AGU FALL MEETING
San Francisco | 15–19 December 2014

B21K-05: Quantifying and Modelling the Seasonality of Pantropical Forest Net Primary Production Using Field Observations and Remote Sensing Data

Tuesday, 16 December 2014
09:00 AM - 09:15 AM
Moscone West - 2003

Climate models predict a range of changes in the Amazonian region, including increased frequency of extreme climatic events, increased average temperatures, increased atmospheric CO2 and reduced rainfall intensity.

Understanding tree growth response to climate is important because wood production is the main way carbon enters the forest ecosystem. The response of tropical tree growth to changing climate could drive a change in the direction of the flux from terrestrial ecosystems to the atmosphere.

Recently, in French Guiana, we have observed that the peak increase in biomass (early wet season), estimated by diameter growth, was not correlated with the peak in chlorophyll activity (early dry season) in French Guiana. This could reflect different timing in the use of photosynthesis products by the plant for primary growth, i.e. shoot growth and leaves production, and secondary growth, i.e. wood production.

To go further, we conducted an analysis combining information on monthly tree growth measurements from 13694 trees (73 pan-tropical forest sites) and monthly litterfall measurements (81 South American sites), with their correspondent monthly climate data and satellite derived vegetation indices (MODIS EVI and NDVI), to calibrate, parameterize and validate a pan-tropical model of biomass production.

Specifically, we aim to (i) analyze if there is a coherence between the biological mechanisms observed from field and from satellite measurements and (ii) determine the relative contribution of climate and environmental site characteristics on the seasonal biomass production.

The results of this work will provide a novel pantropical description of the carbon cycle in tropical forest ecosystems at a seasonal time scale as a function of site and climate characteristics and will be used to quantify changes in tropical forest functioning, in terms of the responses of carbon fluxes to climate change using the CMIP5 climate scenarios.

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