

B21K-01:**Amazon Vegetation Response to Anomalously Dry and Wet Years 2010 and 2011 derived from Lower Troposphere Greenhouse Gas Balances**

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Abstract:

Amazonia is potentially an important region for future changes of the global climate system because its vegetation, the rainforests, is a large ‘labile’ carbon pool. This is particularly so given that the Amazon is warming fast and its hydrological cycle is becoming more variable over the last three decades with an increasing frequency of both severe floods and comparably dry conditions. A diagnostic of the state of these forests is their carbon balance. To observe carbon and more generally greenhouse gas balances of the Basin under these changing conditions we have started regular bi-weekly vertical profile measurements using small aircraft at four strategically selected locations in the Basin in 2009. We will report results from these measurements using a simple air-mass back-trajectory based flux estimation approach. We will first focus on 2010, which was a dry year and 2011, which was an unusually wet year. During both years temperatures were elevated by 1 to 2 degrees C compared to the 1981-2011 mean. We find that during 2010 the Amazon Basin lost substantial amounts of carbon (~0.5 PgC) mainly via fires while in 2011 it was approximately in balance with fire losses balanced by forest carbon uptake. Comprehensive monthly biometric carbon pool measurements at a small set of forest plots suggest productivity stalled during drought months in 2010 and promoted losses by fires. Our results for the wetter year 2011 are consistent with estimates based on censuses at approximately 100 – 150 1ha forest plots distributed widely spread across the Basin. We will extend these results to 2013 and discuss implications of the results for the future of the Amazon rainforests in a warming and higher precipitation world as well as for the global carbon cycle.