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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second largest forest area in the world after the Amazon. Deforestation in Congo Basin countries is generally expected to be low. The assessment of forest cover and forest cover change area is essential for the initiatives mentioned above to determine what is referred to as activity data in the Intergovernmental Panel on Climate Change (IPCC) 2006 guidelines on the Agriculture, Forestry and Other Land Use (AFOLU) sector.

Producing estimates of deforestation in tropical countries in relation to greenhouse gas (GHG) emissions often relies on the use of satellite remote sensing in the absence of National Forest Inventories (NFI). A probability sample combined with an appropriate response design can provide forest cover and forest cover change area estimates and their associated uncertainties in the form of confidence intervals at a set probability threshold as required in the IPCC 2006 guidelines and for reporting to the United Nations Framework Convention on Climate Change (UNFCCC). However, wall-to-wall mapping is often required by countries to provide an exhaustive assessment of their forest resources and as input to land use plans for management purposes, but implementing a wall-to-wall approach is expensive requiring specialized equipment and staff. The recent release of the Global Forest Change mapping products could provide an alternative for tropical countries wishing to develop their own wall-to-wall forest monitoring mapping products.

A model assisted regression (MAR) estimator was applied nationally in Gabon and for selected regions in Cameroon and CAR using the combination of both reference data obtained from a probability sample and nationally produced forest cover and forest cover change maps and produced from the Global Forest Change data. The resulting area estimate is potentially more accurate than the direct expansion estimate and provides an estimate of the precision of the estimate which is not available from the map statistics alone.

Results show that the method presented provides a reliable means of producing forest cover and forest cover change area statistics and confirm the low level of deforestation expected in Congo basin countries. It also confirms the high level of forest cover in Gabon with more than 88% of the country covered by forest covering an area of just over 23.5 million hectares. In Cameroon and CAR, forest represents about 72% of the area of the regions selected with a total of over 5 million hectares.

Forest cover estimates for national level maps lead to coefficients of variation less that 0.3% at national level in Gabon and between 1.4 and 1.8% at regional level in Cameroon and CAR thus reducing significantly the level of uncertainty for forest cover area estimates compared with reference data alone.

Deforestation rates are generally low, with less than 0.4% between 1990 and 2000 in Gabon. In CAR, the deforestation rate is about 1.5% between 1990 and 2000 and 0.8% between 2000 and 2010. However, the deforestation in Gabon is not statistically different from 0 between 2000 and 2010. The same is observed for the Centre region of Cameroon. This is because the changes detected are very small and as a result the coefficients of variations of change estimates are greater.

Overall, results based on the global forest change data are not as accurate and precise and substantial post-processing and calibration are required to obtain results of similar quality than that of the national maps. However, it is considered that the level of effort necessary would be considerably less than that for producing the national maps.

O-2215-04

Will tropical forests face slow down with ongoing climate changes?

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In the context of climate changes, identifying and then predicting the impacts of climatic drivers on tropical forest dynamics is becoming a matter of urgency. We used a coupled model of tropical tree growth and mortality, calibrated with forest dynamic data from the 20 year study site of Paracou, French Guiana, in order to introduce and test a set of climatic variables. Three major climatic drivers of the tropical forest dynamics were identified through the variable selection procedure: drought, water saturation and temperature. Drought decreased annual growth and mortality rates, high precipitation increased mortality rates and high temperature decreased growth. Interactions between key functional traits, stature and climatic variables were investigated, showing best resistance to drought for trees with high wood density and for trees with small current diameters. We then used SELVA, an individual-based model to run forest dynamic simulations for the next century using predictions from the IPCC 5AR with 3 different scenarios corresponding to 3 relative concentration pathways. Basal area, above-ground fresh biomass, quadratic diameter, growth and mortality rates exhibited decreasing values as long as the scenario became pessimistic. Temperature is the strongest driver highlighting a drop of 40% in average forest growth for the RCP8.5. Our results highlights the potential slow-down danger that tropical forests will face during the next century.

2215-POSTER PRESENTATIONS

P-2215-01

Amazonia, a tropical forest in transition: from natural biogenic conditions to land use change, large scale biomass burning and urbanization

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Amazonia is a large tropical forest in transition, with strong pressures for agriculture expansion, climate change, urbanization and others. Deforestation rate has decreased dramatically, from 27,700 km² in 2004 to 4,700 km² in 2013, being responsible for a strong reduction in greenhouse gas emissions on the order of 70%. Agricultural expansion and climate variability have become important agents of disturbance in the Amazon basin. Recent studies have demonstrated considerable resilience of Amazonian forests to moderate annual drought, but they also show that interactions between deforestation, fire and drought potentially lead to losses of carbon storage and changes in regional precipitation patterns and river discharge. Although the basin-wide impacts of land use and drought may not yet surpass the magnitude of natural variability of hydrologic and biogeochemical cycles, there are some signs of a transition to a disturbance-dominated regime. These signs include changing energy and water cycles in the southern and eastern portions of the Amazon basin.

Feedbacks in Amazonia are very strong between ecosystem functioning, trace gases and aerosol emissions, cloud cover, precipitation, radiation balance and other key issues. In the wet season, a large portion of the Amazon region constitutes one of the most pristine continental areas, with very low concentrations of atmospheric trace gases and aerosol particles. However, land use change modifies the biosphere-atmosphere interactions in such a way that key processes that maintain the functioning of Amazonia are substantially altered. This study presents long term aerosol and trace gases observations at a preserved forest site in Central Amazonia, with observations from 2008 to 2013. Amazonian aerosols were characterized in detail, including aerosol size distributions, aerosol light absorption and scattering, optical depth and aerosol inorganic and organic composition, among others properties. Trace gases analyzed includes volatile organic compounds (VOCs), O3, CO2, CH4, N2O and CO. The central Amazonia region showed very low aerosol concentrations (PM2.5 of 1.3±0.7 μgm-3 and 3.4±2.0 μgm-3 in the wet and dry seasons, respectively), with a median particle number concentration of a low 220 cm-3 in the wet season. Aerosol composition shows organic aerosol accounting to 81% to the PM1 aerosol loading. Aerosol light scattering and absorption coefficients were very low during the wet season, increasing by a factor of 5, approximately, in the dry season due to long range transport of biomass burning aerosols reaching the forest site in the dry season.