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I.   SESSION DESCRIPTION

ID: B3

Title of session:

Catalyzing human well-being and climate action with ecosystem services in the Amazon forest

Hosts:

	Title	Name	Organisation	E-mail
Host:	Dr.	David Lapola	Universidade Estadual de Campinas – UNICAMP	dmlapola@unicamp.br
Co-host (s):	Dr.	Patricia Pinho	Stockholm Resilience Center	pinhopati@gmail.com

Abstract:

It is widely discussed that ecosystem services are intrinsically linked to human well-being through both materials, relational and subjective values. Large-scale anthropogenic dynamics are affecting both the abundance, distribution of ecosystem services thus impacting human wellbeing at the local scale. The Anthropocene requires innovative approaches, scale of analysis to influence socio-environmental and climate policies towards a sustainable trajectory. International protocols exist as to limiting temperature warming (Paris Agreement) and also on keeping/improving human well-being (Sustainable Development Goals #3 and #13). There is a notion that the operationalization of ecosystem services could help in the successful implementation of these targets. In the Amazon region this relation is, at least theoretically, more visible. But little effort has been done for a basin-wide identification and valuation of the existing ecosystem services as well as establishing mechanisms and actions through which the provision of these ecosystem services can be guaranteed. In this panel we will present and discuss research-based evidence on ways that ecosystem services can contribute to human wellbeing in relation to climate change and on-the-ground strategies to

keep ecosystem services provision in the Amazon region. There is an special interest in studies that assess linkages between the provision of ecosystem services and the accomplishment of Sustainable Development Goals, and different approaches and methods of scale analyses that can help to inform decision-making policies in the context of resilient socio-ecological systems and climate change. Approaches that link models development and other ecosystem-related models and socioeconomic dynamics will also be discussed.

Goals and objectives of the session:

Align the research community along common objectives for near future projects on the topic of ecosystem services and their relations with human well-being and climate change in the Amazon region.

Planned output / Deliverables:

A session summary highlighting research question and methods that should be prioritized in prospective research proposals on the topic.

Related to ESP Working Group/National Network:

Biome Working Groups- BWG 3 - Forests & Woodlands

II.   SESSION PROGRAM

Date of session: Wednesday, 24 October 2018
Time of session: 10:30-12:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
10:30-10:45	Samara	Martins Silva	University of São Paulo – USP	Quantify the relation for use: lessons and perspectives for ecosystem services in the Brazilian Amazon
10:45-11:00	Moara A.	Canova	University of Campinas – UNICAMP	Trajectory of ecosystem services in the Brazilian Amazon facing climate changes: implications translated in socioenvironmental and economic vulnerability

Time	First name	Surname	Organization	Title of presentation
11:00–11:15	Susana E.	López–Caracena	University of São Paulo – USP	Climate regulation service and carbon storage: a systematic review on the role of tropical forests
11:15–11:30	Lisa	Best	Tropenbos Suriname	Bottom-up perspectives for sustainable management of forests: Indigenous and tribal communities' perceptions on ecosystem services, REDD+ and potential risks and benefits
11:30–11:45	Ederson A.	Zanetti	Angulo Consultoria	TNN2030 Carbon Neutral

III.   ABSTRACTS

The abstracts appear in alphabetic order based on the last name of the first author. The first author is the presenting author unless indicated otherwise

1. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B3 Catalyzing human well-being and climate action with ecosystem services in the Amazon forest

Bottom-up perspectives for sustainable management of forests: Indigenous and tribal communities' perceptions on ecosystem services, REDD+ and potential risks and benefits

First authors(s): Lisa Best, Monika Bertzky

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In international climate change negotiations, Reducing Emissions from Deforestation and forest Degradation, including conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks (REDD+), is envisioned as a financial incentive mechanism to reduce carbon dioxide emissions and enhance their removal. Forests provide ecosystem services onto which about 60 million indigenous and tribal peoples (ITP) directly depend for their livelihood, e.g. for food, water, medicines, fuel, fiber, amenity and expression of their cultural identity. ITP communities can be seen as both providers and beneficiaries of ecosystem services the rainforest provides, because they play a vital role in preserving and managing their living area through customary rules and historical traditional knowledge on the forest.

While the process of preparing for REDD+ implementation is time consuming, it can serve as an enabling instrument for sustainable development, in particular for countries that are at the beginning of the forest transition curve. REDD+ Policies and Measures often include and enable sustainable use and management of forest ecosystem services. Inclusive, bottom-up approaches, based on participation of ITP communities and incorporating their perceptions, are essential to identify sustainable development pathways. We aim to contribute to the growing amount of literature on experiences with REDD+ by sharing insights from Suriname, on how ITP communities perceive the state of the forest, current and future ecosystem service use, as well as risks and benefits associated with potential policies and measures in light of national REDD+ processes. These perceptions can help shape a vision for sustainable management of forests for human well-being in Suriname that goes well beyond REDD+.

Keywords: REDD+, forest ecosystem services, indigenous and tribal peoples, local perceptions, risks and benefits

2. *Type of submission:* **Abstract**

Climate regulation service and carbon storage: a systematic review on the role of tropical forests

First authors(s): Susana Elizabeth López-Caracena, Rozely Ferreira dos Santos
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In the 2000s, the Millennium Ecosystem Assessment highlighted through its program the consequences on ecosystem services of replacing natural ecosystems with human uses, driving many studies on the importance of tropical forests, particularly on climate regulation services. Many of them focus on the potential of forests to mitigate global warming through their performance in sequestering and storing carbon. The objective of this work is to provide a concise summary of these studies analysing their methodologies of quantification and characterization of the ecosystem service of climate regulation in tropical and subtropical forests. In order to do so, we have carried out a systematic review of this literature in the last 20 years, considering the Web of Science and Scopus databases. We obtained 1,104 results among which 43 articles were selected according to thematic precision. We consider that 13 articles summarize efficiently the three main areas of interest of the studies: the quantification of carbon stock as an indicator of carbon sequestration potential; the identification of factors that affect the climate regulation service, which is essentially land use change; and trade-off and synergy relationships with other services. The studies highlight that the climate regulation service has synergy with erosion control and the water cycle regulation service and trade-off with the primary production support service, even in different eco-regions. We emphasize that the carbon stock estimates of tropical forests present high variability and we believe that this issue should be better evaluated in order to make the results comparable and to facilitate management decisions.

Keywords: Ecosystem services, Carbon sequestration, Global climate regulation, Aboveground biomass, Rainforest

Type of submission: **Abstract**

Trajectory of Ecosystem Services in Brazilian Amazon facing the climate changes: implications translated in socioenvironmental and economic vulnerability

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Rising of CO_2 emissions and the rapid changes in Earth's climate and environments represent threats for Tropical Forests. The hypothesis of Brazilian Amazon "Forest-dieback" predicts that with a warmer temperature and drier conditions the conversion of the current Amazon basin's forets into savanna landscape. This conversion can, in turn, impacts the ecosystem services (ES) and hence economic aspects, well-being. From this and considering the scope of the AmazonFACE (Free-air CO_2 Enrichment) program, this study aims to answering the following question: how is the supply of ESs (water maintenance, carbon storage and vegetation functional diversity) affected by climate change due increasing atmospheric CO_2 concentrations, reduce the socioenvironmental and economic vulnerability of different Amazon communities? The analysis are being inquired in two scales: (i) regional, through the biogeochemical fluxes data modelling, using the Carbon and Ecosystem Functional-Trait Evaluation model (CAETÊ) related to current and forthcoming supplying of ESs and (ii) local, through an economic valuation of ESs based on human perspective approach, in Manaus, Itacoatiara and Silves municipalities– in the Amazonas state, Brazil. Preliminary results of the first analysis-scale demonstrates that a CO_2 increment decreased the vegetation functional diversity. Besides, its Net Primary Productivity (NPP) increased and consequently its biomass, however, the carbon was allocated to fine roots, in other words, to the short-term plant tissues and not wood tissues. Therefore, we infer that there is a significant potential to the loss of ES related to carbon storage in Amazon and this, summed to functional diversity reduction might exposes local communities to socioenvironmental and economic vulnerability, especially those that are closely dependents on resources extracted from forest. Thus, the outcomes of this research may reinforce the importance of tropical ecosystems functional diversity

representation by vegetation models, as well as, the need of fastly implement on institutional and policy agendas (National or International).

3. *Type of submission*: **Abstract**

B. Biome Working Group sessions: B3 Catalyzing human well-being and climate action with ecosystem services in the Amazon forest

QUANTIFY THE RELATION FOR USE: LESSONS AND PERSPECTIVES FOR ECOSYSTEM SERVICES IN BRAZILIAN AMAZON

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This abstract presents a new form to quantify the relation of biodiversity and ecosystem services informing on the ecosystem functioning and constituting the base for multiple payments for ecosystem services. Using the methods of allometric equation, diversity indexes and statical modelling. For choose the allometric equation we verified the data for temperature and precipitation at Xingu River Area, Brazilian Amazon. It was chose the Shannon and Simpson diversity indexes for present the applicability for huge database and sensibility to rare species. Posteriorly, the data was statistical analysed consideering Spearman correlation analysis and linear regression. It was considered that significance parameter was $p<0.01$ and $p<0.05$ to select the variables that could integrate regression models for Terra Firme forest at Xingu River Area. The results indicate that the combination of na ecosystem service increase as well as the other supply of ecosystem services also is higher, and reaches in the regression analysis the significance level of $p < 0.001$. The methodology possibility quantify and relate multiple ecosystem services involving linear correlation and regression as statistical methods. This relation also allows the possibility of paying for biodiversity and multiple ecosystem services provision, probably using PSE and REDD+ schemes. Finally, we discussed the limitations for this methodology for tropical forests related to available literature for comparative effects and

new methodological approaches for quantifying and relate multiple ecosystem services in landscape scales for environmental planning and mutiple payment schemes.

4. *Type of submission*: **Abstract**

B. Biome Working Group sessions: B3 Catalyzing human well-being and climate action with ecosystem services in the Amazon forest

TNN2030 Carbon Neutral

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Terra Nova do Norte, in Mato Grosso, prepared the Municipal Policy on Climate Change, the Municipal Action Plan for Climate Change Adaptation and Mitigation. Recognizing the effects of global warming caused by the greenhouse effect and following the global agreements of the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement and the SDGs Sustainable Development Goals, it adopted 18 actions planned to promote low carbon sustainable development. The city has a potential to generate more than 41.5 MtCO2e of carbon credits at an average cost of US$ 2.00 per tCO2e. The city developed the Low Carbon Growth Business Plan aimed at the municipality being Carbon Neutral in 2030, maintaining this profile until 2050. In total, there are more than US$ 70 million of low carbon investment opportunities distributed over 30 years, which will raise the GDP of Terra Nova do Norte by US$ 60 million / year. In addition, the municipality will also account the Green Domestic Product PIV. The TNN GHG emissions inventory resulted in more than 164 thousand tCO2e / year in 2018 (base year 2017), with projections of reaching 70 tCO2e / inhab in 2050, some 25 times above UNEP's target for the cities of developing countries. The Municipal Action Plan for Adaptation and Mitigation of Climate Change in Terra Nova do Norte contains detailed information on the environmental, social and economic-financial adequacy of low-carbon municipal growth alternatives.