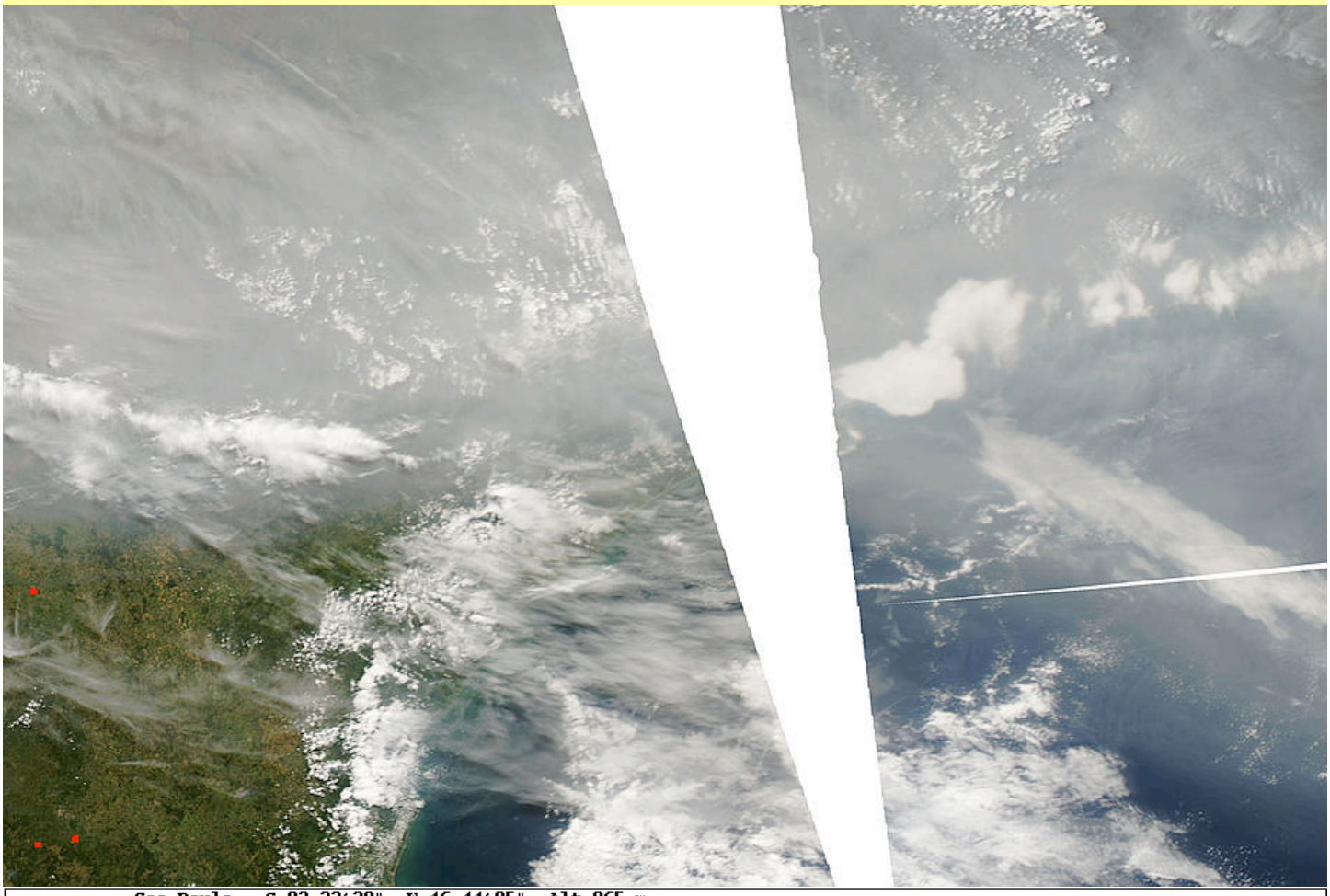
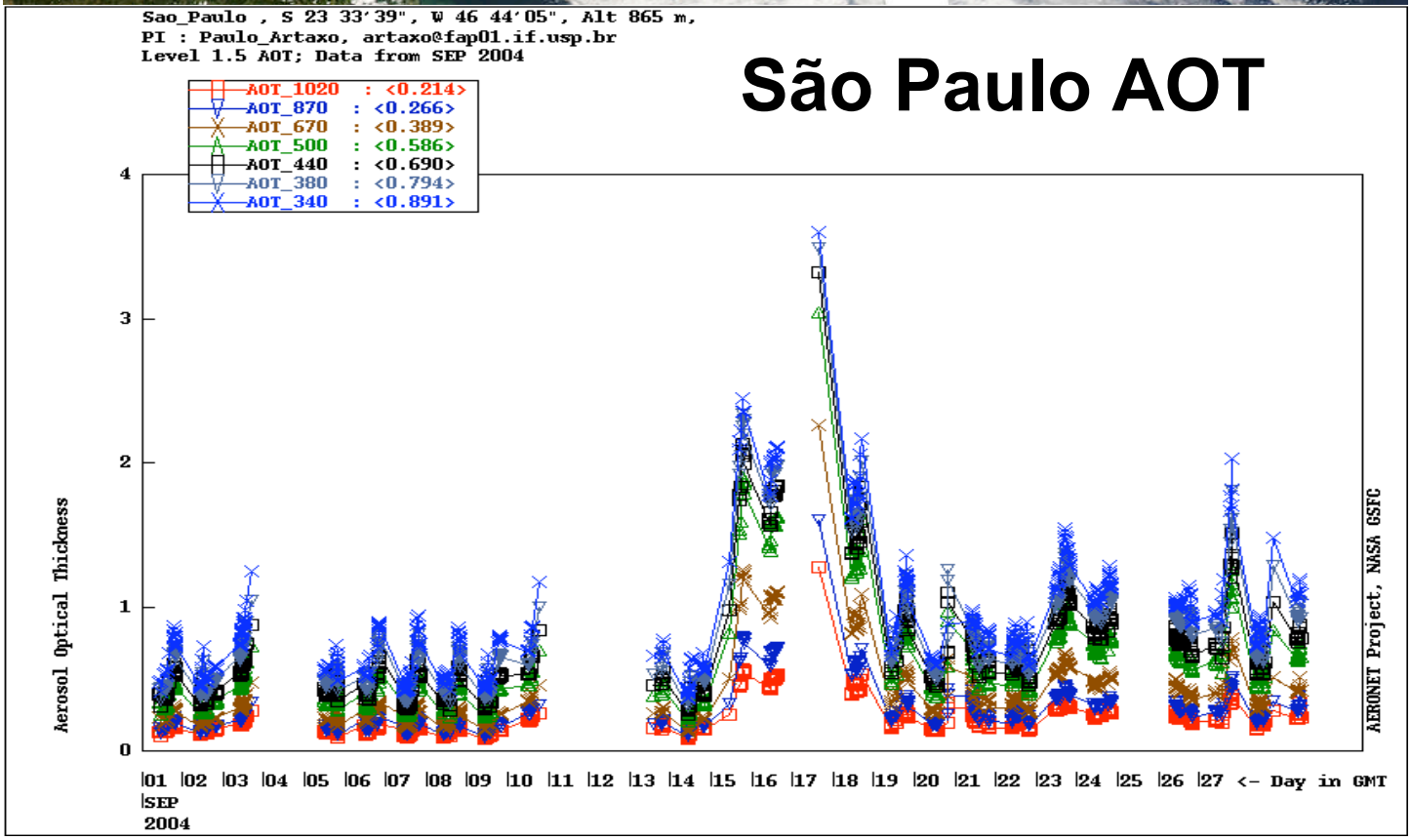
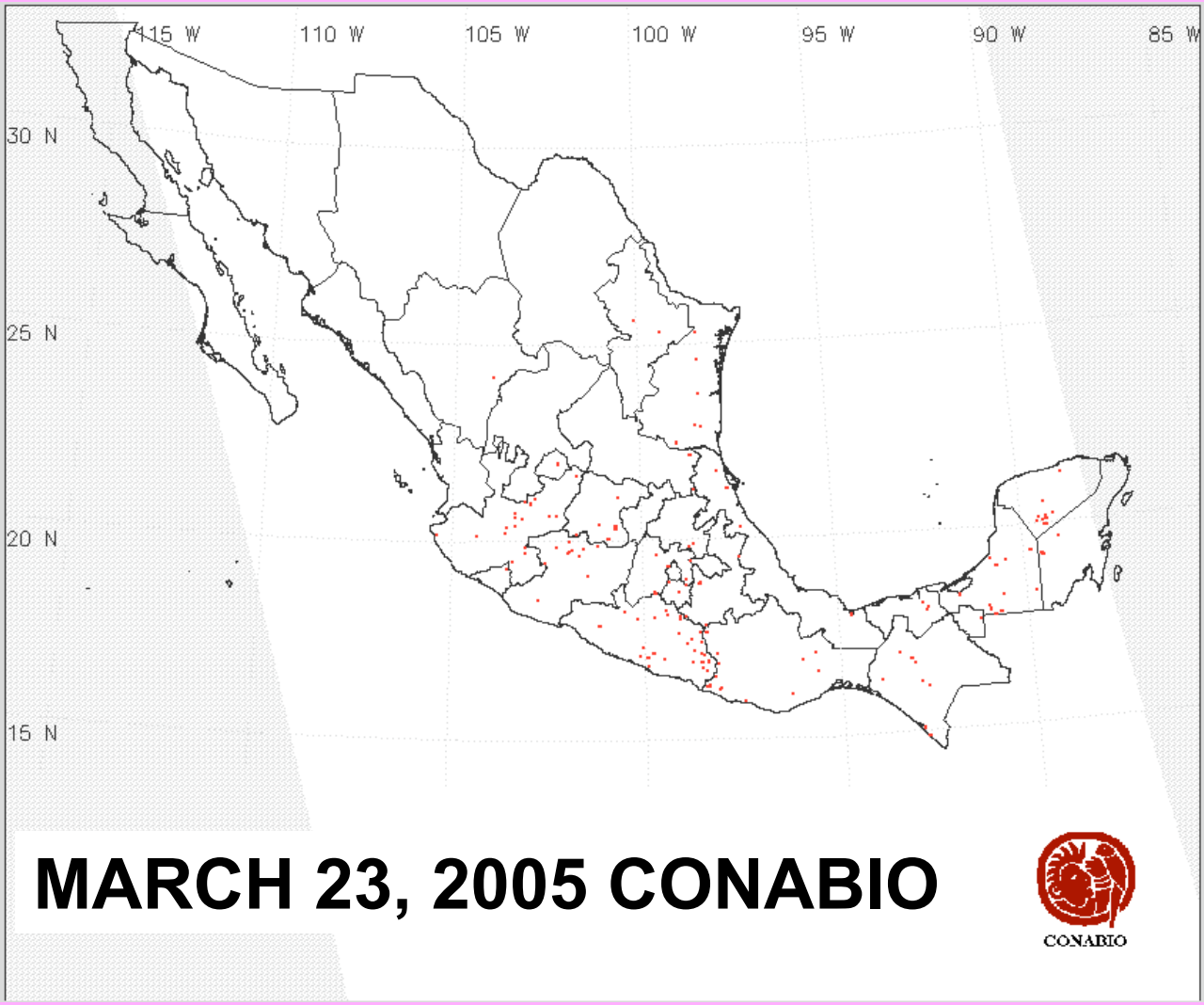
São Paulo – September 16, 2004



Sao_Paulo , S 23 33'39", W 46 44'05", Alt 865 m,
PI : Paulo_Artaxo, artaxo@fap01.if.usp.br
Level 1.5 AOT; Data from SEP 2004

São Paulo AOT





1998: Mexican fires detected in Minnesota

March 2005 or 2003-Composite (Non-El-Nino)

March 23, 2005: Typical of MILAGRO?

MIRAGE

Mega-city Impacts on the Regional Environment

REGIME

Regional Impacts on Mega-city - and Region

Bottom Line: There are poorly characterized sources both urban and regional many of which involve biomass burning. We plan airborne and ground-based work to address this.

I. Airborne Measurements:

Aircraft: King Air 200 (USFS)

Base: Pachuca (T2)

Targets: Agricultural, Forest, Planned (?) Fires. VP T2

Measurements:

1) Airborne FTIR (Yokelson: UM) CO_2, CO, CH_4, NMOC, NO_x, NH_3, HCN, O_3

2) PASS (Dubey: LANL) PM-BC, SSA

3) Particle Microscopy (Buseck, ASU) particle structure/chemistry

4) Cans (Hao: FS) CO_2, CO, CH_4

5) Cans (Atlas: U Miami) CO, CH_4, HC, halocarbons

6) AMS (?) (Toohey: U Colorado) PM chemistry

7) Planned Fire (Alvarado: UW) fuel, fire x-stics

II. Ground-based Measurements:

Mobile Lab	**2-3-FTIR Van (vide infra)**
Base:	**UNAM, rural N & S of MC**
Timing:	**simul, consec, 2007 (?)**
Targets:	**Cooking fires (homes, bakeries, restaurants), Garbage burning, tile/brick making, etc, …**
Measurements:	**1) Folded/open path FTIR on van roof Yokelson UM CO2, CO, CH4, NMOC, NOx, NH3, HCN, O3, etc..**
	2) rolling closed cell FTIR in van Yokelson UM CO2, CO, CH4, NMOC, NOx, NH3, HCN, O3, etc..
	3) Long open path FTIR in van Grutter UNAM CO2, CO, CH4, NMOC, NOx, NH3, HCN, O3, etc..

Measurements (Continued)

Nephelometer, Filters (BC analysis) UM Yokelson

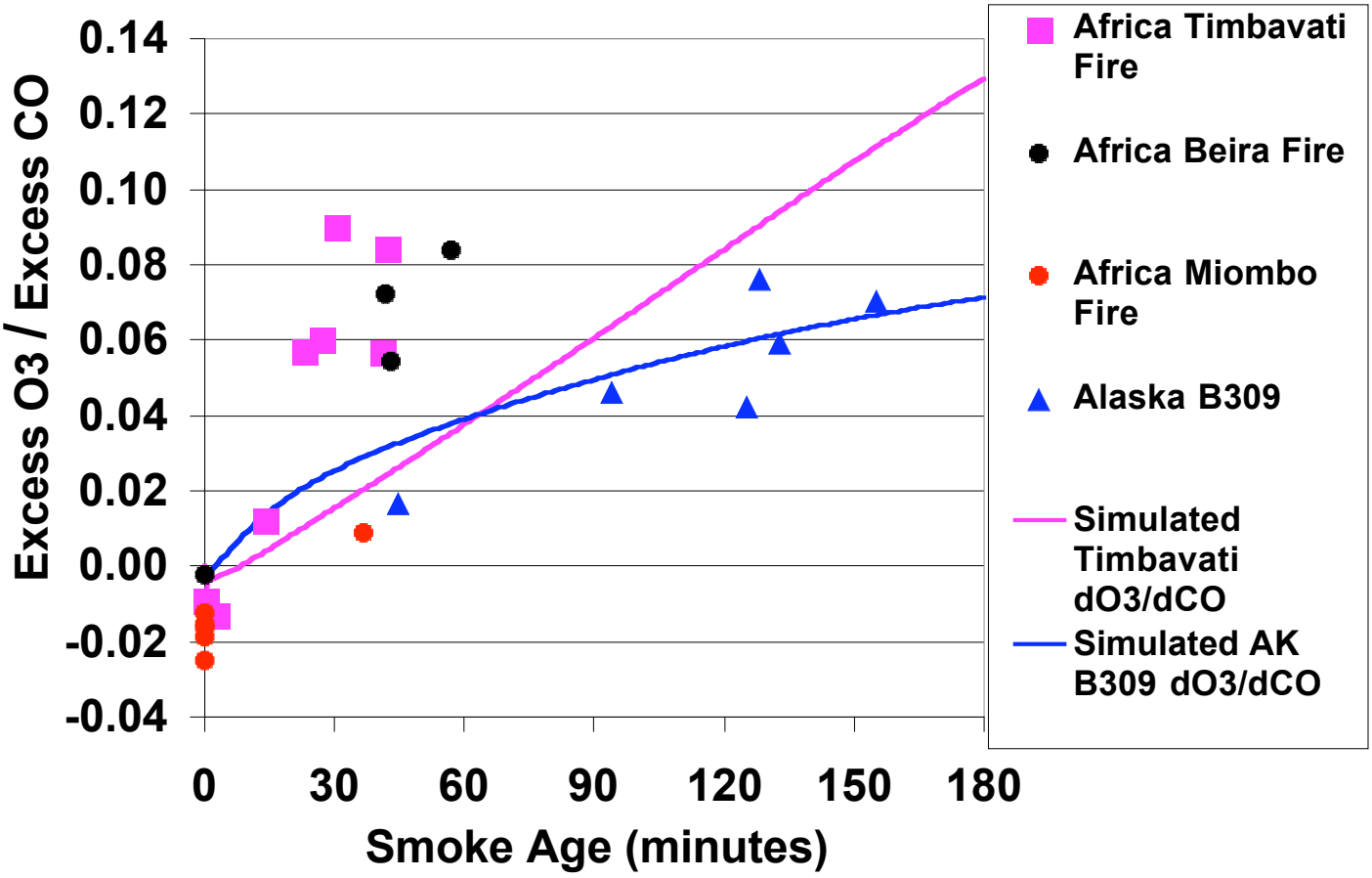
Survey/Questionnaire Fuel Type, amount, etc…Grutter, Alvarado, UM

MIRAGE INFRASTRUCTURE

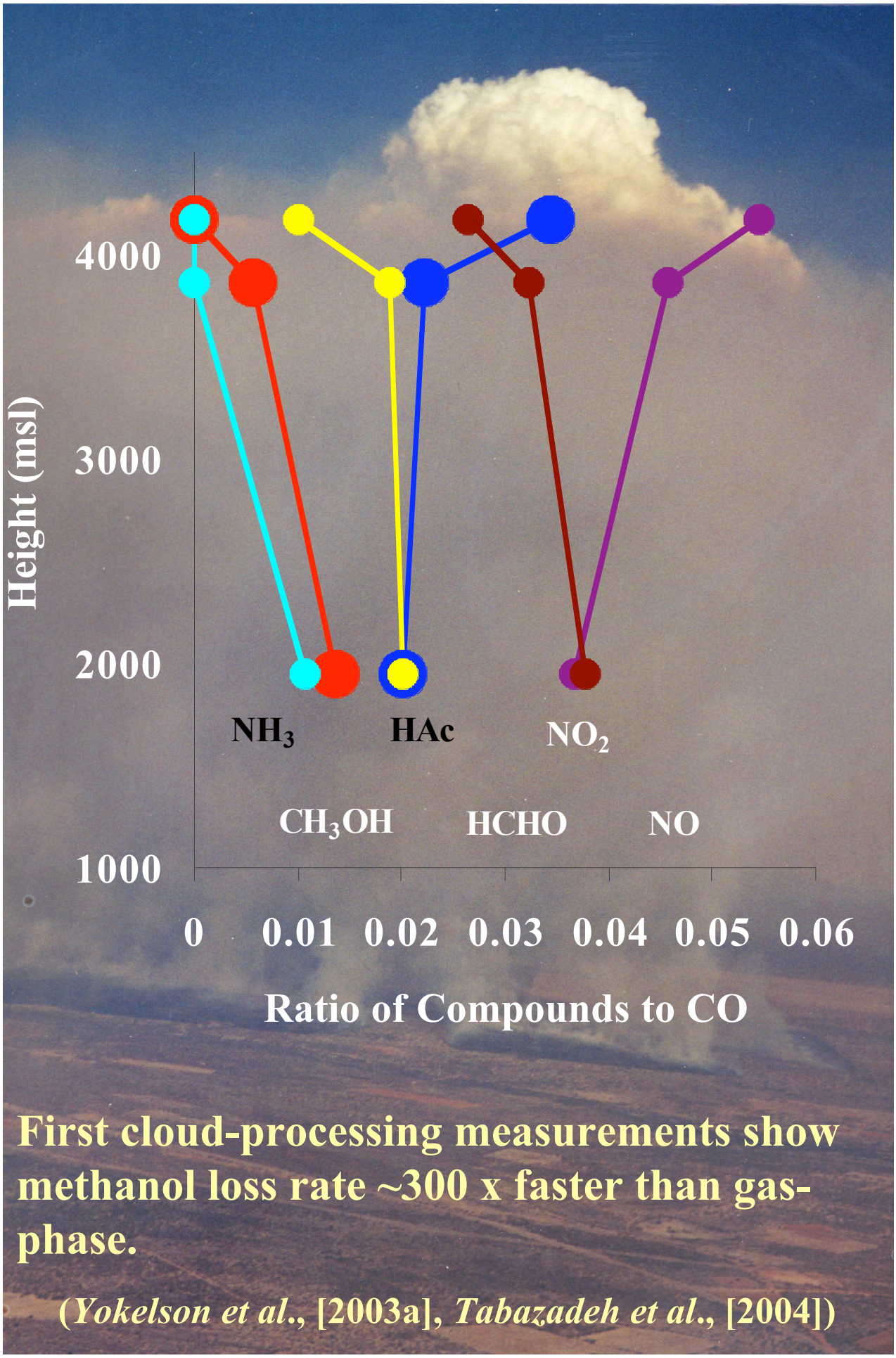
VAN: Folded open-path FTIR on roof, rolling & long-open-path FTIR in back.

AFTIR Inlet for King-Air

Modeling and Measuring Post-Emission Chemistry in Plumes



- "Rapid" (subgrid for global models) O_3 formation everywhere, faster than box model in Africa
- OVOC, HONO improve agreement
- *Trentmann et al.*, 2005



First cloud-processing measurements show methanol loss rate ~300 x faster than gas-phase.

(*Yokelson et al.*, [2003a], *Tabazadeh et al.*, [2004])

Volcanic Plumes

Fires occur on flanks of Popo

Cooking Fires Health/Regional Effects

Pollutant	Average	REL	Peak	STEL	Country
HCHO	1.380	.016	2.580	.1	Zambia
CO	55.3	35	85	200	Zambia
PM2.5	555	50	2694		Mexico
PM2.5 outdoor average ~ 100 μg/m^3					Mexico

Mexico is second in biofuel use in Latin America.

Wood provides ~70% of domestic energy in rural areas.

Acute Respiratory Infections (ARI) are the main global cause of infant mortality killing 3-5 million children under 5 annually (WHO).

Indoor cooking fires are thought to be the main contributor to these ARI (WHO).