valuable support of the local owners of *Pinus patula* plantations and *Alnus acuminata* natural forest, we have established 54 scientific plots. Inside those we have collected a comprehensive set of biotic and abiotic data about mycorrhizal fungi, mesofauna, microclimate, forestry inventory and soils. Each topic has been supported by German universities with the local coordination of Ecuadorian PhD students who work mainly in cooperation with local scientific advisors from the Universidad Técnica Particular de Loja (UTPL, **Figure 1**).

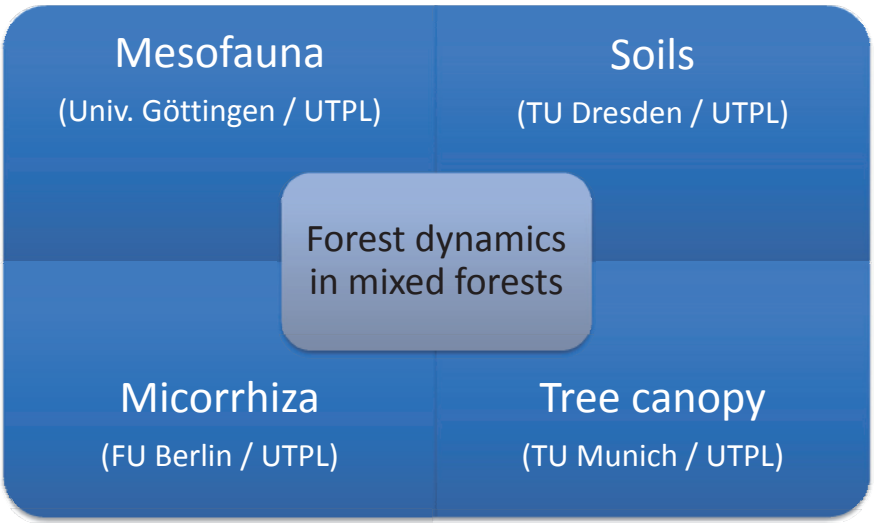

Figure 1: Scientific groups involved to develop a concept for afforestation with conversion of monocultures into mixed forests. UTPL: Universidad Técnica Particular de Loja. Graph: Baltazar Calvas.

Mycorrhizal Fungi
The research is focused on the characterization of the original status of the sites (*Pinus patula* and *Alnus acuminata* sites) regarding root characteristics and the abundance of arbuscular mycorrhizal fungi. In addition, we are working on the morphological identification of roots and the molecular identification of their morphotypes. Preliminary results give us an idea of the unknown ectomycorrhizal diversity of the forests of Ecuador, which can help to understand the ecological processes that occur in montane ecosystems in the tropics.

Soils
A site classification has been developed based on the study of climatic, topographical, soil and forest variables. However, the focus was made on the physico-chemical soil properties important for plant growth like soil organic carbon (SOC), total nitrogen (TN), total elements (e.g. K, Mg, Ca, P, S, Zn, Mn), available PO_4-P, cation exchange capacity (CEC), KCl extractable NO_3-N and NH_4-N and soil pH. Exploratory data analyses applied gave account of a high diversity of the soil properties both among the organic horizons, upper and lower mineral horizons as well as among plantations. Thus, the planned forest management (thinning and underplanting with native species) will have different impacts on nutrient cycling and plant nutrition and will be assessed in further investigations.

Mesofauna
Soil samples were taken for the collection of mesofauna samples in order to study the microbial activities and litter decomposition in different soil layers of alder and pine forests. The most abundant orders were oribatid mites, springtails (both decomposers), and the uropodid mites Gamasida (predators). These results will be used to find a relationship between soil fauna and microbial biomass, as microbes play an important role as primary decomposers of organic matter.

Forestry
Before the tests of silvicultural treatments (thinning and planting of native species) forest inventory data have been collected on all sites. A complete dataset of canopy tree cover, natural regeneration under the canopy and climate data is ready to be analyzed, in order to reveal changes occurring when native species become part of a mixed forest under pine canopies.

Knowledge Transfer

More than 200 Ecuadorian people (scientific staff, institutional forest technicians, rural organizations) participated in several training courses we carried out, like tree climbing for seed collection purposes, seed

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treatment at laboratory and field level with local nurseries, or directional felling of trees. Seed collection and tree felling activities are still in progress and are carried out by local institutions like Ministerio del Ambiente, Consejo Provincial, Municipio de Loja, Empresa Electrica, GIZ-Zamora, Municipio de Zamora Chinchipe, Consejo Provincial de Zamora Chinchipe (**Figures 2, 3**).

Figure 2: Several Ecuadorian people took part in the field training courses which were organized by the Transfer Project together with local institutions. Alfred Woerle was the trainer. Photo: Baltazar Calvas

They all join forces and integrate the new knowledge in their daily activities. Thus the Ecuadorian Minister of the Environment has considered the project being a strong and important component for environmental issues and a helpful partner for forest management decision makers (**Figure 4**).

Figure 3 top: Participants of the field training courses received certificates of participation. Third form left is Dr. Gustavo Samaniego one of the private owners. **Bottom**: After signing the new agreement with the Major from the City of Loja, Dr. Jose Bolivar Castillo (second from left) together with Dr. Bernd Stimm, Dr. Patrick Hildebrandt and Dr. Baltazar Calvas (f.l.t.r.). Photos: Baltazar Calvas

Figure 4: Meeting with the Ecuadorian Environmental Minister, Lorena Tapia (second from right). In the meeting we planned new strategies how we work together in the Transfer Project. Photo: Baltazar Calvas

Currently the documentation and support of methodological processes are performed, being part of a consortium of local owners and institutions, which are in charge of forest development in southern Ecuador. Sharing scientific experience and creating a local network of foresters is a chance to build up the missing bridge in between science and application in southern Ecuador after several years of scientific research. As a consequence, further scientific question may be investigated within this local network in the future. Moreover, the creation of a database about main scientific achievements in forest topics with our local partners is performed.

Acknowledgements

The scientific achievements wouldn't have been possible without collaboration of many people and the financial support from German Research Foundation DFG. The author especially wishes to thank Prof. Dr. Dr. Reinhard Mosandl, Dr. Bernd Stimm, Dr. Sven Günter, Prof. Dr. Stefan Scheu, Dr. Juan Pablo Suarez, Mg. Sc. Dario Veintimilla, Mg. Sc. Pablo Quichimbo, Mg. Sc. Pablo Ramirez, Dr. Leticia Jimenez, Prof. Dr. Ute Hamer, Biol. Micaela Mafla, Ing. Eduardo Cueva, Dipl.-Biol Tessa Camenzind

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Data Warehouse News

Sharing our Data with the World: Open Access and Internal Use

Rütger Rollenbeck (Data Manager) and Maik Dobbermann (Developer and Webmaster)
Philipps University Marburg, Germany – Data Manager, Developer and Webmaster of the DFG-PAK Research Consortium

How we handle access rights for new and old data sets. Data Warehouse is installed in Ecuador. Future upload procedure enhancements underway. Large data repository from SIGTIERRAS opens new research options. New cooperation with German research initiative.

After the successful transition of the data base from the preceding Research Unit FOR 816 funded by the German Research Foundation (DFG) to the new DFG-PAK 823-825 structure, the database now reflects the new organisation scheme and is ready for new scientific data to be uploaded. Apparently, most of the research projects are still in the phase of collecting those data sets and only limited amounts of new information have been stored recently. We hope to stimulate more integrated research, especially in the context of the international cooperation of projects funded by DFG and the Ecuadorian National Secretariat for Higher Education, Science and Technology (SENESCYT). To support this goal, several improvements will be implemented in the data warehouse in the future.

Data Upload Procedures

The new structure and the decision to enable public access to all data of the preceding data from the Research Units FOR 816 and FOR 402 requires a new approach, to separate new and old datasets [1]. While old data sets are now free to download for any user in the world, newer data collections uploaded since 2013 shall still be kept under limited access of members of the current MRp|SE-Program only. This requires that data base users do not extend their existing datasets, but supply the new data as separate datasets. For this, the data base team will offer a cloning function for existing datasets, so all metadata (except temporal coverage) is copied from the older data and the new data can be uploaded and stored under the rules of limited access. The approach is depicted in **Figure 1**. As the Figure shows, temporal overlap between the new and old dataset should be avoided to limit redundant data storage and – even more important – differences within a dataset.

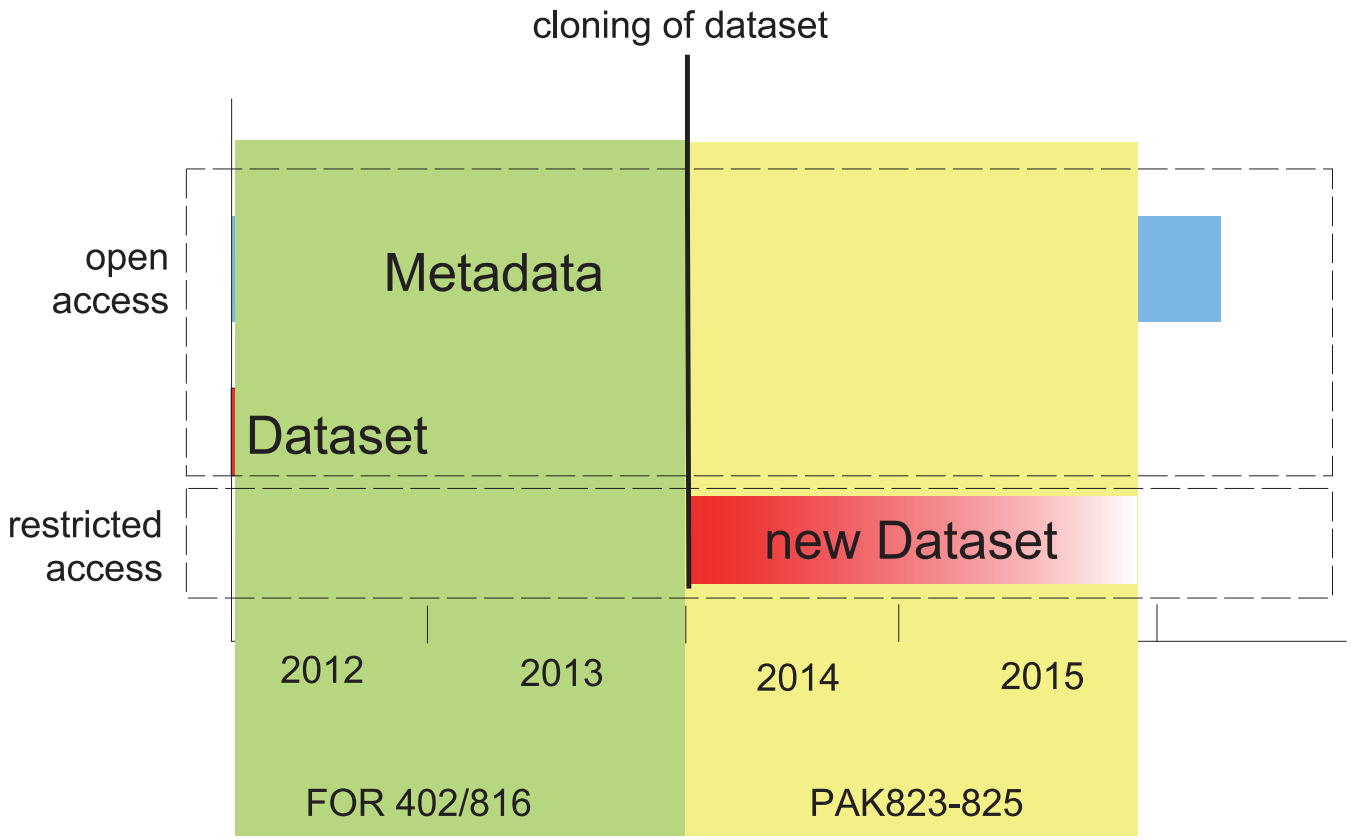

Figure 1: Treatment of continuous research data between the preceding DFG Research Units FOR 402 and FOR 816 and the current DFG-PAK823-825 research projects at the Monitoring and Research Platform South Ecuador (MRp|SE). Graph: Rütger Rollenbeck.

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Upload Procedure Upgrades

The upload procedure itself will be optimised within the next few months. The following tests are on the agenda:

- A new condensed instructions page will be presented, so experienced users can continue quickly with the procedure. For inexperienced users, detailed instructions will be kept available on additional pages.
- An information checklist will be provided, so the data collection can take care of gathering all relevant metadata required for the comprehensive data set description, during the upload.
- The upload procedure will be simplified, by supplying predefined categories, where possible, so the users have to spent less effort in choosing descriptive terms like attribute names, titles, captions or key words.
- The upload page will be condensed to fit into a single web page. Users will be supplied with a short list of requirements before starting the upload procedure.
- Templates for the most common data types will be made available, e.g. an Excel template for time series data. The template will hold all necessary information to automatically parse and build the metadata.

Automatic procedures for quality assessment of time series data have been developed and will also be integrated in template files. Users can adjust the criteria to their needs, while quality flags will be automatically written.

Upcoming Data Warehouse Workshop in Germany

All those news will be presented and explained during the next Data Warehouse Workshop in Marburg, intended to take place in January 2015.

Data Repository from SIGTIERRAS

A large data repository has been made available by the "*Sistema Nacional de Información y Gestión de Tierras Rurales e Infraestructura Tecnológica*" SIGTIERRAS. Thanks to the effort of Jörg Zeilinger, this Ecuadorian authority has made available about 1.3 Terabytes of data, mainly consisting of GIS-layers associated data tables, statistical analyses and aerial photography in very high resolution (cm scale) of the south of Ecuador. The geographic coverage are the provinces of Azuay, Cañar, El Oro, Loja, Morona Santiago and Zamora-Chinchipe.

The Data Warehouse manager is compiling a detailed metadata index of the repository, which will be uploadad on the webpage as soon as it ist completed. The data can be accessed by directly contacting the Data Warehouse manager. This requires a separate use agreement to be signed.

Data Warehouse Workshops in Ecuador

The installation of the Ecuadorian Data Warehouse system took place in June 2014 at the Universidad del Azuay in Cuenca. Thanks to the great support from David Siddons and Diego Pacheco, the successful installation was completed within a few days. At the same time, two Data Warehouse Workshops were held for the future users of the Ecuadorian Data Warehouse systems. The Ecuadorian projects are now busy compiling their attributes and further specific requirements to make the best use of the new system.

Cooperation of the Data-Warehouse Team with the Face2Face Initiative

On other news, the Data Warehouse team has started a fruitful cooperation with the German research initiative Face2Face, whose researchers analyse effects of climate change as well as adjustments to climate change and develop climate change adjustment strategies or ways of reducing the effects of global warming [2]. The members of that group are considering the implementation of another copy of the existing system: a responsible personnel has been acquired and hardware considerations have been finished. Probably, the next Data Warehouse Workshop will include members of that group, too.

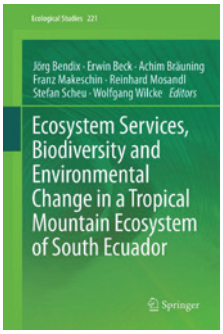
Additional Information

[1] Both datasets are available at www.tropicalmountainforest.org. If you log in the system automatically gives access to the new data sets.
[2] Face2Face initiative: www.proloewe.de/en/face2face

Book Review

15 Years of Ecosystem Research in Ecuador

In August 2014 Sandra Luque reviewed the book which summarized the 15 years of ecosystem research in south Ecuador carried out by the preceding two Research Units FOR 816 and FOR 402 (see About Us section) in the journal MRD. After describing the book's importance and focus she characterizes the gap which the book now fills. The reviewer from the Mountain Ecosystems Unit in the Frensh Saint-Martin-d'Hères now visiting the Scottish Department of Geography and Sustainable Development at the University of St. Andrews introduces the four parts of the book in detail: the introductory chapters, the current situation of biodiversity and ecosystem services, the future changes and their impacts on biodiversity and ecosystem functioning, as well as the synopsis chaperts. She cites the topics, tables and figures she likes most and recommends: "It is a fine book, an extraordinary, well-written, and well-produced synthesis of interdisciplinary work – and it educates" (p. 304).



Bendix J, Beck E, Bräuning A, Makeschin F, Mosandl R, Scheu S, Wilcke W (2013): Ecosystem Services, Biodiversity and Environmental Change in a Tropical Mountain Ecosystem of South Ecuador. Ecological Studies, Springer, Berlin, Volume 221, 438 pp.

Reference

Luque S (2014): Review of "Ecosystem Services, Biodiversity and Environmental Change in a Tropical Mountain Ecosystem of South Ecuador". *Mountain Research and Development* (MRD) **34**: 303-304: doi: http://dx.doi.org/10.1659/mrd.mm142

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News from Infrastructure Providers and Non-University Partners[1)]

The Dry Forest Gains Two World Recognitions

The organization Nature and Culture International (NCI) was involved in establishments of two initiatives which now received recognitions by the UNESCO and the UN Development Program.

UNESCO: Dry Forest is a Biosphere Reserve

On 12th July 2014 the UNESCO declared the dry forests of Loja and El Oro as a Biosphere Reserve. Thus Ecuador now has six biosphere reserves. The Dry Forest Biosphere Reserve is formed by the Loja cantons of Zapotillo, Macara, Puyango, Pindal and Celica and Paltas (Dry Forest Commonwealth), including Sozoranga, those which add to the Las Lajas canton, of the El Oro province. In total, there are more than 500,000 ha (**Figure 1**). A great part of it is covered by the best conserved dry forests in the country. According to United Nations Educational, Scientific and Cultural Organization, "the reserve is home to one of the largest populations of endemic South American birds, and also considerable populations of some emblematic animal species, such as the long nosed crocodile and black howler monkey." Another characteristic is that in the core zone of the Reserve there are no national parks, but 17 reserves of the autonomous decentralized governments (GAD). The majority of them are already created and others are in the process of creation. The establishment of them is a process that is unprecedented in the country. NCI was the principal institution in charge of the construction of the technical file and accompanied the Dry Forest Commonwealth and Municipalities on the process towards the declaration of the Reserve.

Palo Santo Won Equator Prize of UN Development Program

The Bolivar Tello Cano Community Association, which operates in the Dry Forest Biosphere Reserve, is one of the 35 winners of the Equator Prizes of 2014, recognized by the Equator Initiative of United Nations Development Program (http://www.equatorinitiative.org/index.php?option=com_content&view=article&id=412&Itemid=537&lang=en). The prize was awarded because the Association has found a strategy to reduce deforestation by providing a sustainable income-generation activity for local indigenous communities that does not require cutting down trees. The Association is the principle executor and benificary of the Palo Santo Project, which links three essential components for sustainable development: conservation, research and industry, and of course the fruit of the Palo Santo tree which lifes in the dry forest. From its fruits an essential oil can be extracted which is used by the cosmetic industry for perfumes, flavorings and the like. The majority of the earnings from the sale of oil goes to the Association, but a part is also routed for research and conservation of the dry forest. The Association received 5,000 US Dollars and a Certificate of Achievement (**Figure 2**). The Ecuatorial Awards were handed over in New York on September 22nd. NCI has accompanied the Association since the beginnings of the project in 2007 and togetehr with the Universidad Técnica Particular de Loja (UTPL) has been the technical principal and cooperator of the project.

Figure 2: Community representative Violeta Condoy (right) received the Ecuator Award from Helen Clark, the administrator of the United Nations Development Program (UNDP). Photo: Fabrice Grover

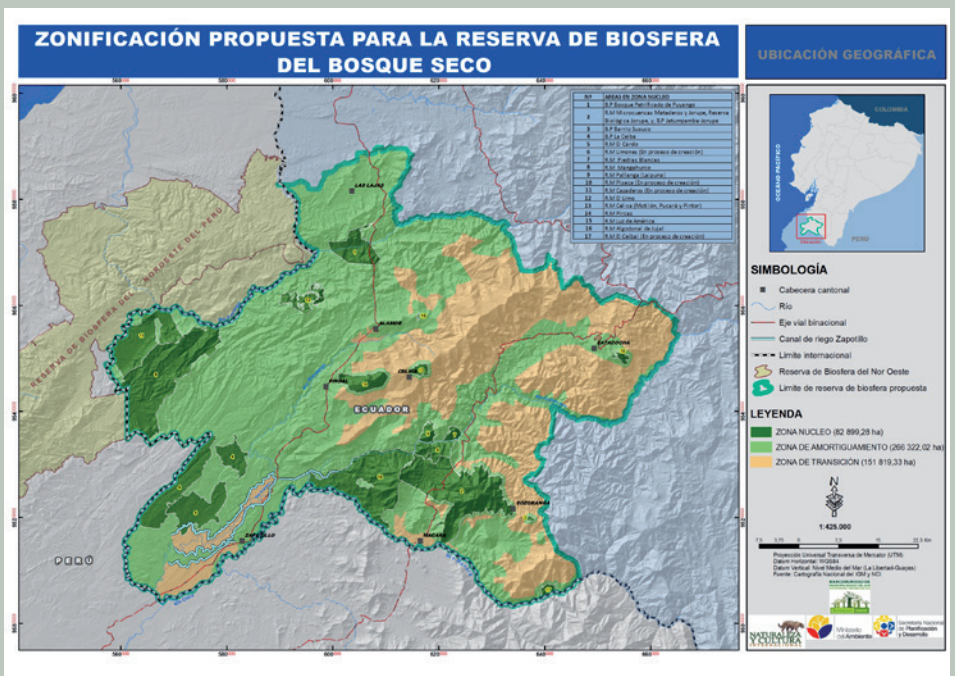

Figure 1: Area of the Dry Forest Biosphere Reserve. Map: NCI

[1)] In this section infrastructure providers and non-university partners present news around the Research Platform. This time Bruno Paladines from the NGO Nature and Culture International (NCI) reports about the South Ecuadorian dry forests.

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Miscellaneous

First Record of the Black Tinamou in Southern Ecuador

Eike Lena Neuschulz
Biodiversity and Climate Research Centre, Frankfurt (BiK-F), Germany – member of the DFG-PAK Research Consortium

A Black Tinamou (*Tinamus osgoodi,* **Figure 1**) was discovered in Zamora Chinchipe Province in the forest of the San Francisco Research Station (ECSF) by researchers of the Biodiversity and Climate Research Centre, Frankfurt (BiK-F). These chicken-like, ground-dwelling birds with cryptic plumage belong to one of the most ancient groups of living birds, the Tinamous.

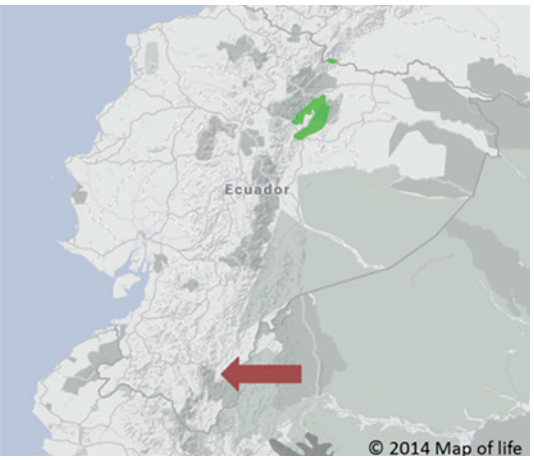

Figure 1 top: The Black Tinamou (*Tinamus osgoodi*) is seldom observed in the wild due to its cryptic life. Photo: © Pablo Negret / Universidad de Los Andes with kind permission from the photographer via: http://www.arkive.org/black-tinamou/tinamus-osgoodi. **Bottom**: Green area shows the known distributional range of Black Tinamou in Ecuador. The red arrow indicates the location of the new record of the species. Map: modified according to *Map of life 2014*, http://mol.org accessed 22 October 2014. Reprinted with kind permission from *Map of life*.

Although some species of Tinamous are relatively common, they are extremely shy and difficult to encounter. The record of the Black Tinamou in the forest at the ECSF increased the known distributional range of the species, as the species was hitherto only known from Northern Ecuador (**Figure 1**). This regional first record illustrates the lack of basic information on the distribution of Ecuador's bird species.

Master Programm in Conservation Biology and Tropical Ecology at UTPL

The Universidad Técnica Particular de Loja (UTPL) recently launched a new master´s degree program in "Conservation biology and tropical ecology (BioCET)". Students will obtain advanced academic training in theoretical and experimental ecology and conservation biology. This academic program will allow students to gain competences to design research projects and monitoring, develop management plans and conservation, as well as, capabilities to communicate scientific results. Classes begin in early 2015 and students can enroll soon, for additional information please contact ciespinosa@utpl.edu.ec or the Natural Sciences Department at UTPL.

Juan Pablo Suárez, Carlos Iván Espinosa – members of the SENESCYT Research Consortium

Research at Bombuscaro

Researchers who need to stay for several nights in the huts of the Podocarpus National Park entrance at Bombuscaro are no longer welcomed to use the administration kitchen from the park rangers. Therefore, a 'field kitchen' from the Estación Científica San Francisco (ECSF) is now waiting for researchers to help creating warm meals during field stays. The field kitchen comprises a gas cylinder and a stove with two plates, a bigger and a smaller cooking pot with lids and some spoons (**Figure 2**). The kitchen's equipment is stored in the storage

Figure 2: New field kitchen at Bombuscaro. Photo: Yvonne Tiede

room of the park rangers in the tourism-building and can be used from all researchers of the Platform projects for free. Please also note that recently the blankets in the National Park huts are no longer provided by the park rangers.

Yvonne Tiede – member of the DFG-PAK Research Consortium

Event Calendar

Data Warehouse Workshop

The next Data Warehouse Workshop is intended to take place at the University of Marburg, Germany, in January 2015.

Deadlines for gtö Conference are Approaching

The Deadlines for early bird registration and the submission of abstracts for the international conference of the Society for Tropical Ecology (gtö) are 15th December 2014. The event will take place at the Eidgenössische Technische Hochschule (ETH) in Zurich, Switzerland, from 7th - 10th April 2015. It will focus on "Resilience of Tropical Ecosystems: Future challenges and opportunities".
More: http://www.gtoe-conference.de

Deadline

The editorial deadline for the forthcoming German issue of the MRp|SE Newsletter is:

29th April 2015.

Please send ideas, manuscripts and images to executive editor Dr. Esther Schwarz-Weig. Please feel free to contact her if you have any questions concerning the Newsletter. E-mail: esw@sci-stories.com

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People and Staff

Photo: Simone Strobl

Johannes Knüsting (left) and **Michael Schorsch**, PhD students in the Deptartment of Plant Physiology of the German University of Osnabrück in Professor Renate Scheibe's lab (associated member of the DFG-PAK Research Consortium), supported the gas exchange and (evapo-) transpiration measurements of **projects C5** and **C6** for the dry season measurement campaign in October 2014 with three more porometers and input of their working experience from an earlier campaign in the Reserva Biológica San Francisco (RBSF) in the scope of their master thesis.

Simone Strobl

Obituary

Photo: private

Professor Dr. Peter Fabian died on the 11th of march 2014 in Munich, Germany, at the age of 77 years. As a renowned and acknowledged capacity in the field of atmospheric research, Fabian contributed important ideas and impulses to the preceding DFG-Research Units FOR 402 and FOR 816.

He was born on the 11th of October 1937 in Dresden and started his career as a scientist studying physics, geophysics and meteorology in Göttingen, Germany, from 1957 to 1962. He obtained his PhD at the same place in 1966. In 1981 he wrote his habilitation thesis and 2 years later became professor at the Max Planck Institute of Aeronomy in Göttingen.

In the following years his research took him around the world, working in places like Zürich, Switzerland, California, USA, Mexico, Argentina and Japan. Since 1999 he occupied the position of professor in ordinary for bioclimatology and imission research at the Wissenschaftszentrum Weihenstephan in Freising near Munich, Germany.

He implemented long term research projects like the Collaborative Research Center (SFB) 607 and his dedicated participation in the Research Units FOR 402 and FOR 816.

Peter Fabian did pioneering research in studying the behavior of ozone in the stratosphere and the troposphere using advanced methods like balloons, rockets and remote sensing devices. Later on he extended his work to the Green house gases and atmospheric matter transport in general.

In Ecuador he implemented a unique network of observations to study the impact of biomass burning and industrial emissions on the tropical mountain forest. His work contributed largely to understand the role of fog inputs to the water balance and nutrient inputs from the atmosphere.

At the same time he supported the formation of the European Geophysical Union (EGU) and became its first president. He also organized a variety of conferences around this period, known as the Humboldt conferences.

His work has been published in about 250 peer-reviewed articles and four monographs, of which the last one could only be finished one week before he passed away. Peter Fabian will be remembered as an influential scientist, a strong but relaxed personality and a dear colleague and friend.

Rütger Rollenbeck

About Us

Monitoring and Research Platform | South Ecuador

The Platform for Biodiversity, Ecosystem Monitoring and Research in South Ecuador (MRp|SE) is a German-Ecuadorian joint venture of interdisciplinary research and knowledge transfer. Investigating three ecosystems in South Ecuador, the teams aim to understand impacts of global change (mainly atmospheric nutrient deposition related to land use changes) on processes, functions and services of the megadiverse ecosystems of the Andean mountain rainforest, the dry forest and the Páramo. Regarding knowledge transfer the program aims on implementing and further testing options for sustainable land use. At the same time, research has been started towards a novel functional monitoring system indicating impacts of environmental changes on ecosystem functions in the sense of an early warning system. The prototype indicator system under development shall be implemented on a broad scale in cooperation with non-university partners for use by relevant stakeholders in policy and development planning.

Research and knowledge transfer is funded by two national research foundations, the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) and its Ecuadorian partner organization Secretaría Nacional de Educación Superior, Ciencia, Tecnología e Innovación (SENESCYT), as well as by four Ecuadorian non-university partners (NCI, FORAGUA, ETAPA and Gestión Ambiental Zamora).

In research funding, the Platform marks a new and advanced step of cooperation as all involved organizations are funding joint German-Ecuadorian projects for the first time in parallel and on a larger scale. The MRp|SE was inaugurated in Cuenca on 16 October 2013 based on more than 16 years of intensive research into biodiversity and ecology of the South Ecuadorian Andes. In 1997, a small group of Ger-

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man researchers funded by the DFG began to investigate the biodiversity-rich mountain rain forests. From 2001 the first DFG Research Unit (FOR 402) operated with a significantly larger consortium. A second Research Unit (FOR 816) continued from 2007 to 2013.

Over the years, cooperation with Ecuadorian partners has gradually been intensified including the Universidad Técnica Particular de Loja, the Universidad Nacional de Loja, the Universidad del Azuay, the Universidad de Cuenca, the Pontificia Universidad Católica de Quito, the foundation Nature and Culture International (NCI), the city enterprise of Cuenca (ETAPA EP), the regional water fund FORAGUA, and the environmental department of the city of Zamora. Two more knowledge transfer projects funded by DFG are closely linked to the Platform: The program “Nuevos Bosques para Ecuador” and “Radar Net Sur” which are cooperating with the government of the province Loja (GPL) and private land owners.

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