



T-0 Supersite Overview

Jeff Gaffney

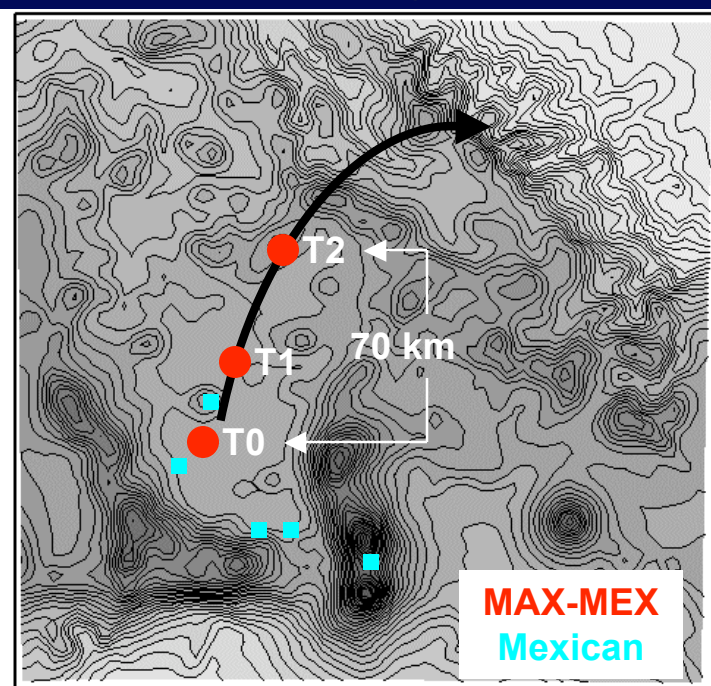
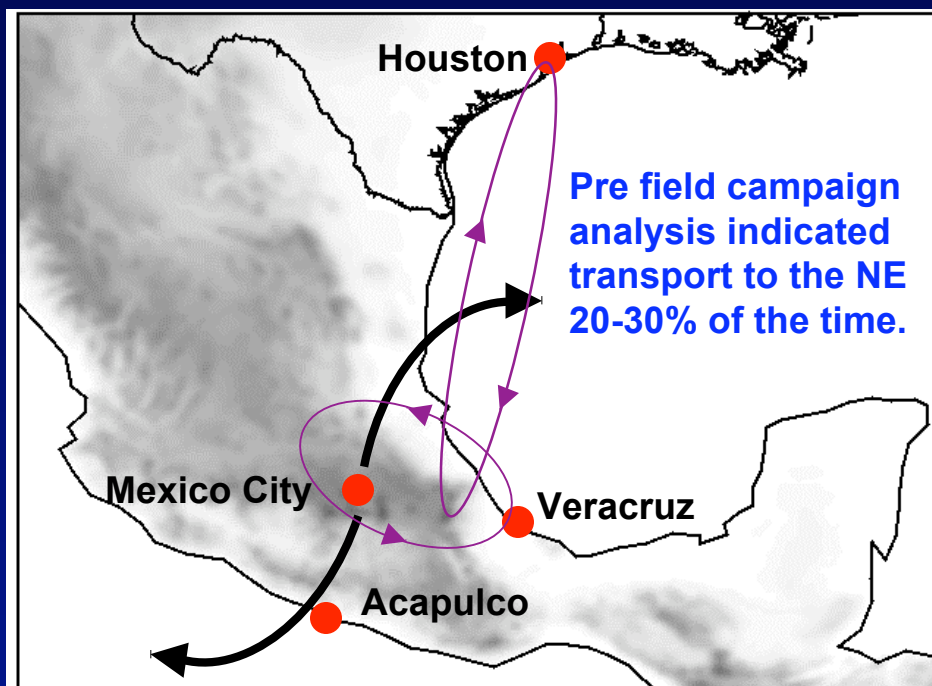
University of Arkansas at Little Rock

MILAGRO Science Meeting
Boulder, CO October 2006



Pre Field Campaign Activities

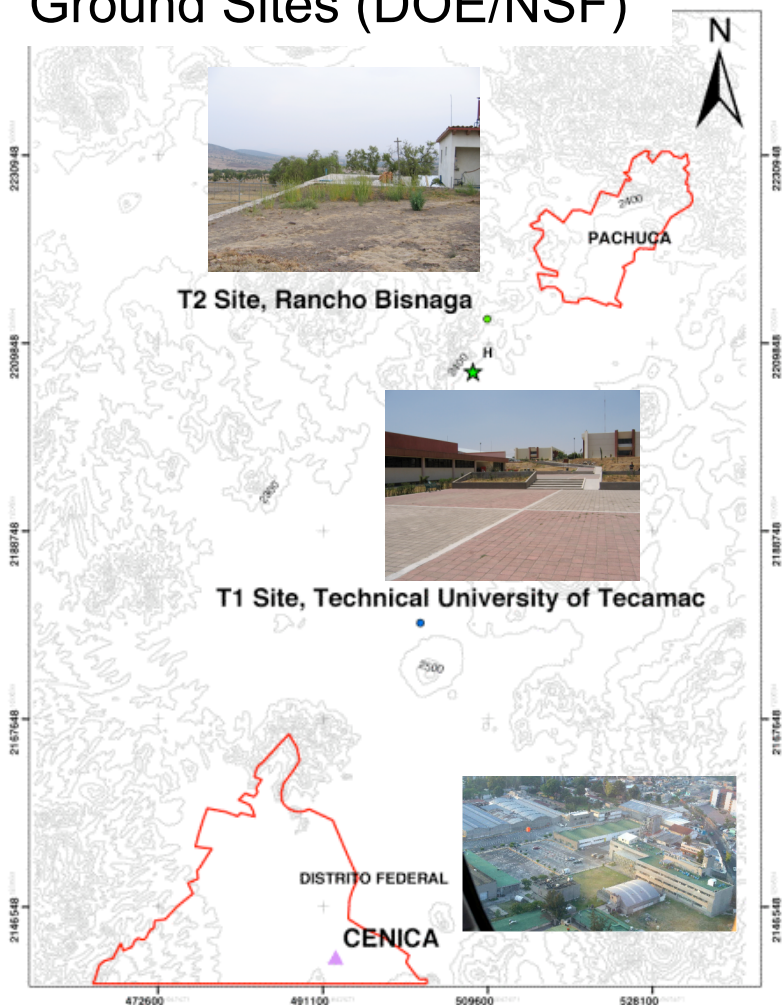
Modeling Used to Target Meteorology, Chemistry, and Aerosol Instrumentation Sites for 2006 Field Campaigns



- Operational rawinsondes (NSF): supplemented to 4 per day at Veracruz and Mexico City and 2 per day at Acapulco
- Aircraft operations: Veracruz – NASA at Houston
- Radar wind profilers: T0, T1, T2, Veracruz
- Microwave radiometer: T0
- GPS radiosondes: T1, T2
- Tethersonde: T1
- Micropulse Lidar: T1

Pre Field Campaign Activities

Ground Sites (DOE/NSF)

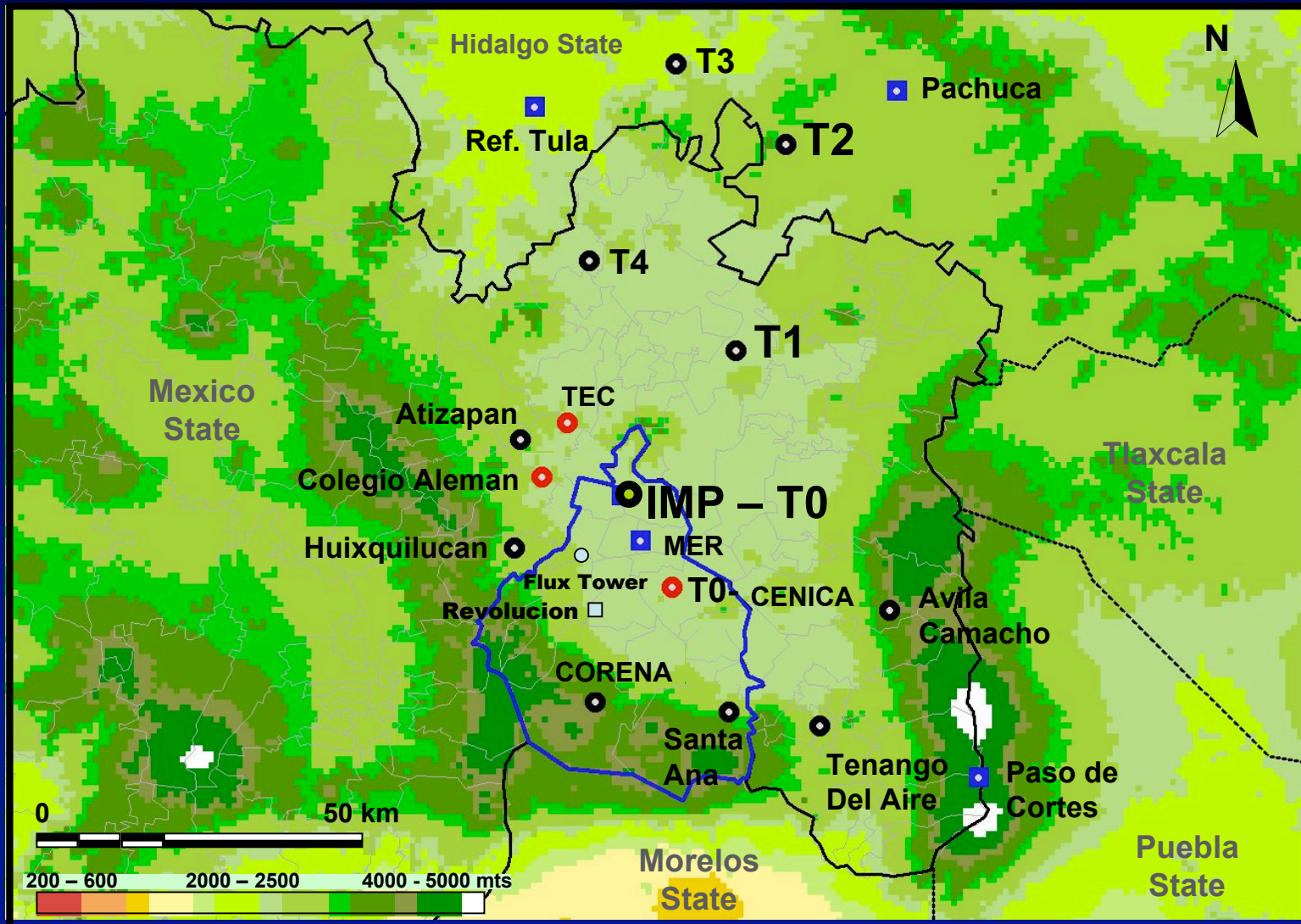


Ground Sites Identified in April 2005 –Veracruz Selected for G-1 Operation

Aircraft Operations - Veracruz



MILAGRO Measurement Sites



- Mobile site
- Fixed site
- Other measurements

IMP chosen for T-0 site – INFRASTRUCTURE



Infrastructure

- Nearly 150 m² of working space with internet access, phone line, desks and chairs.
- Nearly 200 m² available for equipment deployment.
- IMP contract with PRAXAIR
- Medical services



 INSTITUTO MEXICANO DEL PETROLEO



Instituto Mexicano de Petroleo -IMP



T-0 (Bldg. 20) Participants and Instrumentation



MET
RADIATION
AEROSOLS
GASES



Institution

Instrument

CENICA

2 HiVol, 1 RAS, 9 MiniVol samplers for PM2.5, PST and PM10

UW-Madison

Tekran 2537A, 1130 denuder and 1135 RPF modules - Hg

U. Iowa

(2) 3-d Sonic anemometers - Temp. RH, and Pressure sensors

U. Iowa

H2O / CO2 Sensor and CO monitor

U. Iowa

Up and Down-welling short wave radiation

MIT / Goteborg U.

Scanning Mobility Particle Sizer, Aerosol Mass Spectrometers, PM-2.5

LANL

H2/CO/C2H4 Monitor

UW-Madison

Filter Sampler and Semi-continuous EC/OC

UAM-Azcapotzalco

3 High Volume Samplers

Georgia Tech

High Volume Sampler

UNAM-CCA & IQ; INCan

High Volume Samplers (PM-10 and PM-2.5)

RAMA Monitoring Station

commercial automatic monitors ozone, NOx, CO

CCA

High Volume sampler

CENICA/CSIC

Green Monitor and Cascade Impactor

T-0 (Bldg. 27) Participants and Instrumentation



University of Alabama, Huntsville

915 MHz Wind Profiler and .905 mm laser ceilometer



MET
RADIATION
AEROSOLS
GASES

T-0 (Bldg. 32) Participants and Instrumentation



Institution

University Arkansas Little Rock/ANL

UALR/ANL

MIT/MC/NASA Goddard/U. Sao Paulo

PNNL

Colorado State U.

Chalmers

Instrumentation

Filter Samplers – Natural Radionuclides

RB Meter and Vaisala Weather Station

Sun Photometer

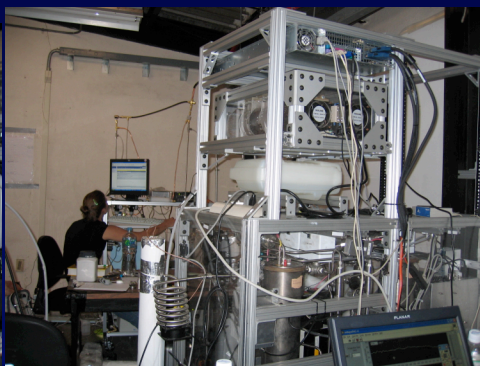
MFRSR, Eppley B&W radiometer and Campbell data logger

MFRSR

Stationary Solar FTIR

MET
RADIATION
AEROSOLS
GASES

T-0 (Bldg. 32) Participants and Instrumentation (Continued)



University Arkansas Little Rock/ANL

Aethalometer (7 channel) and Multi-Angle Absorption Photometer

University Arkansas Little Rock/ANL

Nephelometer (Three wavelength)

University Arkansas Little Rock/ANL

Nephelometer one-wavelength (2 – wet/dry)

BNL

CCN Counter and Scanning Mobility Particle Sizer

MIT/VIT

EcoChem monitors

Univ Colorado

High Res. TOF-AMS

Univ Colorado

Thermal Denuder, Aerosol Concentrator, Optical Particle Counter

Univ Colorado

TSI SMPS, nano-SMPS, and DustTrak

MIT/MC/NASA Goddard/U. Sao Paulo

nucleopore filter

ARI

ARI High Res. TOF-AMS/with soft ionization*

DRI

Photoacoustic Spectrometer

PNNL/EMSL

DRUM Aerosol and TRAC Aerosol Samplers - Cascade Impactor

UCSD

ATOF-MS

Texas A&M

TDMA, APS, and CCN Separator

U. Iowa

Dry-ambient Aerosol Size Spectrometer; SMPS

MET
RADIATION
AEROSOLS
GASES

T-0 (Bldg. 32) Participants and Instrumentation (Continued)

Bldg. 32: Lara Sosa



MIT/Heidelberg

MC

Texas A&M

UALR/ANL

Chalmers

UNAM/IFU

Paul Scherer Institute

U. Indiana/MC

DOAS, MAX-DOAS, and Spectroradiometer

Open path-FTIR

PTR-MS and CIMS

Open path NIR TDLAS

3 MAX-DOAS

HCHO instrument **MET**

IC-MS

Laser and supporting equipment for HOx measurements

RADIATION
AEROSOLS
GASES

T-0 (Fútbol Field – Soccer Field) Participants and Instrumentation



CENICA

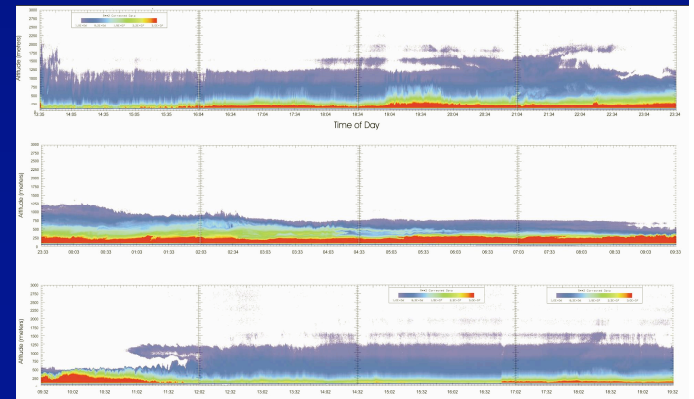
Tethered balloon, ozonesondes,
metsondes

U. Iowa

Vertically staring Lidar

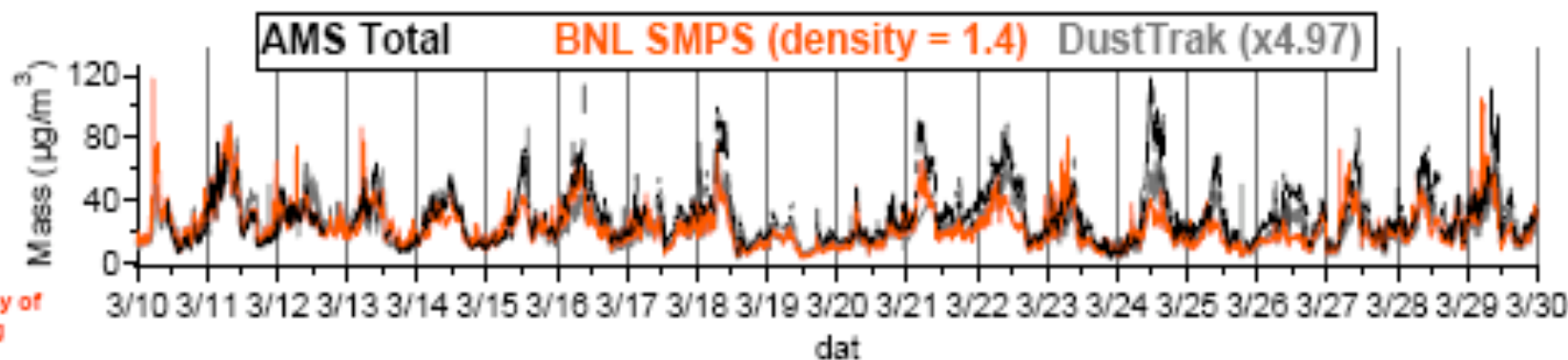
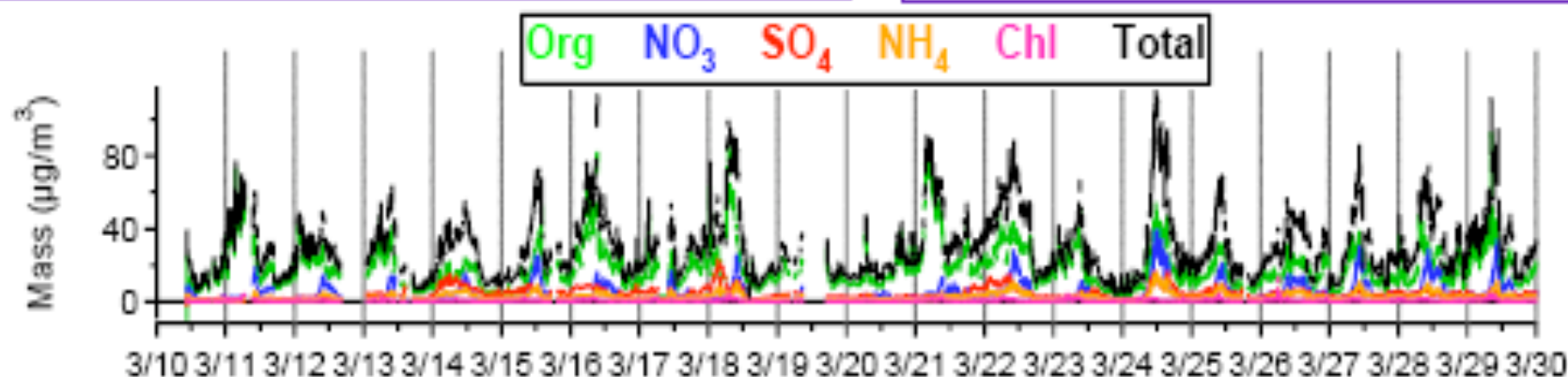
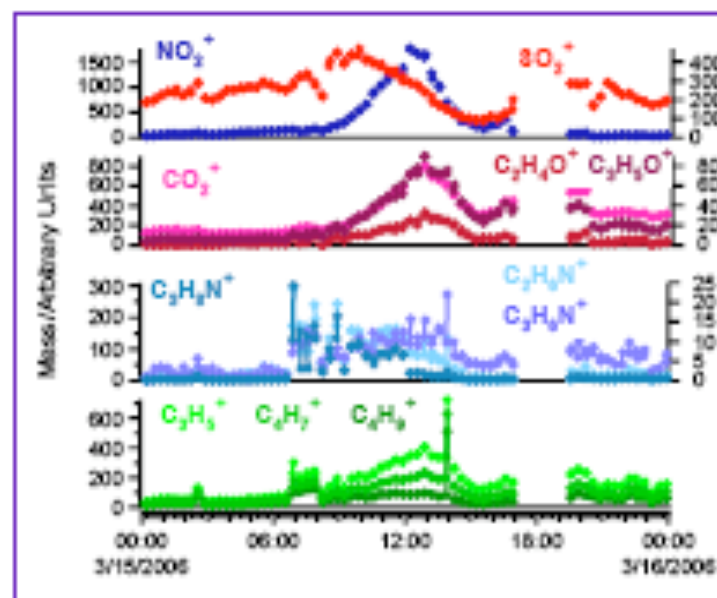
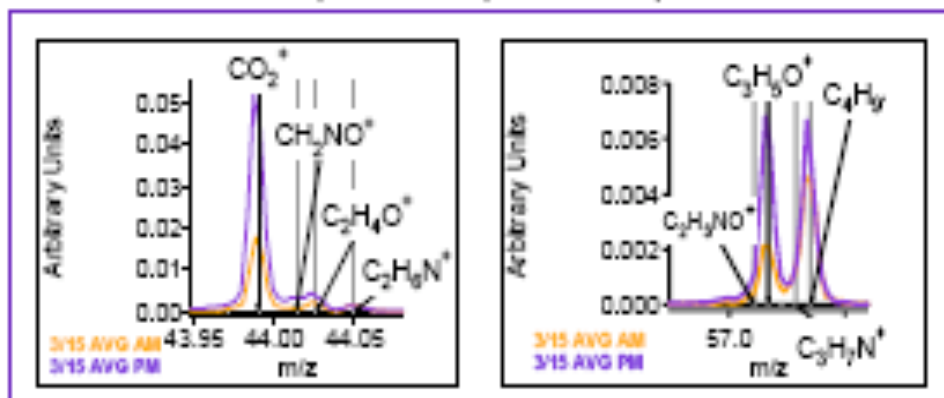
Univ. Alabama
Huntsville

12-channel passive microwave
radiometer with computer.



MILAGRO: T0 HR-ToF-AMS

Preliminary Data: Univ. of Colorado / ARI
Aiken, Salcedo, Jimenez, et al.

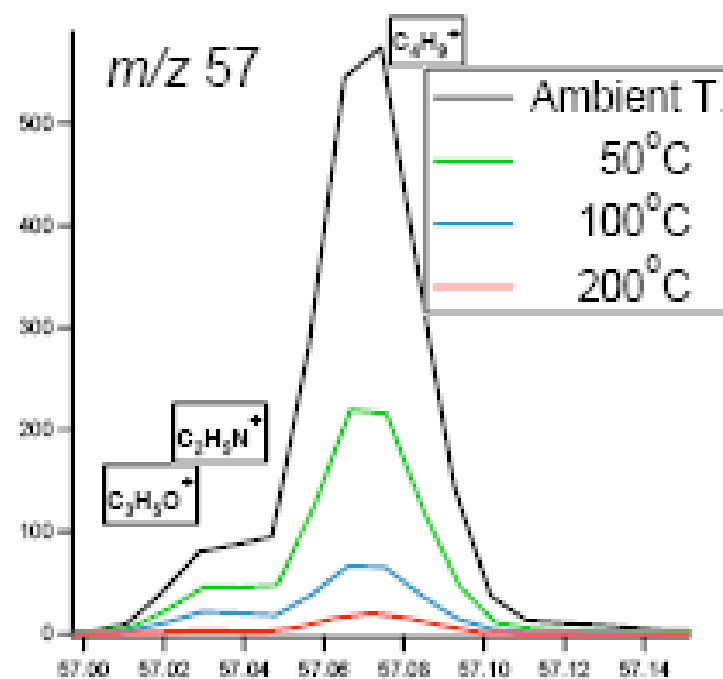
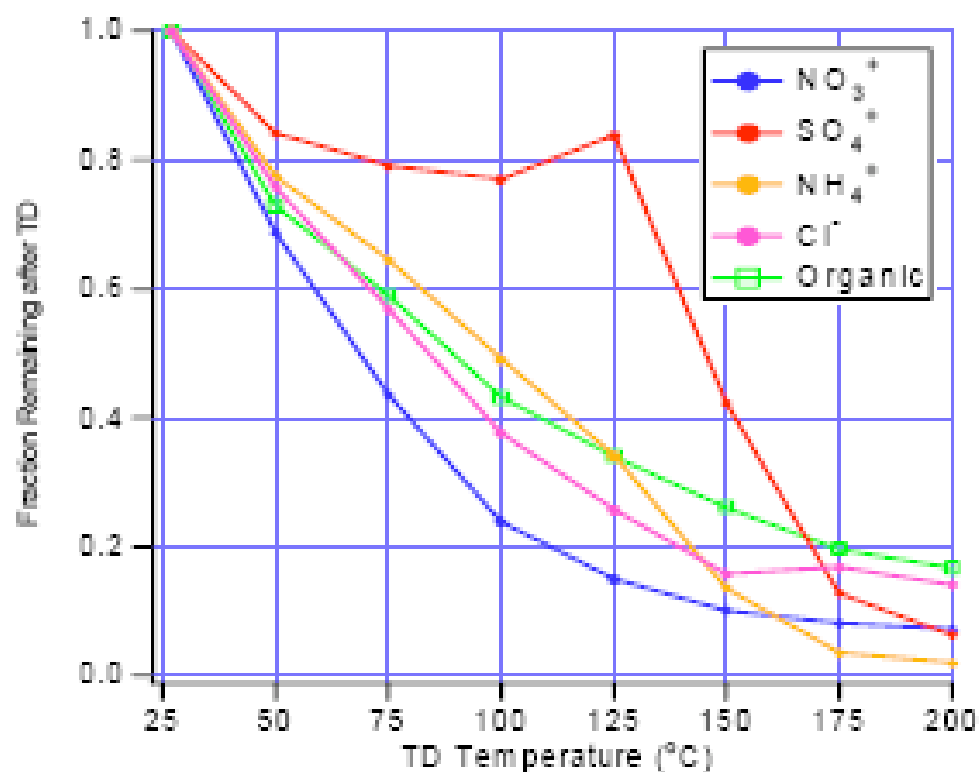


BNL
SMPS
Data
courtesy of
J. Wang

MILAGRO: Thermodenuder-AMS

Preliminary Data: University of Colorado; Huffman, Jimenez et al.

- Thermodenuder (TD) = heated tube w/ 9 s residence time followed by charcoal diffusion drier to remove volatilized material.
- HR-ToF-AMS and SMPS sampled behind TD, alternating TD and ambient
- TD Temperature is varied (Fig. 1) to get a plot of % mass remaining after TD as $f(T)$
- HR plot (Fig 2) shows oxygenated fragment not as volatile as hydrocarbon-like



Some T-0 Anticipated Analyses and Results

- Examination of size-dependent aerosol composition as function of “age” subsequent to emission and chemical processing. (T-0 as Beginning Point)
- Attribution of changes in size-dependent composition to specific processes.
- Quantification of secondary organic aerosol production.
- Comparison of properties of biomass burn and urban soot aerosols.
- Examination of dust events and dust interactions with urban aerosol.
- Examination of hygroscopic growth, CCN properties, and precipitation scavenging in relation to aerosol properties.
- Quantitative description of aerosol transport. (T-0 Initial Conditions)
- Examination of evolution of composition and optical properties of black carbon and secondary organic aerosol. (With Aircraft and T-1 and T-2)
- Evaluation of performance of current models.
- Development of new and/or improved treatments of aerosol processes.
- Urban Production of Secondary Organic Aerosols and Associated Oxidants
- Megacity Emissions of Gases and Aerosols into Regional Scales (Global?)

VERY RICH DATA SET!

And the MILAGRO Continues



Acknowledgments

ASP MAX-MEX Science Team

Molina Center

NSF and NCAR

NASA

IMP HOSTS – Particularly Gustavo Sosa

MILAGRO Participants

Our Mexican Hosts – INE, CENICA, SENEAM, IMP, UT Tecamac

