Poster Presentation
Theme 1.2: The Contemporary Carbon Cycle - Emerging Approaches and Novel Observation Techniques
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Amazon Basin biomass burning emission and its correlation with climatology and deforestation

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Tropical rainforests have great potential to affect the global carbon budget considering their large quantities of labile carbon stored in forests and soils. Among the tropical regions, the Amazon forest covers the largest area and also hosts the largest carbon pool (~200 PgC), corresponding for 50% of its biome globally. It has a total area of approximately 6.7 million km^2, of which, 4.2 million km^2 is in Brazil, which corresponds to approximately 60 % of Amazon territory, and contains one quarter of global biodiversity.
Over recent years, the Amazon Basin hydrological cycle has changed considerably which presented severe droughts in 2005, 2010 and 2015. 2015 is likely the largest drought over the past 15 years. Droughts in the Amazon are intrinsically correlated to extensive wildfires. At 2004/2005 the number of fire hot spots reached its maximum, coincident with the peak in deforestation. However, in the recent years, despite the decrease in deforestation rates, increase in fire hot spots have been observed, particularly during the years of extreme drought, 2010 and 2015. 2011 had the fewest number of fire hot spots, but since 2013 a positive trend was identified, reaching the maximum peak in 2015. Although deforestation estimation has decreased strongly over the last decade (71% reduction from 2004 to 2012), estimates of fire related carbon fluxes to the atmosphere estimated using regular atmospheric carbon monoxide concentration measurements indicate that there may be a discrepancy. These data do suggest a much smaller decrease, which lead us to believe that deforestation, as observed from satellite, is not the only process causing release of carbon by fires. Thus, understanding the relation between carbon emissions from biomass burning and climate, fire hot spots based on remote sensing and deforestation is important as it may reveal biases in remote sensing based estimates of deforestation. In turn it may help to evaluate the effectiveness of actions to preserve the forests.
To elucidate the actual contribution and the carbon emission from biomass burning in the Amazon Basin, measurements of carbon monoxide are an important tool. We will report the results from a recently established pan Amazon lower troposphere biweekly to monthly atmospheric sampling program for the years 2010 to 2014. Amazon Basin biomass burning carbon emissions have been determined by applying a mass balance technique to carbon monoxide measured from vertical profiles in four sites over the Amazon Basin. We will present these results from biomass burning and compare the carbon monoxide emissions with those from carbon dioxide, resulting in a ratio of carbon biomass burning emission which we will analyze with respect to climate, deforestation and number of fire hot spots.

Poster Session (see poster session schedule)