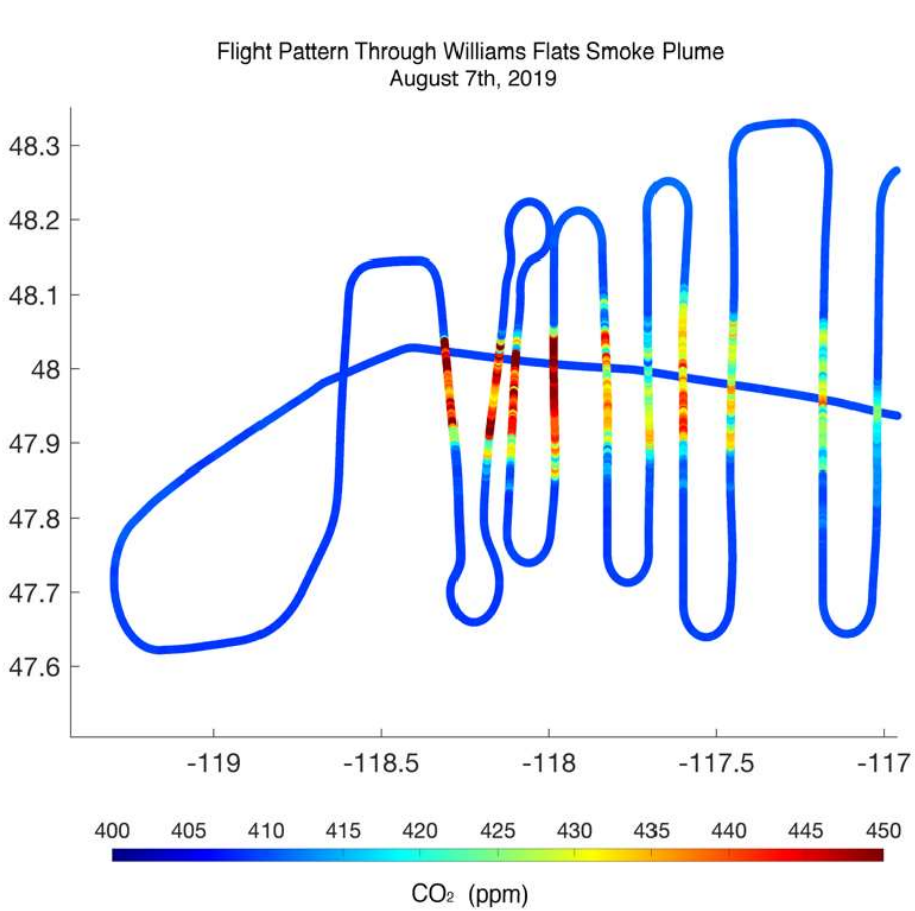
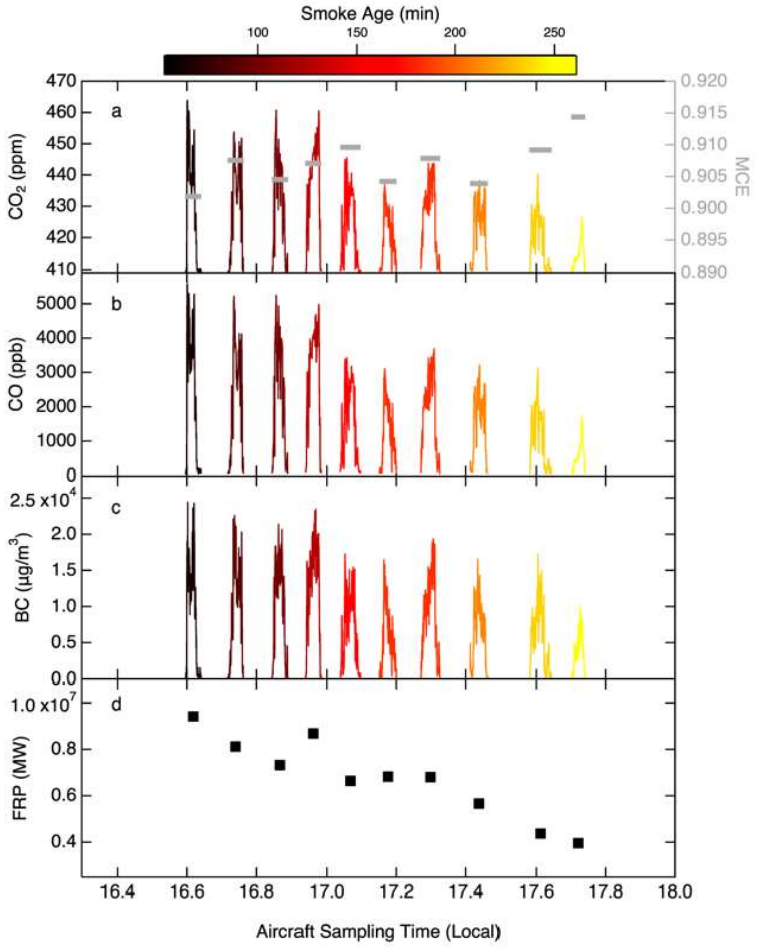
Photo: Sam Hall

What are we learning from intense field campaigns?

Photo: Sam Hall

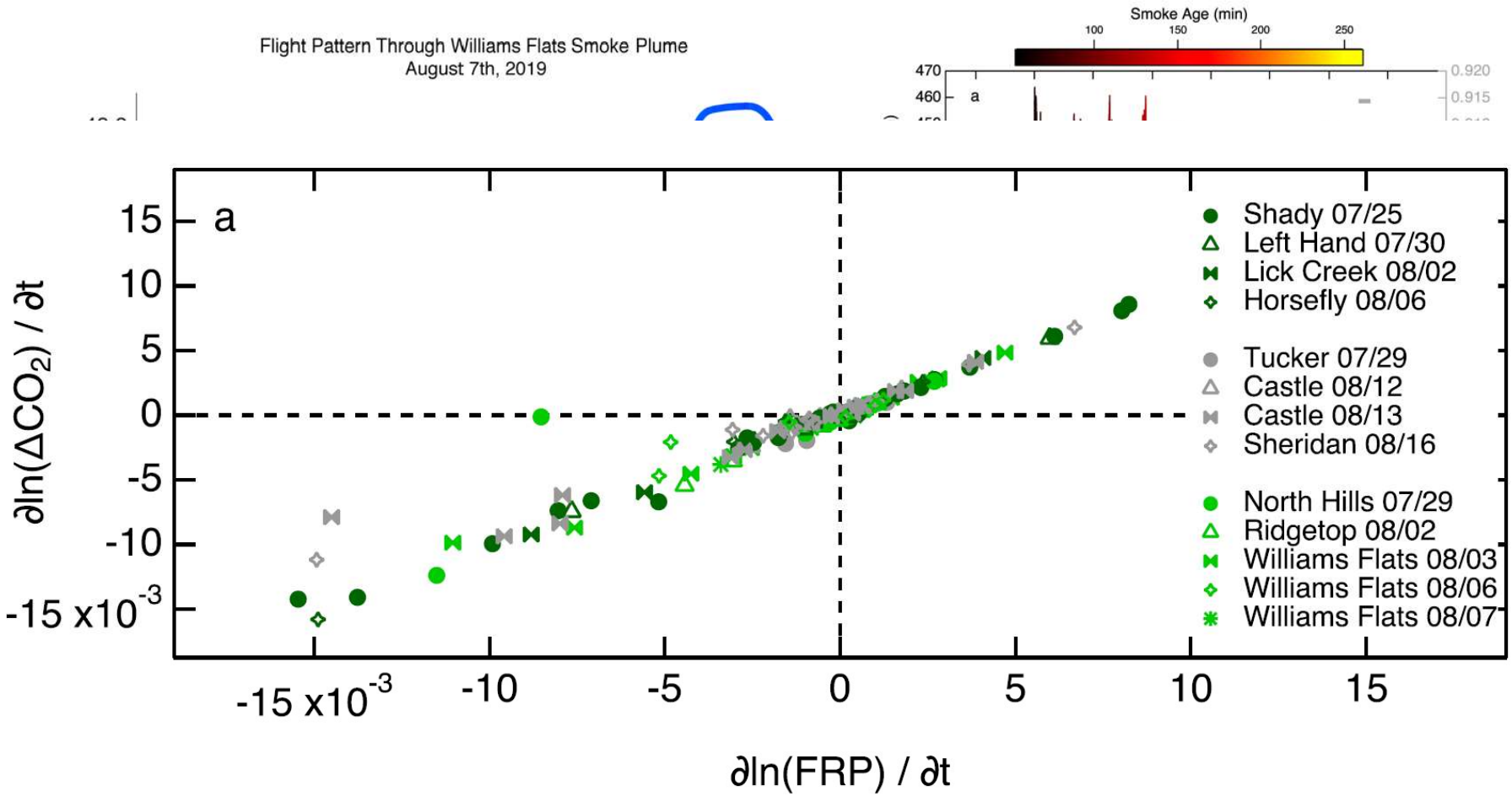
Connecting satellite and in situ observations





Liz Wiggins and Amber Soja

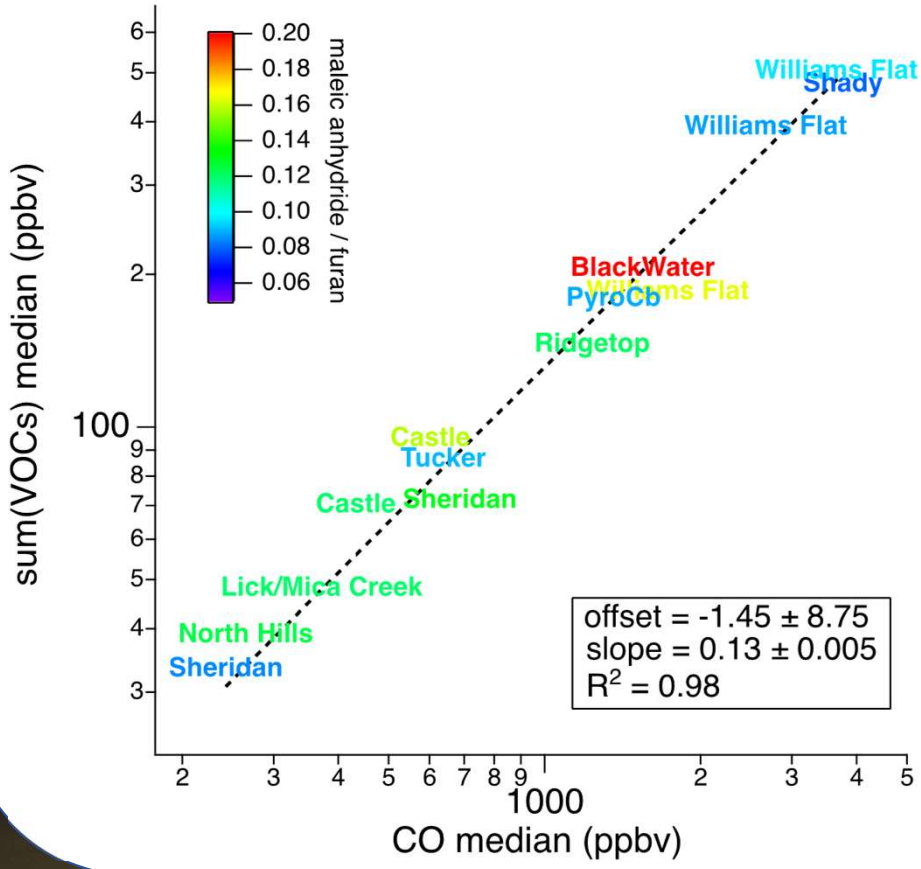
Connecting satellite and in situ observations



Liz Wiggins and Amber Soja (NASA/NIA)

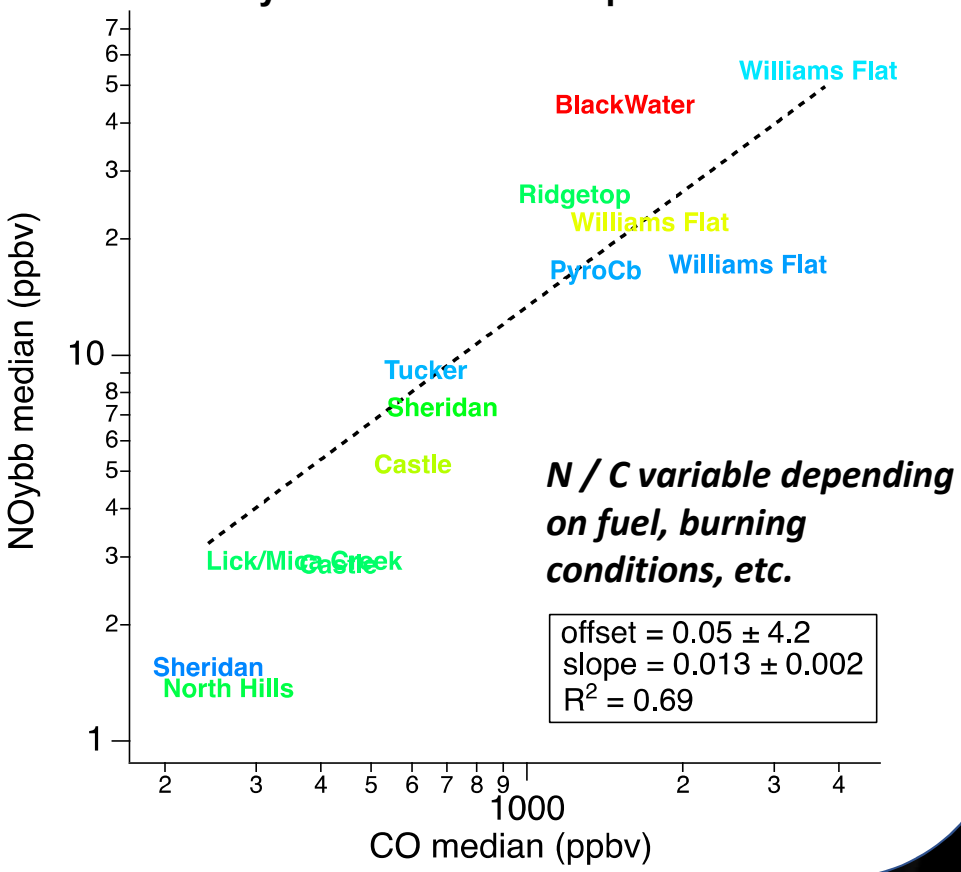
Fire-to-Fire Variability in VOCs & NOybb Emissions

sum(VOCs) vs CO



NOybb vs CO

NOybb = NOx + PANs + pNO3 + HONO

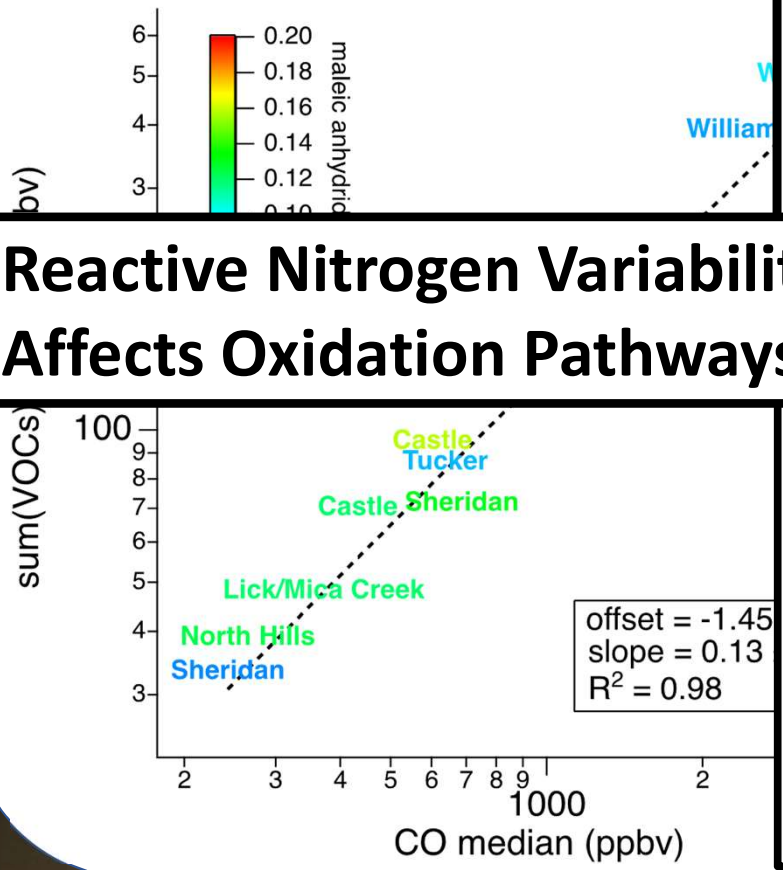


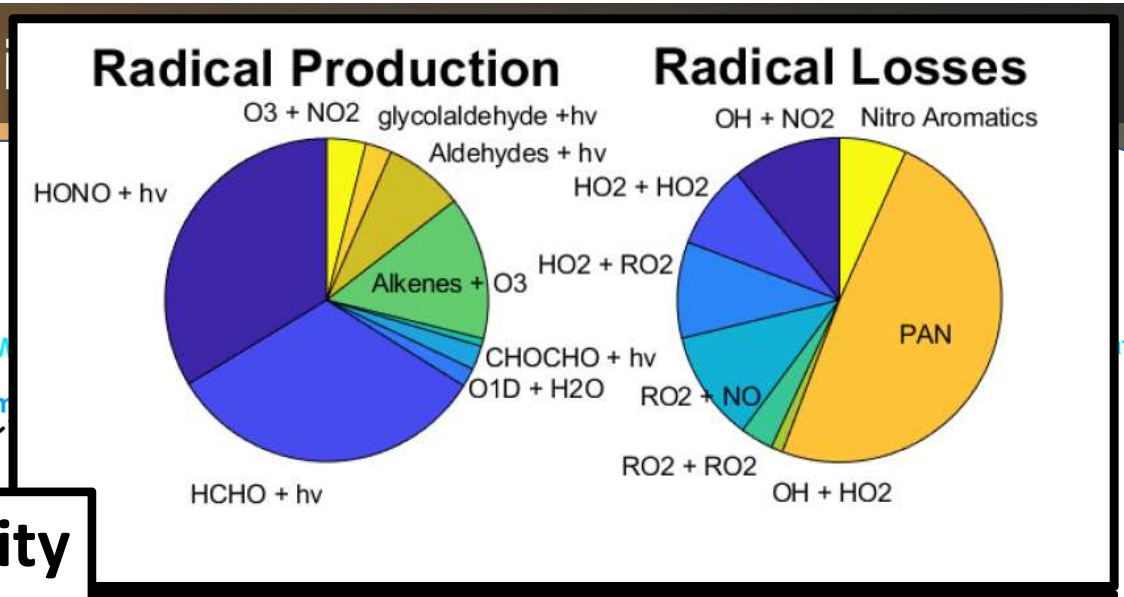
N / C variable depending on fuel, burning conditions, etc.

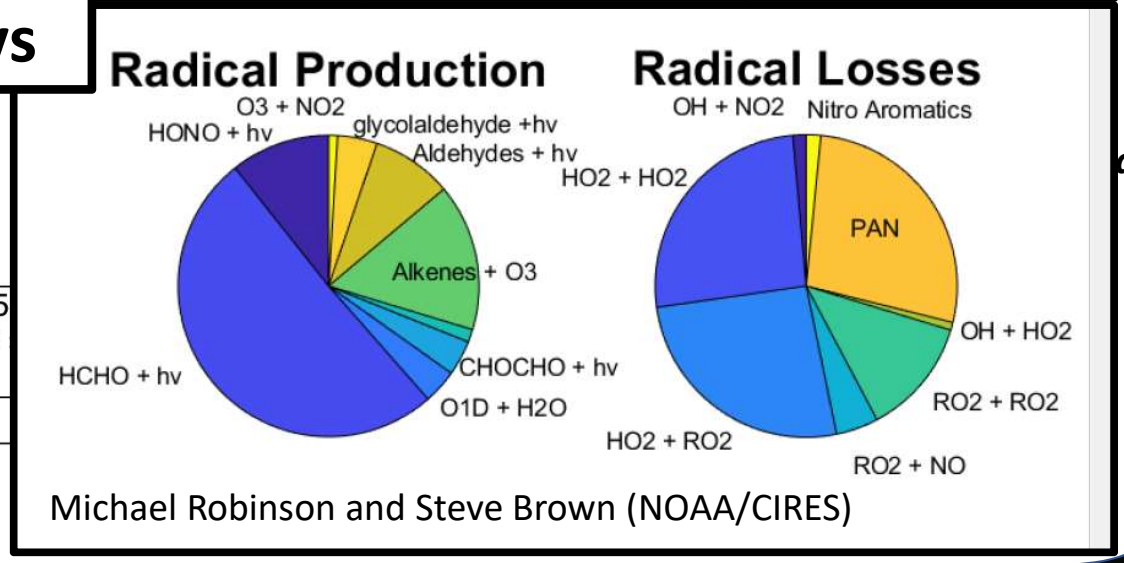
Georgios Gkatzelis and Carsten Warneke (NOAA/CIRES)

Fire-to-Fire Variabili

Reactive Nitrogen Variability Affects Oxidation Pathways

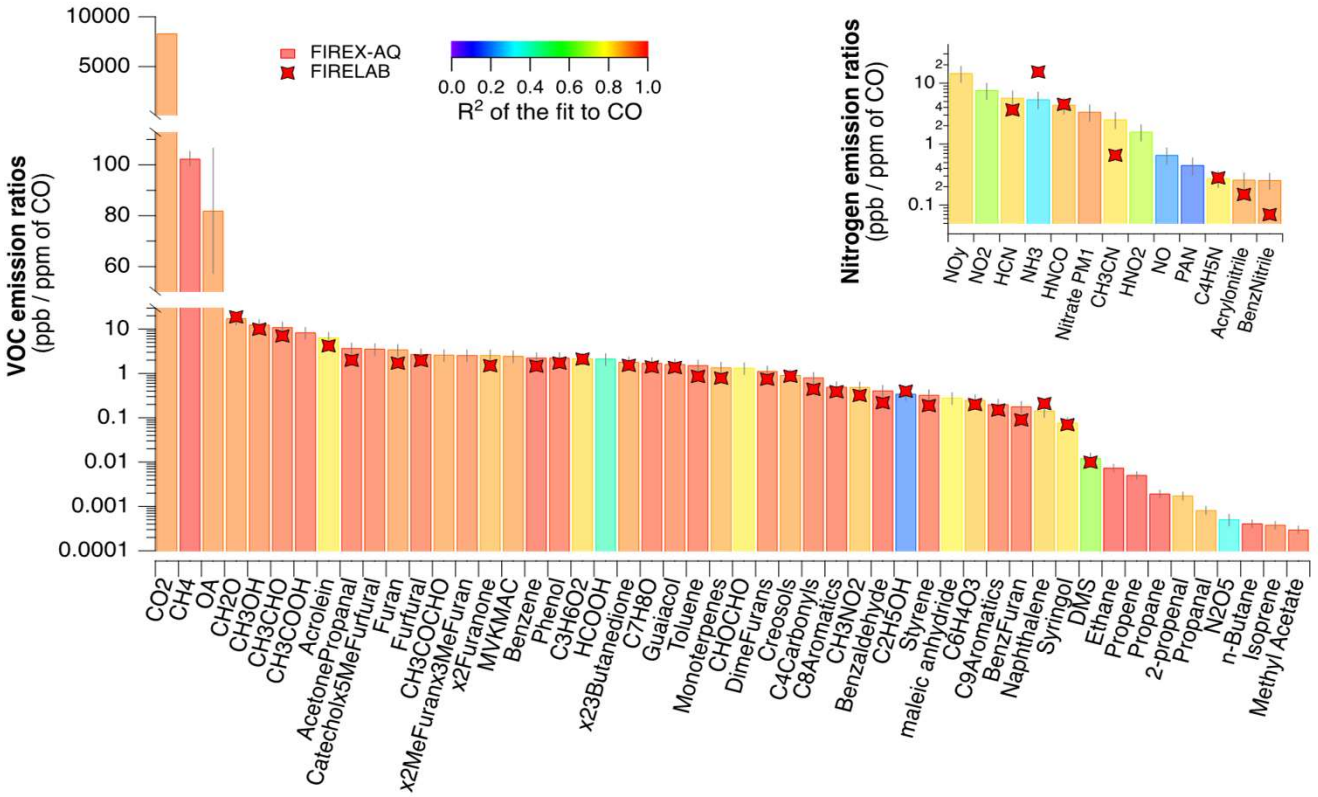






Michael Robinson and Steve Brown (NOAA/CIRES)

FIREX-AQ Emissions point to complex chemistry



Diverse Chemical Processes:

Ozone Production

Primary/Secondary Aerosol Chemistry

Aerosol Optical Properties

Brown Carbon Absorption

Air Toxics

Factors that must be deconvolved in the analysis of plume transects:

Emissions (FRP)

Plume age

Dilution

Actinic Flux

Day/Night Chemistry

The Challenge: How do we simplify complex chemical processes and their outcomes for use in global and regional models?

Summary for discussion:

Connecting satellite and in situ data is critical: Only satellites can capture the dynamic nature of fire emissions, and field campaigns provide the context for improving the ability to use satellite data to better constrain models in the amount, timing, and composition of emissions (based on fuel data, area burned, FRP, and trace gas and aerosol observations)

Chemistry is sensitive to myriad factors: This includes initial emissions, reactive nitrogen content, actinic flux, day/night chemistry, etc.

Complex processes must be simplified for use in models: The chemistry of both trace gases and aerosols need to be understood in as much detail as possible, but they must also be appropriately simplified/parameterized.

Don't forget:

Active remote sensing is valuable for plume rise/dynamics, total aerosol flux estimation, evolution of aerosol optical properties, etc.

Small Fires play an important role (harder to detect, but more regular and predictable, and add to diversity in fuels studied)