OUR COMMON FUTURE UNDER CLIMATE CHANGE

International Scientific Conference

ABSTRACT BOOK

7-10 July 2015 • Paris, France

This Abstract book is based on a compilation of all abstracts selected for oral and poster presentations, as of 15 May 2015.

Due to the inability of some authors to attend, some of those works will therefore not be presented during the conference.

OUR UNDER
COMMON CLIMATE
FUTURE CHANGE

Welcome to the Conference

Welcome to Paris, welcome to 'Our Common Future under Climate Change'!

On behalf of the High Level Board, the Organizing Committee and the Scientific Committee, it is our pleasure to welcome you to Paris to the largest forum for the scientific community to come together ahead of COP21, hosted by France in December 2015 ("Paris Climat 2015").

Building on the results of the IPCC 5th Assessment Report (AR5), this four-day conference will address key issues concerning climate change in the broader context of global change. It will offer an opportunity to discuss solutions for both mitigation and adaptation issues. The Conference also aims to contribute to a science-society dialogue, notably thanks to specific sessions with stakeholders during the event and through nearly 80 accredited side events taking place all around the world from June 1st to July 15th.

When putting together this event over the past months, we were greatly encouraged by the huge interest from the global scientific community, with more than 400 parallel sessions and 2200 abstracts submitted, eventually leading to the organization of 140 parallel sessions.

Strong support was also received from many public French, European and international institutions and organizations, allowing us to invite many keynote speakers and fund the participation of more than 120 young researchers from developing countries. Let us warmly thank all those who made this possible.

The International Scientific Committee deserves warm thanks for designing plenary and large parallel sessions as well as supervising the call for contributions and the call for sessions, as well as the merging process of more than 400 parallel sessions into 140 parallel sessions. The Organizing Committee did its best to ensure that the overall organization for the conference was relevant to the objectives and scope. The High Level Board raised the funds, engaged the scientific community to contribute and accredited side events. The Conference Secretariat worked hard to make this event happening. The Communication Advisory Board was instrumental in launching and framing our communication activities on different media. We are very grateful to all.

We very much hope that you will enjoy your stay in Paris and benefit from exciting scientific

interactions, contributing to the future scientific agenda. We also hope that the conference will facilitate, encourage and develop connections between scientists and stakeholders, allowing to draw new avenues in the research agenda engaging the scientific community to elaborate, asses and monitor solutions to tackle climate change together with other major global challenges, including sustainable development goals.

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inconsistencies are sometimes of the same order of magnitude as the values indicated in the maps. During the past few years, the FIP has invested a great deal in the processing of remote sensing data, and in particular of the data generated by the very promising LiDAR technology (airborne or terrestrial laser). These new technologies allow unprecedented measures of forest structures with a centimetre-level resolution through entire landscapes. Furthermore, the FIP has monitored forest dynamics in permanent forest plots at Uppangala, in the Western Ghats biodiversity hotspot, for more than 20 years. Coupling detailed information on forest dynamics with airbone and terrestrial LiDAR data opens promising perspectives to understand and forecast with high precision the ability of tropical forests to stock carbon.

P-2215-09

GHG emissions and mitigation – a model approach for the Brazilian Amazon

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According to the recent scientific literature on the field, about 70% of the terrestrial sink of CO2 derived from anthropogenic activities resides in tropical forests. Of the tropical belt, the South America Amazon encompasses the largest continuous broadleaf forest in the globe. Estimates accounts more than 50% of the tropical carbon sink to these forests. Tropical deforestation accounts from about 1/10th to 1/5th of the global anthropogenic emissions of carbon and carbon equivalent green house gases. Big uncertainties associated to these estimates rely on the quantification of above and bellow ground living biomass in tropical forests and its spatial distribution. Adding up to the uncertainly on carbon emission estimates, the deforestation is not a linear process, but a patchy activity in the landscape, characterized by dynamic processes in both spatial and temporal dimension. Thereby, studies on carbon sources, sinks and stocks are urgent observational needs for both remote and ground observation in the tropics.

This paper will present recent studies coupling observation, remote and modeling approaches to better estimate green house gases emissions from tropical deforestation, with special focus on the Amazon forest. The result present outcomes of the INPE-EM model, developed at the National Institute for Space Research, in Brazil. This is a spatially explicit modeling framework that incorporates the deforestation dynamics, the biophysical and socioeconomic heterogeneity of the region. As well, we will explore mitigation of greenhouse gases emissions within a sustainable development framework, in special associated to nutrient use and emissions of nitrous oxide.

P-2215-10

Contribution of the analysis of diurnal cycles for understanding the mean seasonal cycle of rainforest photosynthetic activity in Central Africa

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Global carbon, water and energy cycles are substantially driven by vegetation phenology. In particular tropical rainforests have been shown to be a key component of the climate system as they act as major water vapor sources and carbon dioxide sink. For these reasons their evolution in response to both human pressure and climate change is critical. As compared to the Amazonian and Asian rainforests, the rainforest of Central Africa experiences slower deforestation rates, so that its main threat for the next decades might come from climate change. So far, the response and sensitivity of the Central Africa rainforest to the mean seasonal evolution and inter-annual variability of climate has attracted little interest. Indeed, most of the studies focus on its Amazonian counterpart and suggest that solar irradiation is the main driver of the annual and inter-annual variations of rainforest photosynthetic activity, and the Central Africa climate itself is not well documented.

As a first step towards a better understanding of the Central Africa rainforest sensitivity to present-day climate variability and response to climate change, this study performs for a target region located between 0-5°N/12-19°E (thus documenting forest areas from 5 countries) and using space borne observations, a detailed analysis of the rainforest photosynthetic activity mean seasonal cycle comparing it with those of climate variables considered as potential drivers, i.e. rainfall, cloudiness and solar irradiation.

Several key points emerge from our study. First, the seasonal cycles of photosynthetic activity (EVI MODIS) and rainfall over our target region are both bimodal. However, the highest peak of EVI (March-May) coincides with the driest of the two rainy seasons while the lowest peak of EVI (September-October) coincides with the wettest of the two rainy seasons. Second, the two rainy seasons are not associated with two distinct lows in total solar irradiation and two distinct peaks in total cloudiness: the first rainy season (March-May) which is less rainy as compared to the second one (September-October), is also less cloudy and receives more total solar irradiation. This might explain the higher EVI values recorded. Third, the high total cloudiness recorded throughout the seasonal cycle actually hides marked seasonal variations in the frequency of the 5 main types of clouds analyzed. These cloud types have specific diurnal cycles which control those of solar irradiation (thus the daily light and energy available for photosynthesis), but also influence the remote sensed photosynthetic activity data (or index).

Our results clearly show that (1) nor the two dry seasons, nor the two rainy seasons do compare in terms of mean rainfall, cloudiness, solar irradiation and temperature, and (2) water and light availability have a respective weight in the Central Africa rainforest photosynthetic activity which evolves throughout the seasonal cycle. They also suggest that any evolution, due to climate change, of the complex diurnal cycles of rainfall, nebulosity and solar irradiation which characterize the equatorial climate regimes might perturb the rainforest phenology and enhance these ecosystems vulnerability.

P-2215-11

Bhabar Terai Forest Cover Reduction Causes Climate Change in the North Bank of the Brahmaputra Valley increased Severity in Flood

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During the last few decades floods in the Brahmaputra basin had been extremely of large magnitude and high frequency and there were heavy floods in Assam almost every alternate year. The fragile hills of the Himalayan Mountain range are prone to major landslides that are getting aggravated due to wide ranging deforestation, mining in the catchment, rampant construction of embankments and roads and cutting in the Brahmaputra basin.

We have examined the decadal change in the forest cover of the Brahmaputra basin from 1970-80's to 2010 and compared with the increase in the level of flood severity, frequency and increasing level of the rising temperatures from the existing data sources and field survey on the North Bank of the river Brahmaputra.

During the period of the study this has been found that the decreasing forest cover has major role in the rising temperature and flood. On the entire North Bank of the