The seasonal and spatial variability of aerosols over LPB

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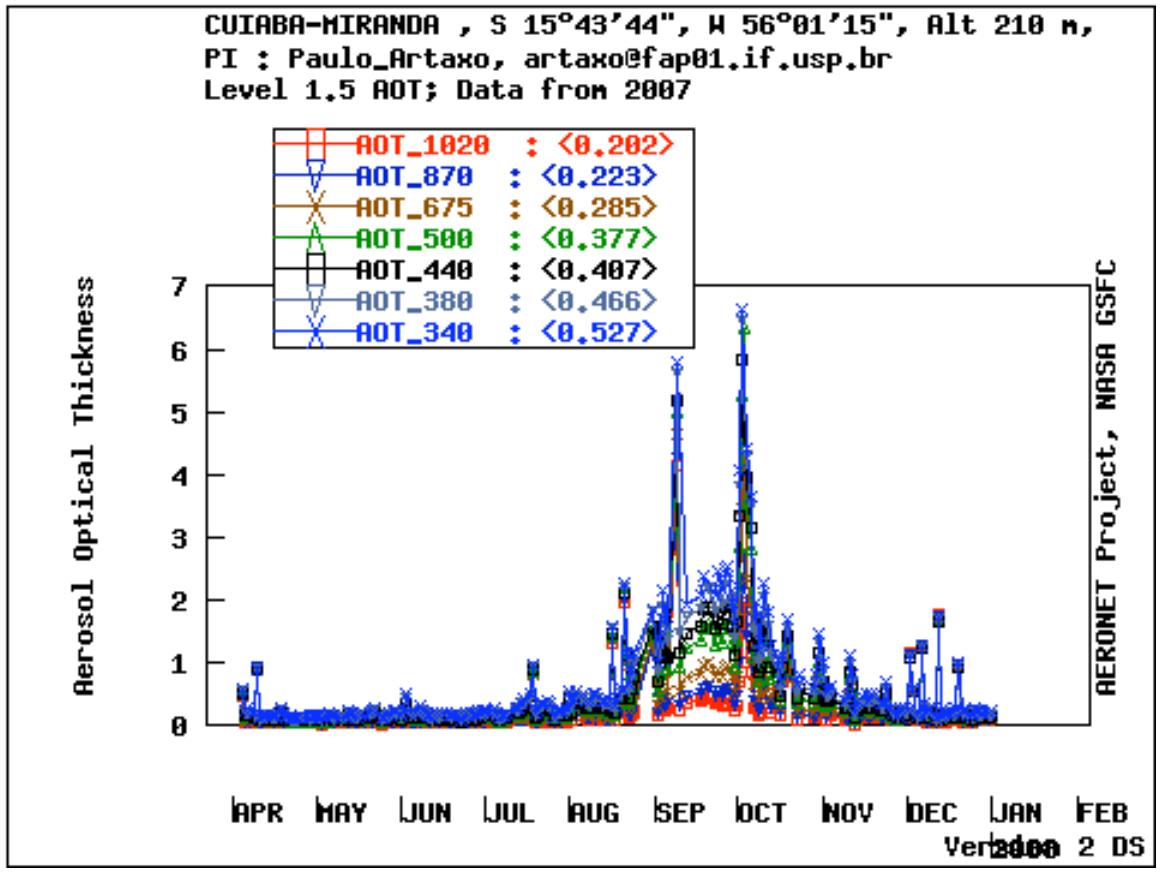
Atmospheric Aerosol load in the LPB region is driven by Spring Biomass burning



Because of the high carbon content biomass burning aerosols are highly absorbing

Impact of Aerosol-Cloud Interaction Processes on Precipitation

Radiative Forcing Effect	Cloud Type	Description	Effect on Precipitation
First Indirect Effect (Cloud Albedo)	All clouds	More reflected solar radiation	n/a
Second Ind. Effect (Cloud lifetime)	All clouds	Decreased Precip. Efficiency	Decrease
Semi-direct Effect	All clouds	Abs Solar radiation by aerosols may cause evap. cloud particles	Decrease
Thermodynamic Effect	Mixed-phase clouds	Delayed onset of freezing	Increase or decrease
Glaciacion Indirect Effect	Mixed-phase clouds	More ice nuclei increase precipitation efficiency	Increase
Riming Indirect Effect	Mixed-phase clouds	Decrease riming efficiency	Decrease
Surface Energy Budget effect	All clouds	Increased aerosol and cloud OT reduce net Surf. Solar radiation	Decrease

From Lohman and Feitcher, ACP, 2205

Available NASA-produced data sets

Ground based:

AERONET
-Spectral optical depth (340-1020 nm)
-Refractive index (real and imaginary components)
-Particle Size Distribution

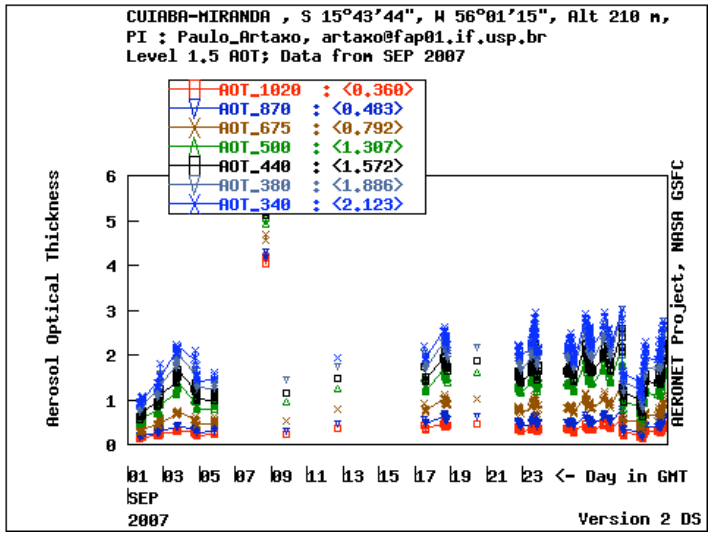
MPLNET

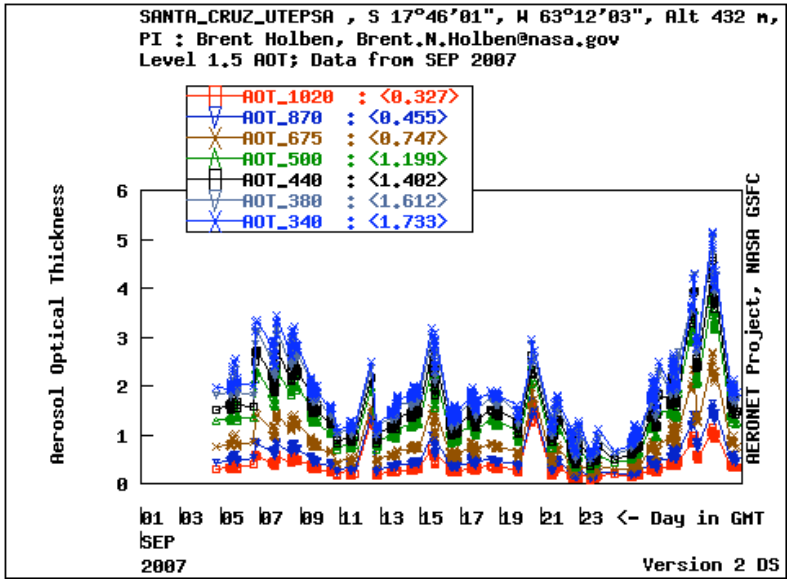
Space:
Terra-MODIS (2000- present), Aqua-MODIS (2000-present),
MISR(2000-present)
- Total Aerosol Optical Depth, Particle size information

TOMS (1979-1992, 1997-2005)
- Aerosol Index (daily), Aerosol Extinction and Absorption optical depth (monthly)

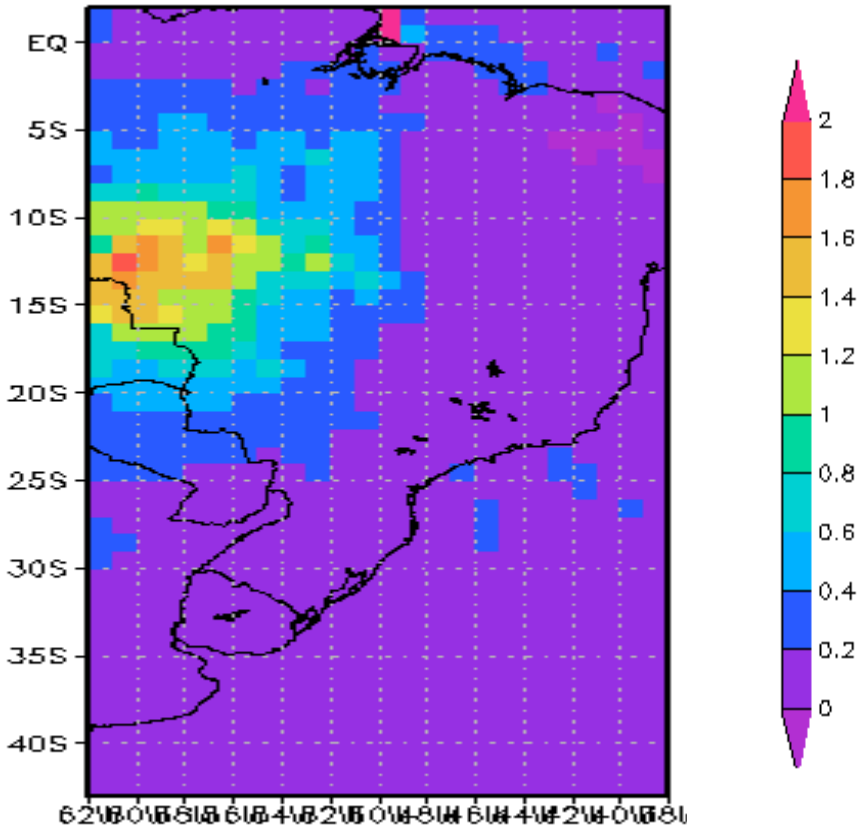
Aqua OMI, Ozone Monitoring Instrument, (2004 – present)
-Daily Aerosol Index, and Aerosol Extinction and Absorption optical depth

Aerosol Robotic Network Coverage in LPB



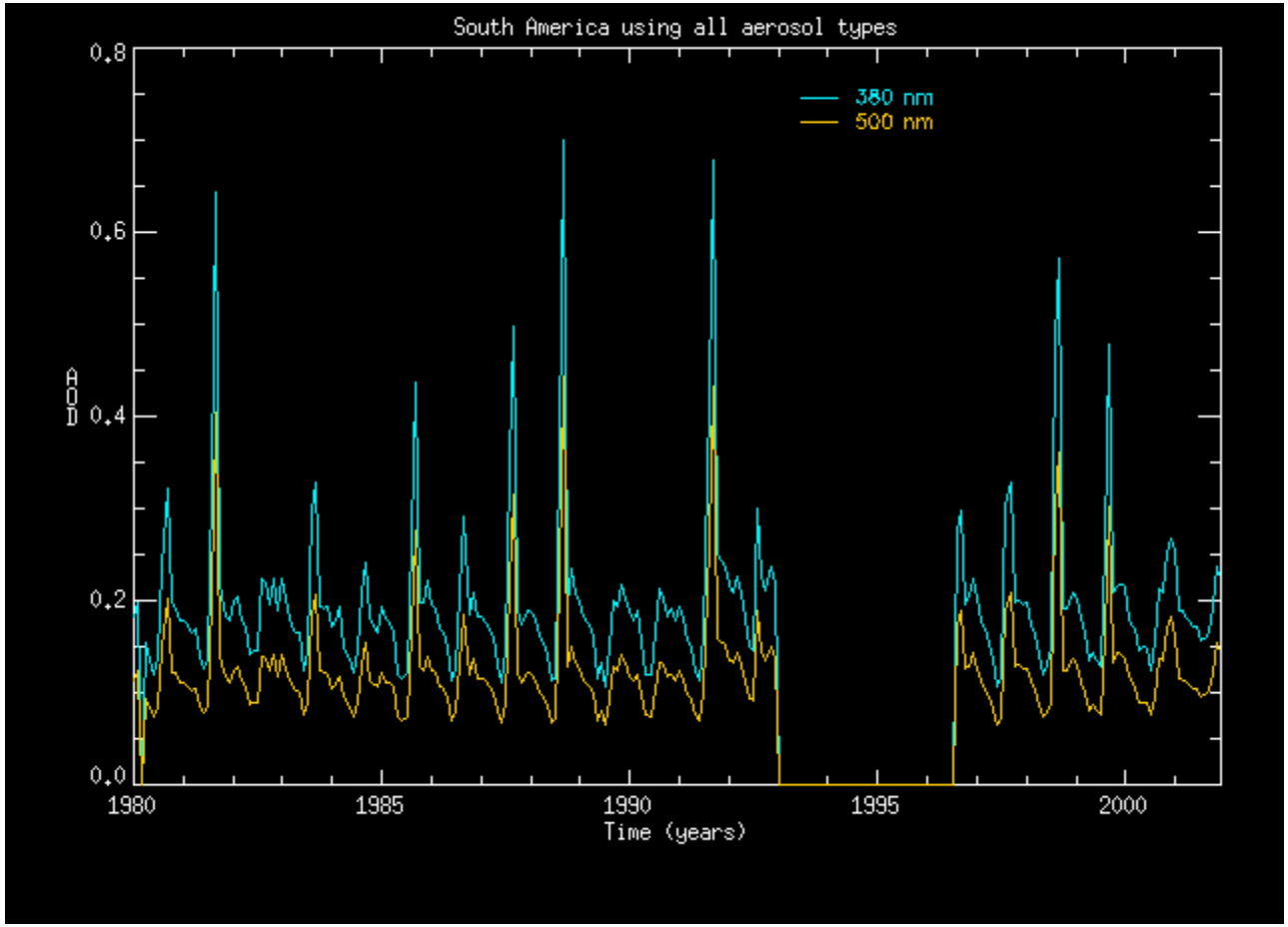


Satellite data: Aqua-MODIS September Monthly Mean



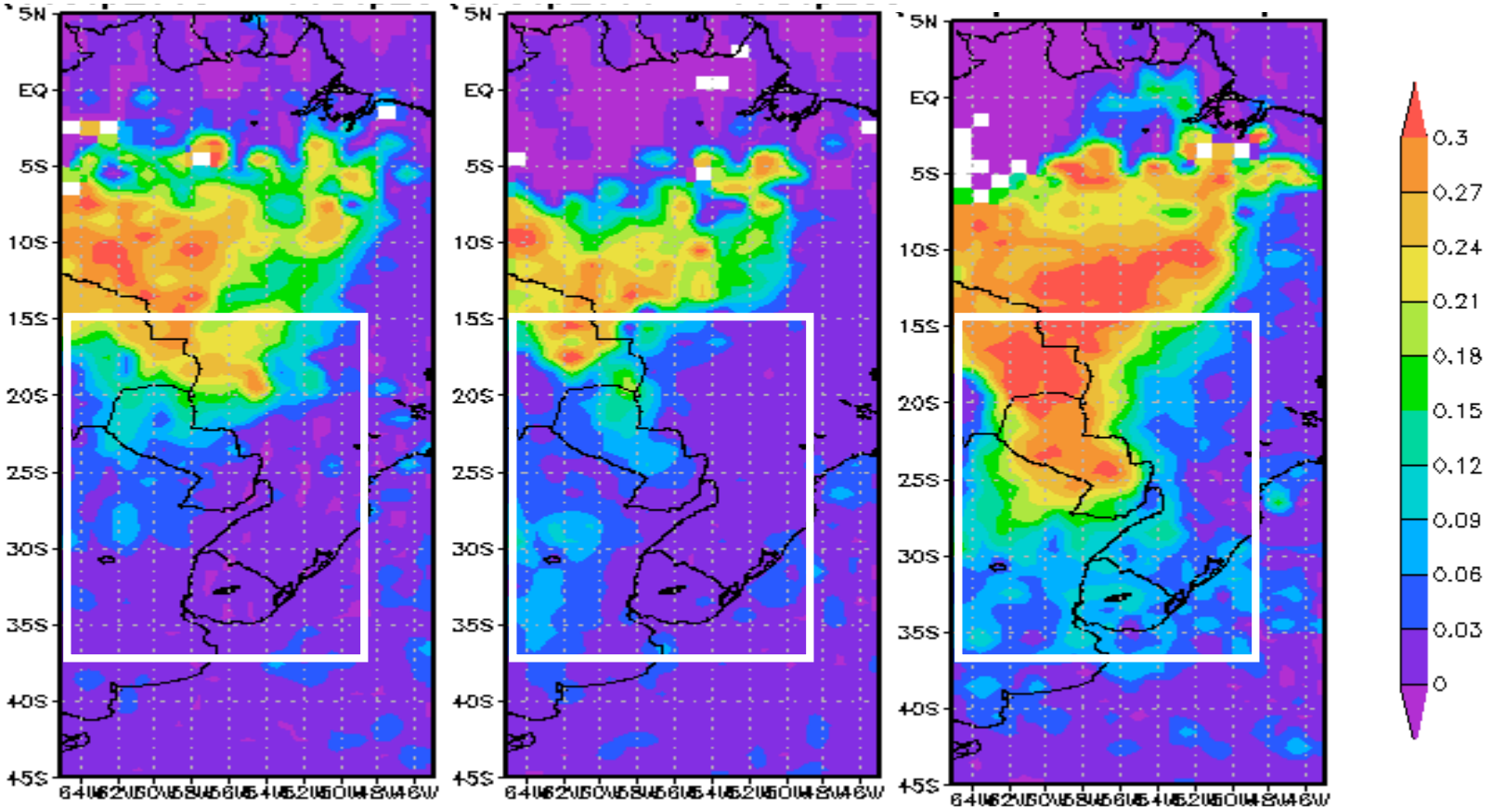
Aqua-MODIS
Sept - 2006

Satellite Observations: TOMS



AOD long-term record from TOMS observations

Satellite Observations: OMI



Sept - 2005

Sept -2006

Sept - 2007

Aerosol Absorption Optical Depth (OMI)

Summary

-Carbonaceous aerosols are an important component of the LPB surface-atmosphere system.

-Aerosol-cloud interaction processes (both radiative and non-radiative) may have an impact on the hydrological cycle by a reduction in precipitation.

-Because of the large absorption capacity of carbonaceous aerosols the semi-direct radiative forcing effect of aerosols (burning of clouds) may be especially important on both the radiation balance and the hydrological cycle in the LPB.