

Analysis of the first year of atmospheric CO₂/CH₄ measurements at LAMTO, Ivory Coast

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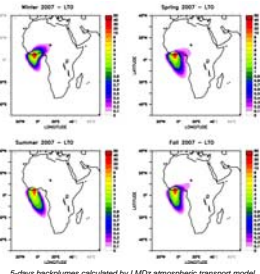
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Introduction

The atmospheric CO₂ and CH₄ monitoring network is very heterogeneous, with a relatively high density of stations in North America and Europe, and almost none stations over large parts of the world like Africa, Siberia or South America. The poor density of the monitoring network over some continents is the main reason for the large uncertainties in the regional flux estimates based on the analysis of spatial/temporal gradients of atmospheric concentrations. As part of the European project CarboAfrica, we have installed a new monitoring station at the Station de Géophysique de LAMTO, Ivory Coast (6.22°N, 5.03°W, 155masl) on August 2008. This poster is presenting the measurement site, the instrument, and the preliminary results.



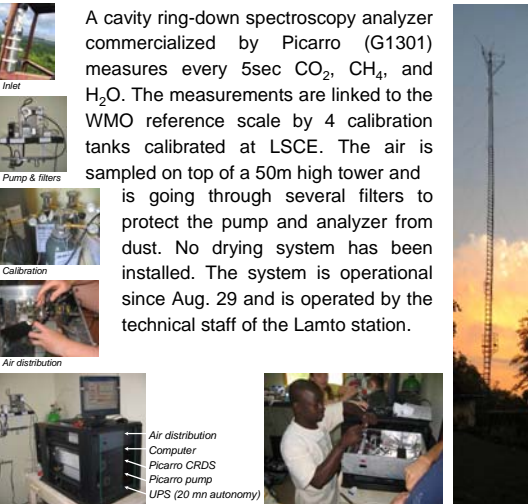
The LAMTO station

The site is located 160km North/West from Abidjan in an ecological reserve created in 1962. The station of Lamto was devoted to the study of the savannah ecosystem for more than 40 years [Abbadie et al., 2006]. Several field campaigns have been organized to characterize the ecosystem and the impact of biomass burning.

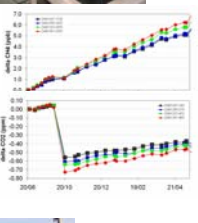


The CO₂/CH₄ analyzer

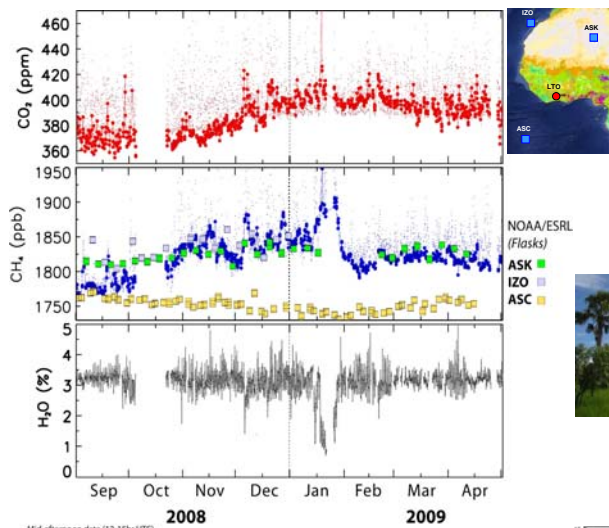
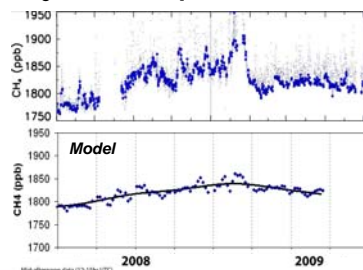
A cavity ring-down spectroscopy analyzer commercialized by Picarro (G1301) measures every 5sec CO₂, CH₄, and H₂O. The measurements are linked to the WMO reference scale by 4 calibration tanks calibrated at LSCE. The air is sampled on top of a 50m high tower and is going through several filters to protect the pump and analyzer from dust. No drying system has been installed. The system is operational since Aug. 29 and is operated by the technical staff of the Lamto station.



The drift of the instrument is corrected by regular measurements of four calibration gases and one target gas.

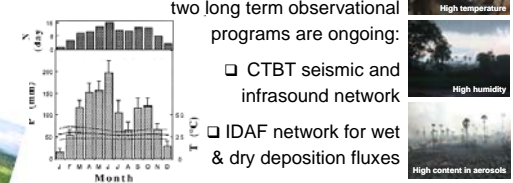


Comparison of CH₄ measurements with simulated data using LMDz transport model indicate an underestimation of the biomass burning emissions [Van der Werf et al., 2006; gfdv2 database]



In addition to the greenhouse gases measurement program, two long term observational programs are ongoing:

- CTBT seismic and infrasound network
- IDAF network for wet & dry deposition fluxes



The 2009 Harmattan

In January 2009 we observed relatively low content of water vapor for about 10 days. Trajectories and remote sensing images (Parasol) clearly indicate an air mass originated from North Africa during this period. Associated to this dry air we analyzed high CH₄ concentrations. The CO₂/CH₄ ratio observed in the air correspond to the emission ratio for biomass burning of tropical forests.

