

Eleven Years of Black Carbon Measurements in the North Atlantic at the Pico Mountain Observatory, Azores (2225m asl)

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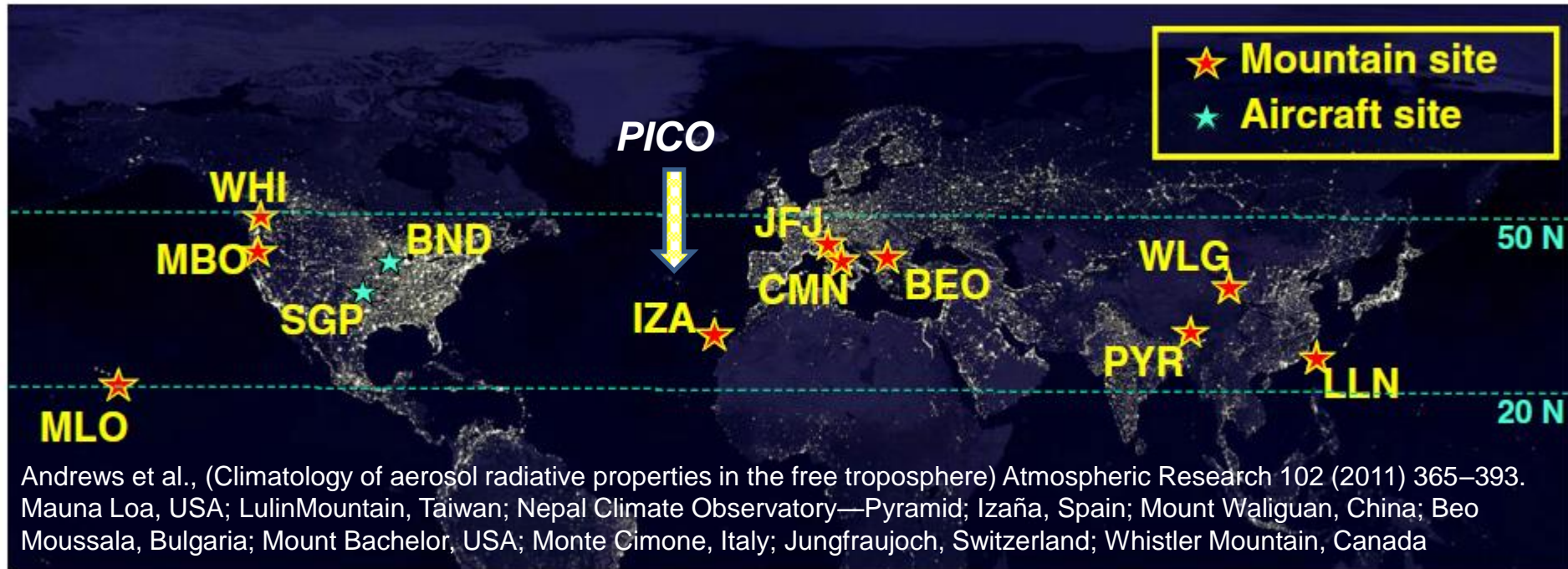


Acknowledgements

- DOE – ASR
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- Coauthors
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Measurement site and Data



Significance

- Study of free tropospheric aerosol properties
- Representative of the large scale atmosphere
- Potential for studying background/mixed aerosols in the context of the radiative effect and climate change in general.

Current Measurements at the site

Previous/Existing *2001 to 2012*

- ✓ BC
- ✓ NMHC
- ✓ Ozone
- ✓ Meteorology

2004 to 2011

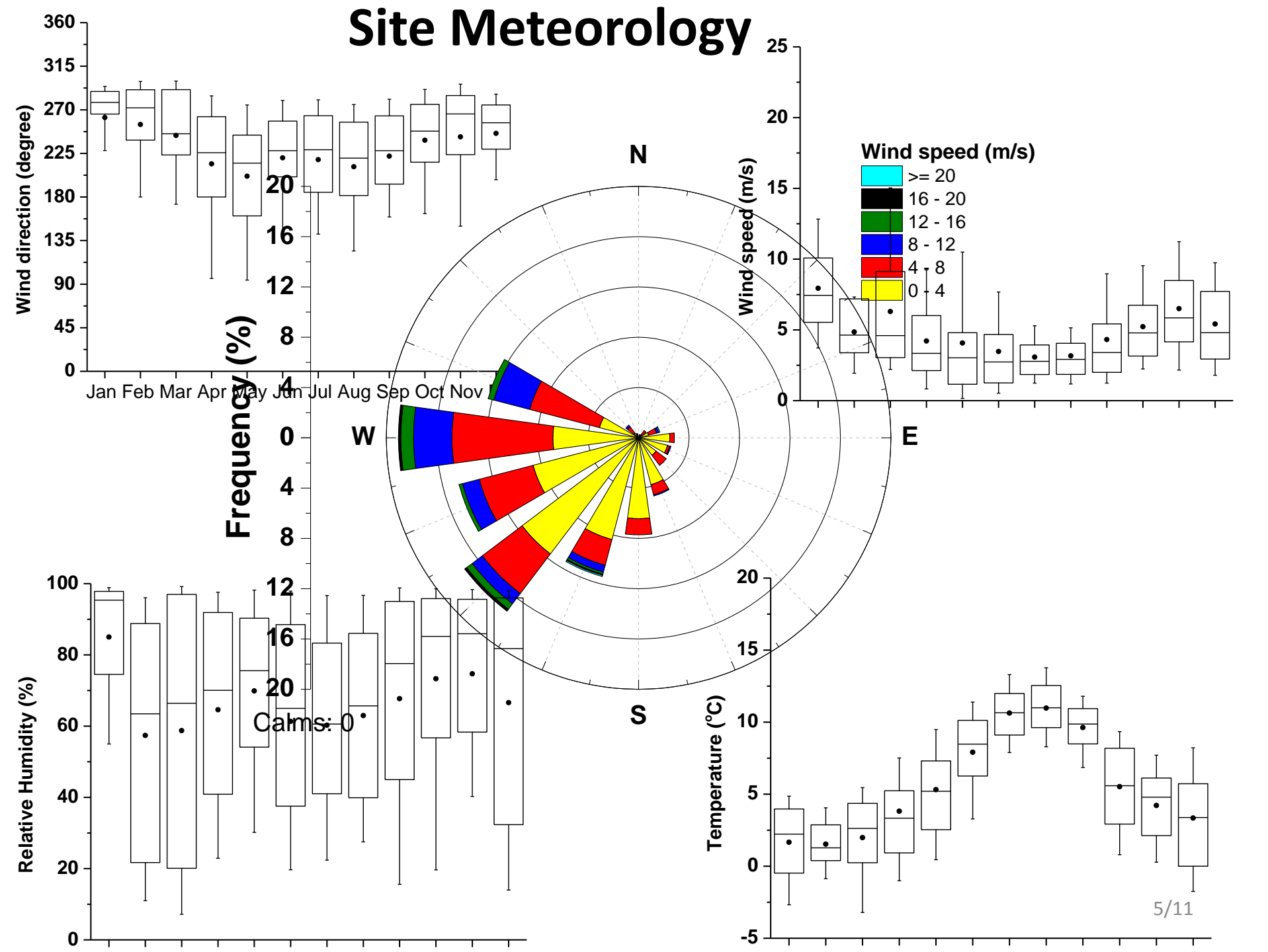
- ❖ $\text{No}_x\text{-No}_y$
- ❖ PAN

New Aerosol Characterization

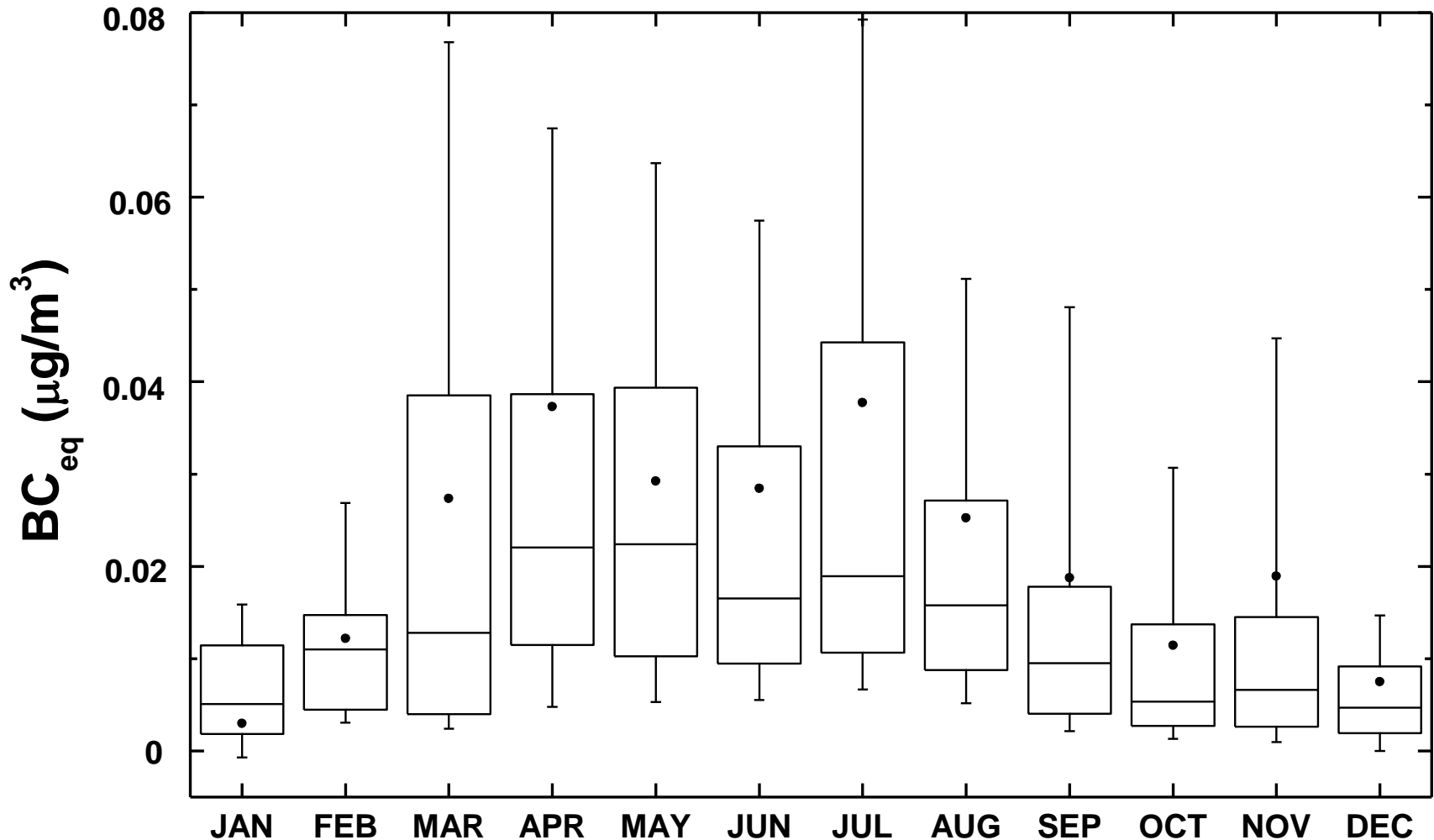
Summer 2012- present

- 3- λ Scattering/Backscattered Fraction-Nephelometer
- Concentration- OPC
- Morphology (SEM-TEM) - Filters/Grids Sampler
- Aerosol Chemistry-High Volume Samplers

Site Meteorology

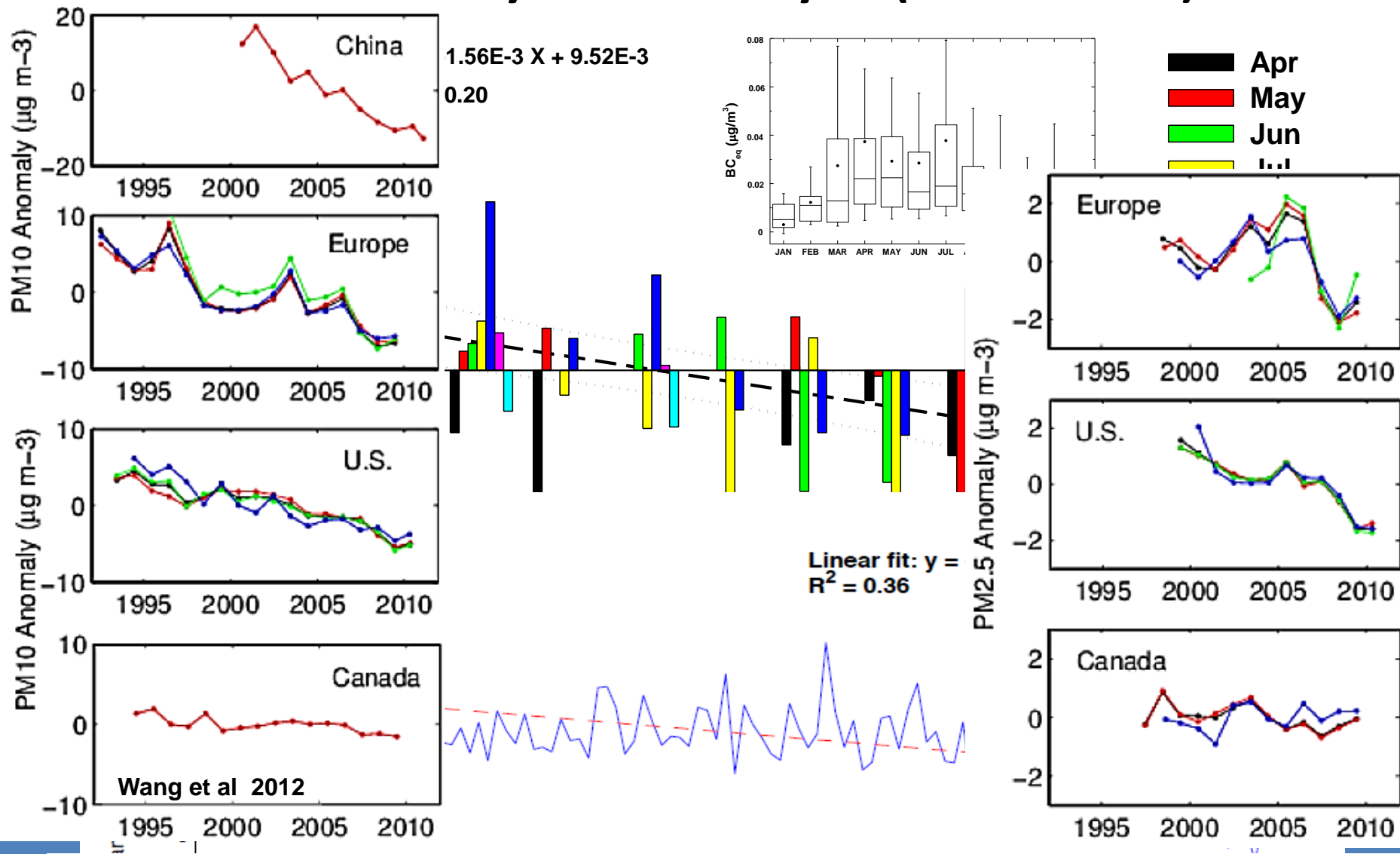


Seasonal Cycle (2001 - 2012)



- BC distributions are positively skewed
⇒ Due to a few high values from events

Preliminary Trend Analysis (2001 - 2012)

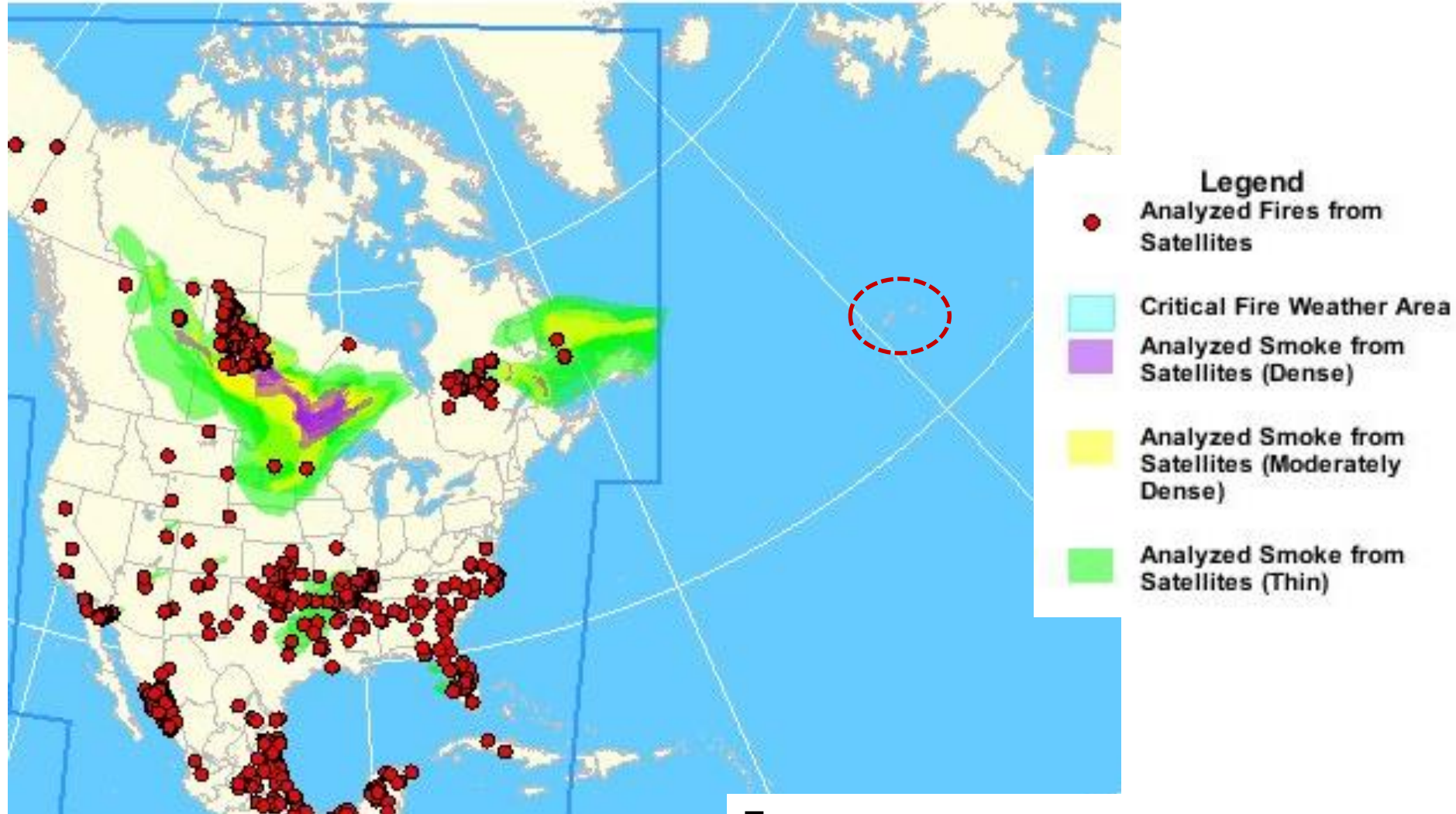


- **PM₁₀ US** decreased by 33 %, averaged over 129 sites from 1993 to 2010.
- **PM₁₀ Europe** decreased by 4 %, averaged from 250 sites from 1992 to 2009.

Year

Wildfires in Canada

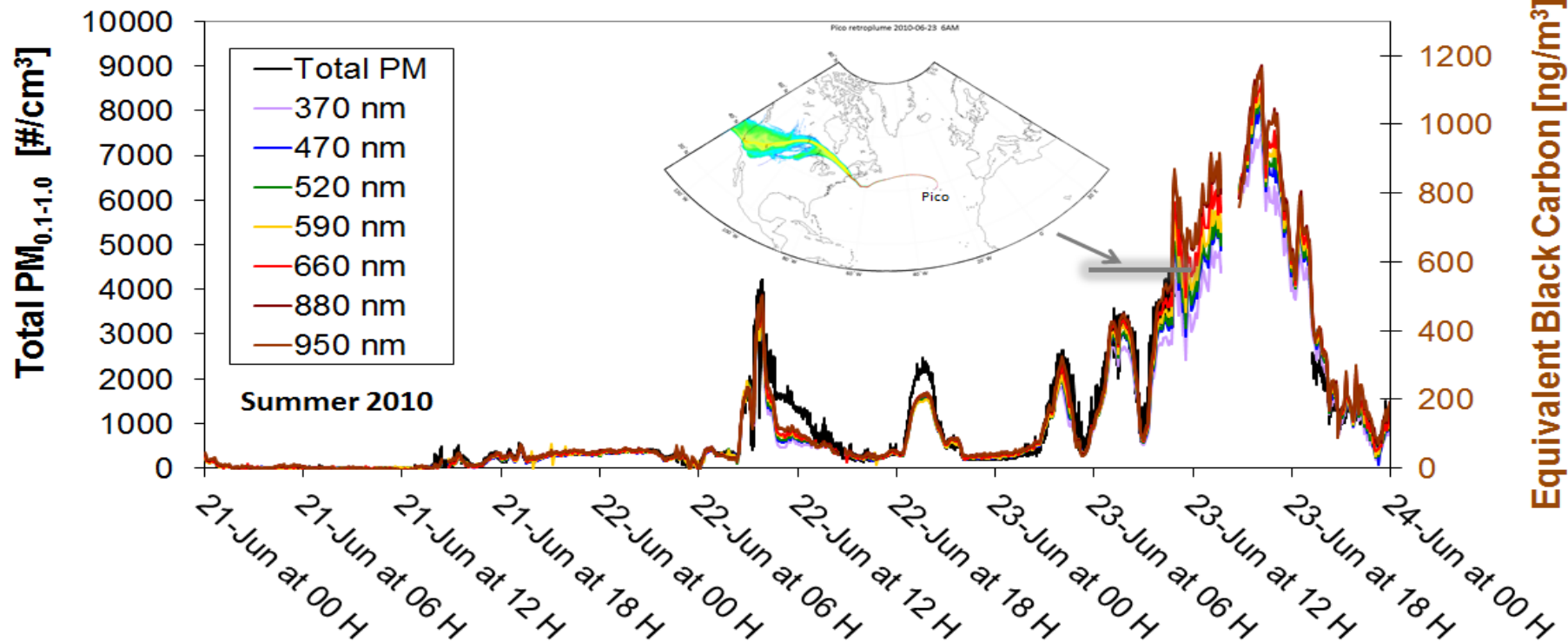
June 2010



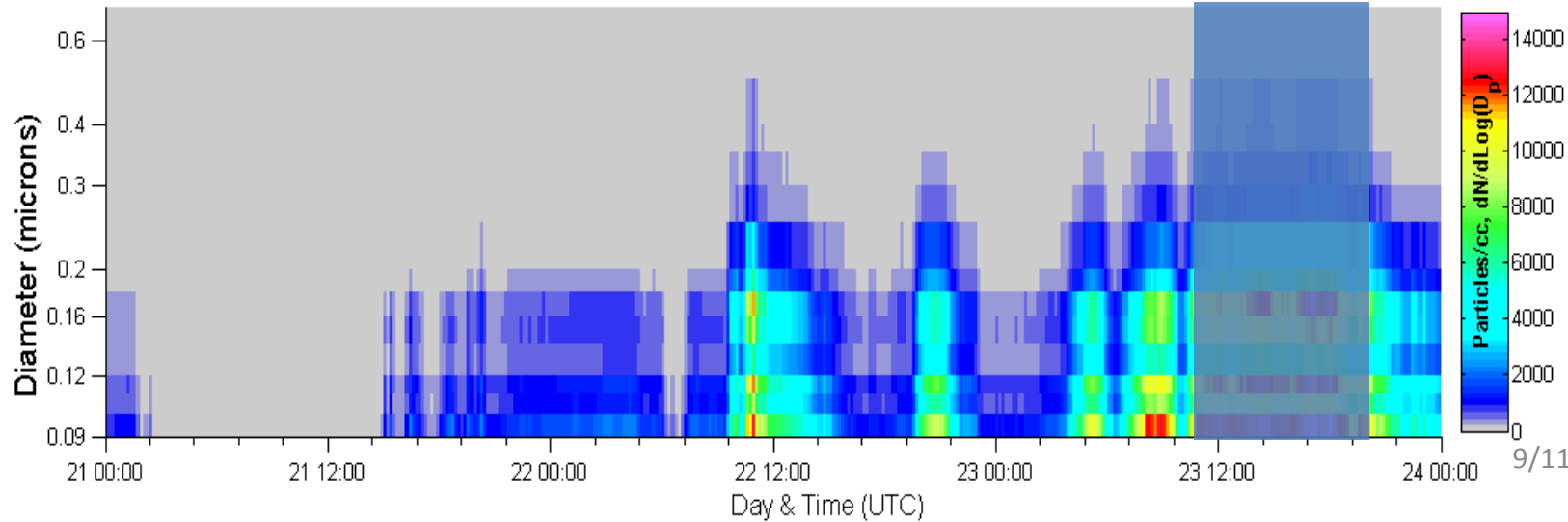
From

<http://www.firedetect.noaa.gov/viewer.htm>

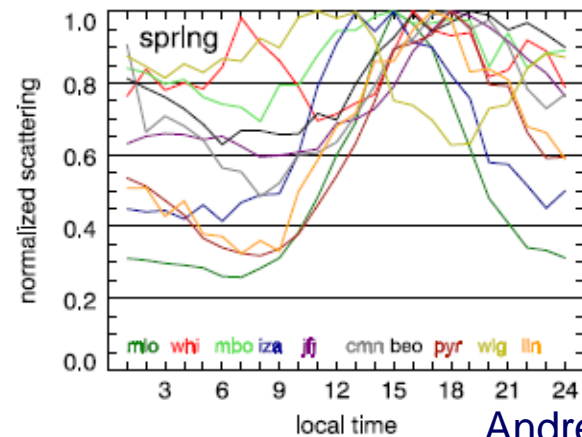
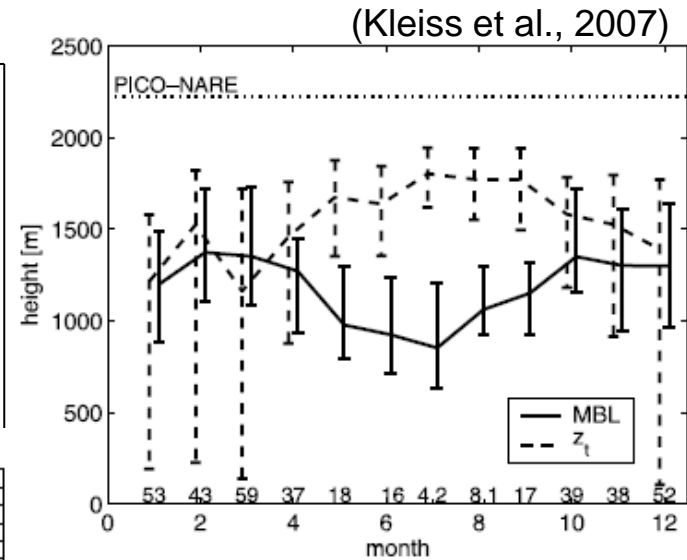
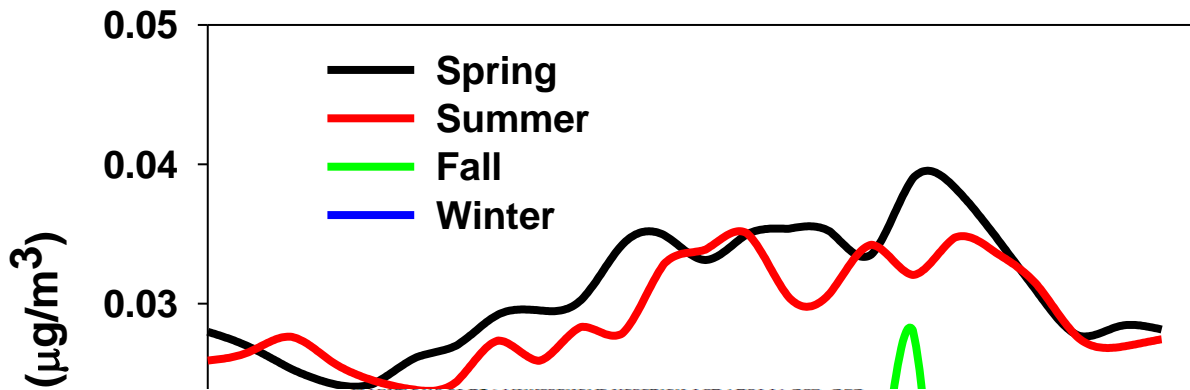
Long-range Transport Event from Biomass Burning in North America



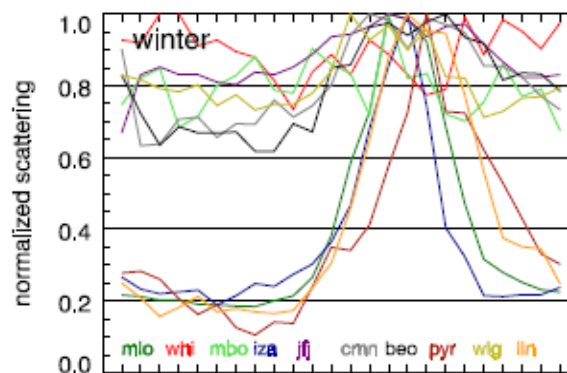
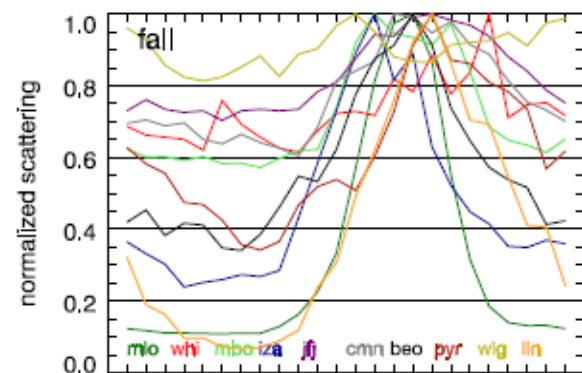
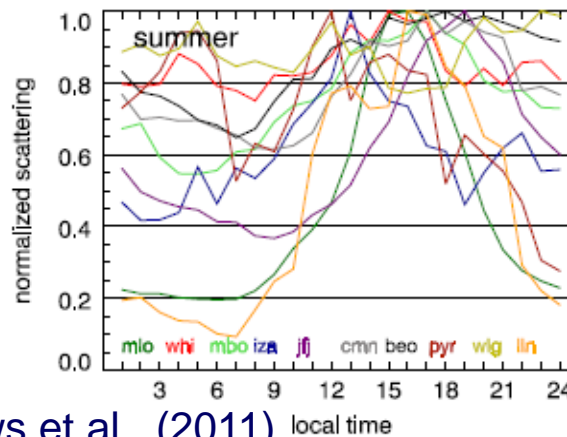
Pico PMS June-21-2010 12:00AM to June-24-2010 11:50PM



Black Carbon Monthly Diurnal Variability (2001-2012)



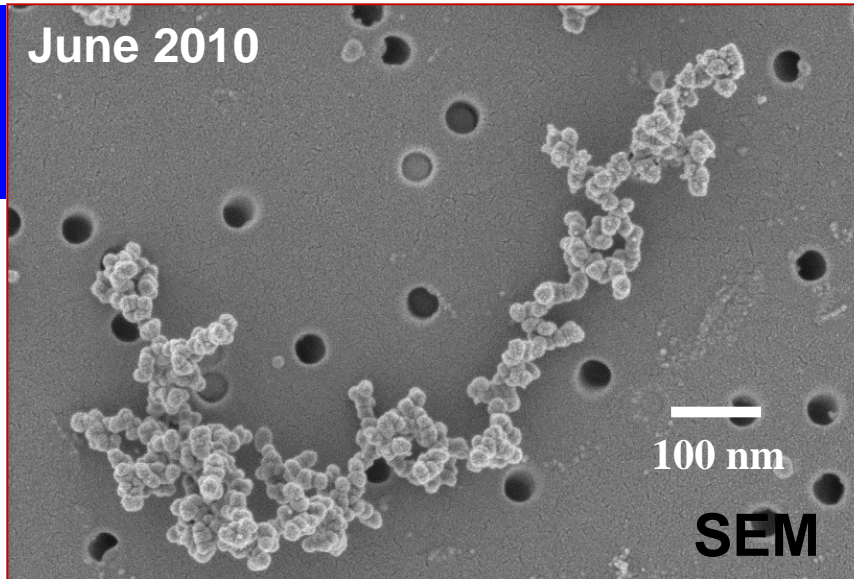
Andrews et al., (2011)



- PICO station is significantly farther north (latitude 38.5°N) causing reduced insolation,
- Island is smaller and not heavily populated,
- Mountain is smaller. (Kleiss et al., 2007)

Aerosol Aging/Mixing

CARES, Central Valley, California

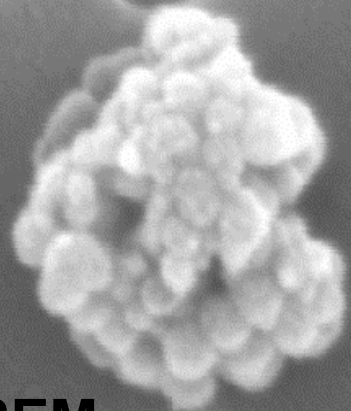


Fresh Soot

PICO

July 20, 2012

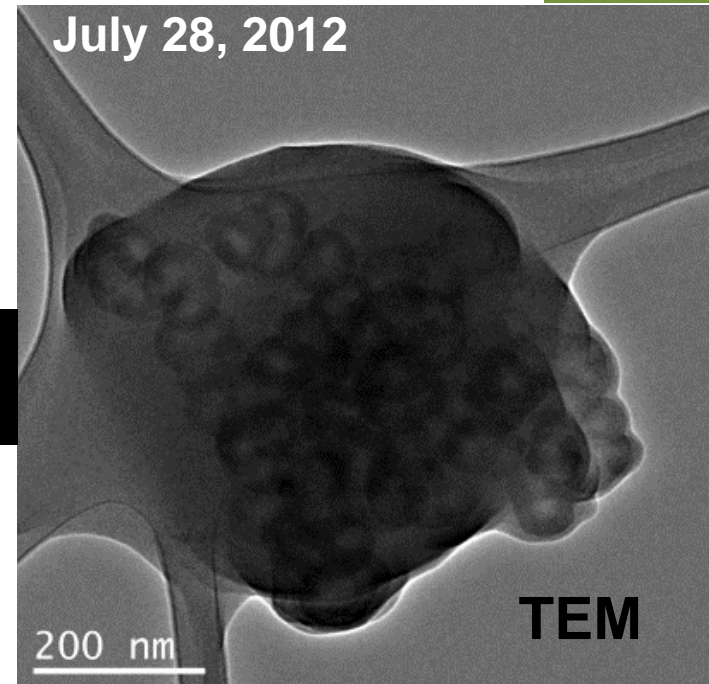
Compacted (Aged) soot



SEM

Mixed/Coated soot

July 28, 2012



TEM

PICO

- Pico Mountain Observatory: Large scale transport events seem to shape the variability
- Reduction in BC concentrations from 2001-2012
- Marginal seasonal diurnal variation in summer
- Free tropospheric-aged particles

*Thank You all
for kind attention!*