Geophysical Research Abstracts,
Vol. 11, EGU2009-6565, 2009
EGU General Assembly 2009

Controls on the seasonality of photosynthesis across the Amazon basin -A cross-site analysis of eddy flux tower measurements from the Brasil flux network

N. Restrepo-Coupe (1), S.R. Saleska (1), H.R. da Rocha (2), and the Brasil flux network Team

(1) Dept. of Ecology and Evolutionary Biology, University of Arizona, Tucson AZ, 85721 USA (ncoupe@email.arizona.edu),
(2) Dept. of Atmospheric Sciences, Universidade de São Paulo, São Paulo, Brazil

The Amazon Basin is categorized as a terrestrial biogeochemical "hotspot" where climate change and deforestation can trigger substantial changes on atmospheric CO. However, model skill at predicting seasonality of photosynthetic metabolism and ecosystem productivity in the Amazon is limited. To enhance our understanding of these processes, we investigated the seasonal and spatial patterns of Amazonian forest photosynthetic activity by integrating data from a network of ground-based eddy flux towers in Brazil established as part of the 'Large-Scale Biosphere Atmosphere Experiment in Amazonia' project. We present the results of a simple model of leaf-flush for two central Amazon BrasilFlux sites, based on the eddy covariance estimates of canopy photosynthetic capacity (Pc) and measured canopy structure parameters.
We found that in contrast to studies of Amazon evapotranspiration, which is highly correlated with available energy, Amazon ecosystem photosynthetic flux surprisingly showed no simple relationship with measures of available energy. We hypothesize that the seasonality of Amazon photosynthesis is controlled by the interaction of adaptive mechanisms (which biologically determine photosynthetic capacity through leaf flush and litter fall seasonality) and sunlight availability (which determines the fraction of photosynthetic capacity utilized). Equatorial climates advantage vegetation that can grow leaves in the dry season, when surface solar radiation peaks, but southerly sites may not because of reduced seasonality in surface radiation.