

AMAZONICA

The overall goal of AMAZONICA is to obtain a basin-wide balance of carbon related greenhouse gases over a period of four years. The approach combines the rate of change of lower to mid troposphere CO₂, CH₄, CO over the basin using *in situ* measurements with modelling approaches of surface fluxes. Atmospheric transport modelling is then used to link the tropospheric greenhouse gas distributions with process based surface flux estimates. Important components of surface flux estimation include improvements of the estimation of fluxes associated with land vegetation and land use change, and in turn improve predictions of the future evolution of the coupled carbon cycle climate system of the basin.

Start of Aircraft and on-ground Greenhouse Gas Measurement Program

Luciana Gatti, Alexandre Martinevski, Manuel Gloor, John Miller

After lengthy but finally successful acquisition of greenhouse gas aircraft sampling equipment we have started the regular Greenhouse Gas sampling of the lower to mid troposphere (up to 14500 feet) above the Amazon basin by the end of last year. Specifically we have started aircraft based measurements at Rio Branco, Tabatinga and Alta Floresta. These measurements complement ongoing measurements at Santarem. We also started sampling at the coastal site Salinópolis (Pará) and we start sampling at Natal soon as well. A recent study by Luciana summarising the implications on CO₂ sources and sinks from land within the region of influence of the Santarem station revealed seasonality in fluxes similar to on-ground Eddy flux based studies and also that the land vegetation in this region is approximately in balance. We are excited that the new upcoming data will permit us to extend this analysis to a much larger area of the basin and to identify and understand controls on large-scale carbon fluxes. Also from this moment onwards it is important that we compile anthropogenic fluxes of CO₂, CO, CH₄ and river out-gassing fluxes from on-ground data to compare with the atmospheric data and obtain a basin-wide synthesis of carbon cycling and its controls.

Aircraft Greenhouse Gas Sampling at Rio Branco and Tabatinga (Seneca II) and Alta Floresta (Cesna 206)



Below Salinópolis and the forest near Alta Floresta



We would like to acknowledge the great help of Colm Sweeney and Kirk Thonning, Doug Guenther from NOAA ESRL, and Bill Hollander from HPD.

Photos credited to Dr Luciana Gatti

Aircraft and on-ground Greenhouse Gas Measurement Program

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The Greenhouse Gas sampling network is now in operation at the stations shown on the map (Fig.1). The network includes so far four aircraft sites with biweekly sampling and 3 Atlantic coast surface stations which provide reference concentrations for air flowing into the basin. At surface stations the sampling frequency is weekly. We are in the process of adding two more surface based stations: one at the foothills of the Peruvian Andes (either Huancayo Observatory or Oxapampa forest). Some of the first results from the network are shown in Fig. 2. We have started to analyse the signals using a profile integration technique as in Gatti et al. 2010. To make further progress towards determining trends of the various carbon pools and the basin as a whole, we need the flux fields to be provided by the other work packages: fluxes due to land use change and fires from remote sensing, fluxes due to river out-gassing and the fluxes associated with changes of the biomass of old-growth forests. These fluxes will permit a more detailed analysis using atmospheric chemistry and transport models.



Figure 1- Stations

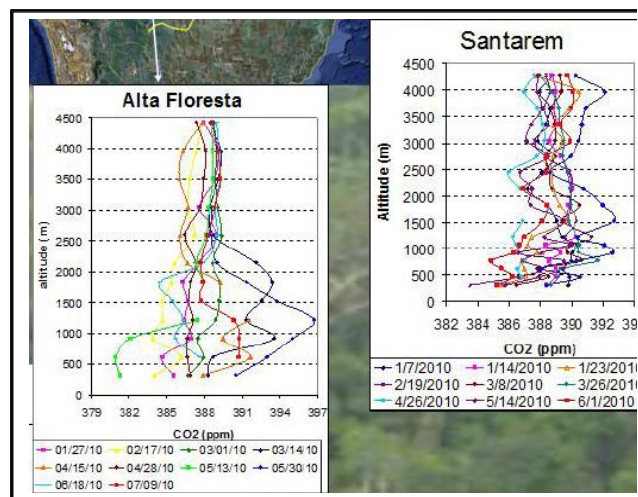


Figure 2- Example of results

7 - 9th December 2010

The **I NERC/AMAZONICA – FAPESP/CTrack&Water WORKSHOP** took place in Ubatuba, São Paulo, Brazil. 42 participants from around the world focused on the carbon balance of the Amazon region. Many thanks to **Joana Ricardo** and **Mónica Felipe** for their valued help, and to everyone in our postgraduate and research community for their enthusiastic involvement.



Participants – AMAZONICA Meeting