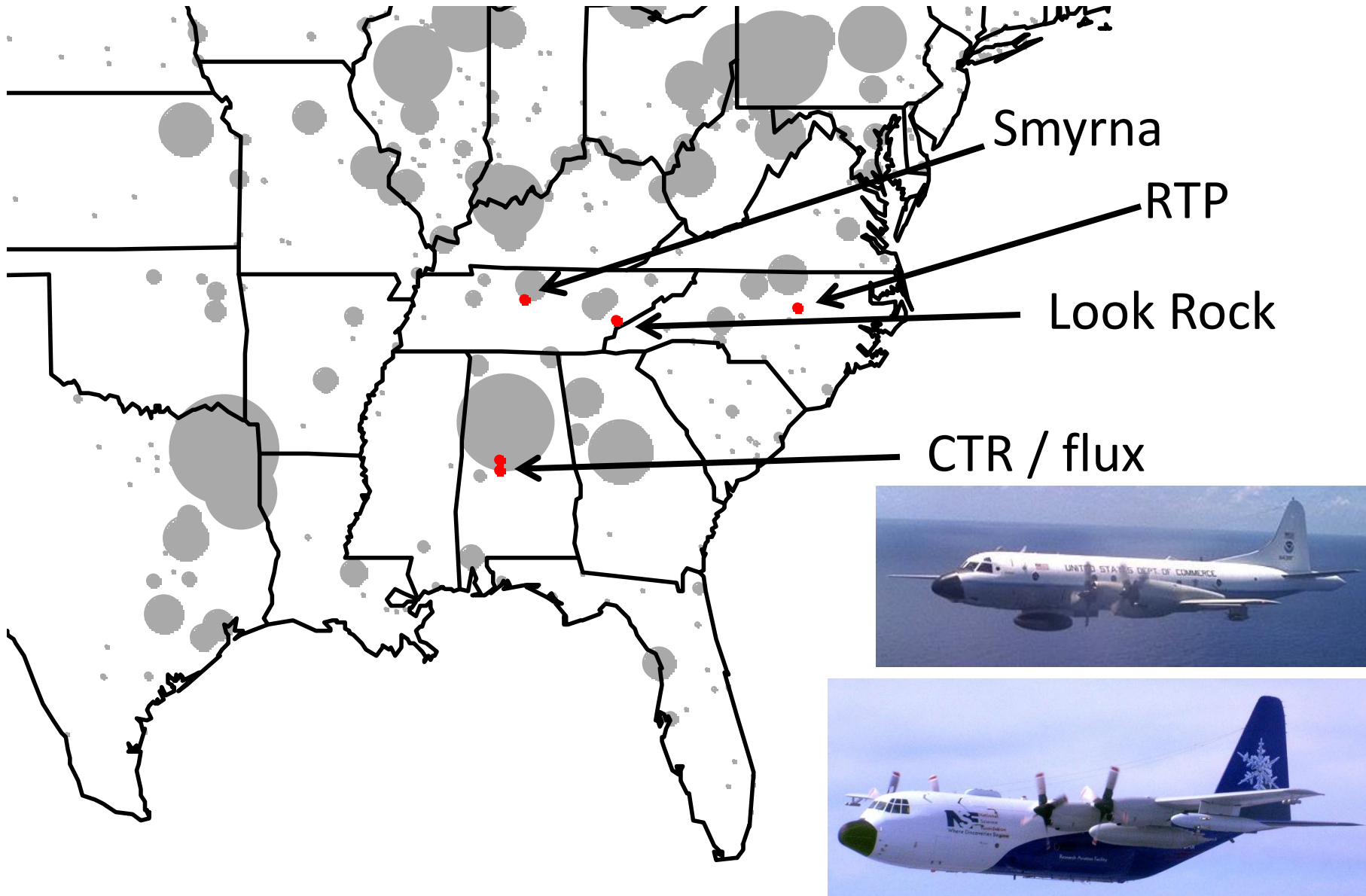


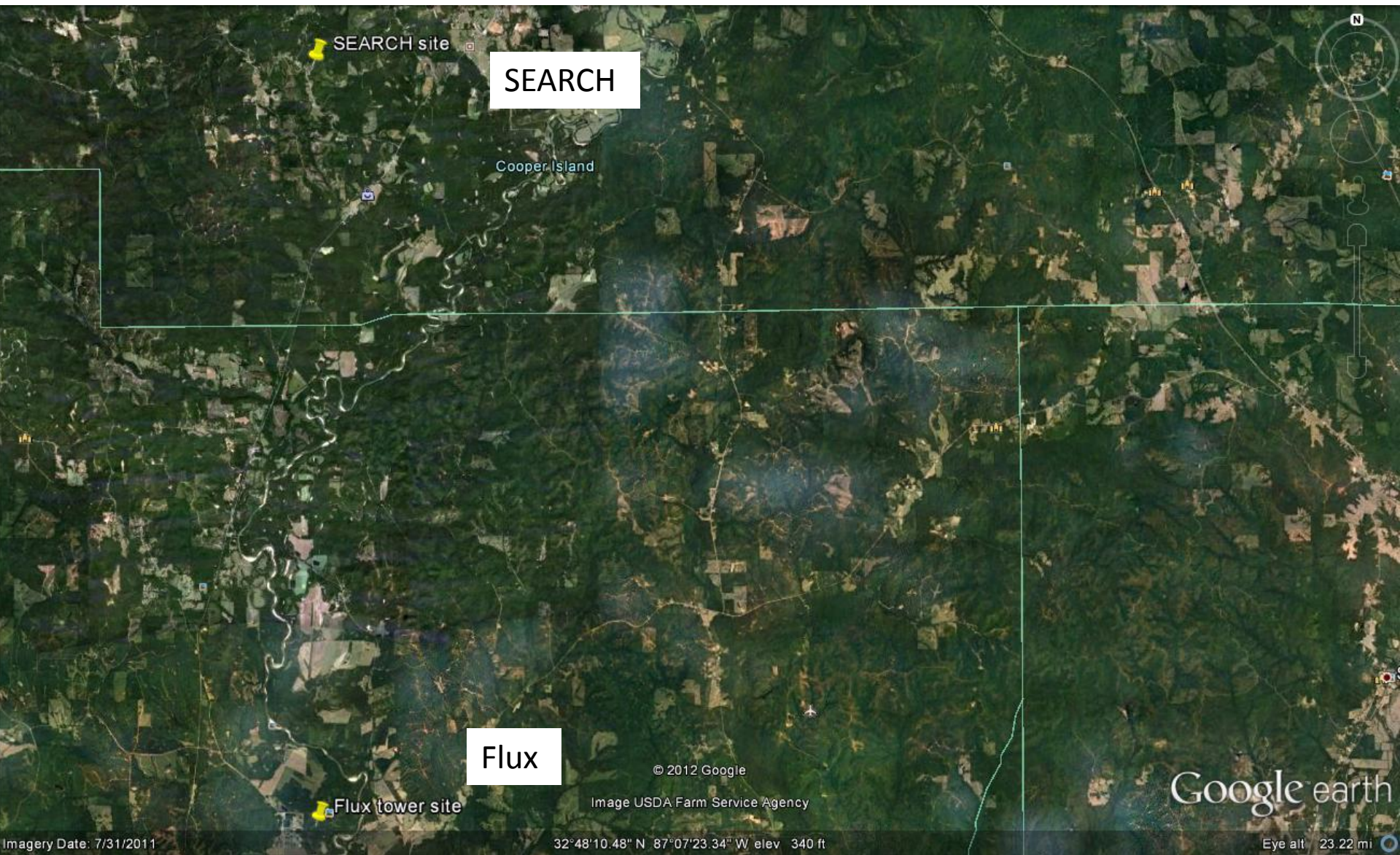
Southern Oxidant and Aerosol Study



- NSF funded \$4 million in individual investigator proposals
- NSF's overall investment in SOAS is \$8+ million
- EPA originally planned to fund 8 proposals, but increased investment to 14 proposals
- NOAA's commitment to fly the P3 for SENEX was an important impetus
- SOAS is unique as a 'grass roots' field campaign
- One of my personal favorite SOAS facts:
 - **EPA** funded a **university** scientist to fly an instrument on **NOAA's** plane

Regional Investigation of Local and Long-range Chemistry (REILLY)





SEARCH site

SEARCH

Cooper Island

Flux

Flux tower site

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Image USDA Farm Service Agency

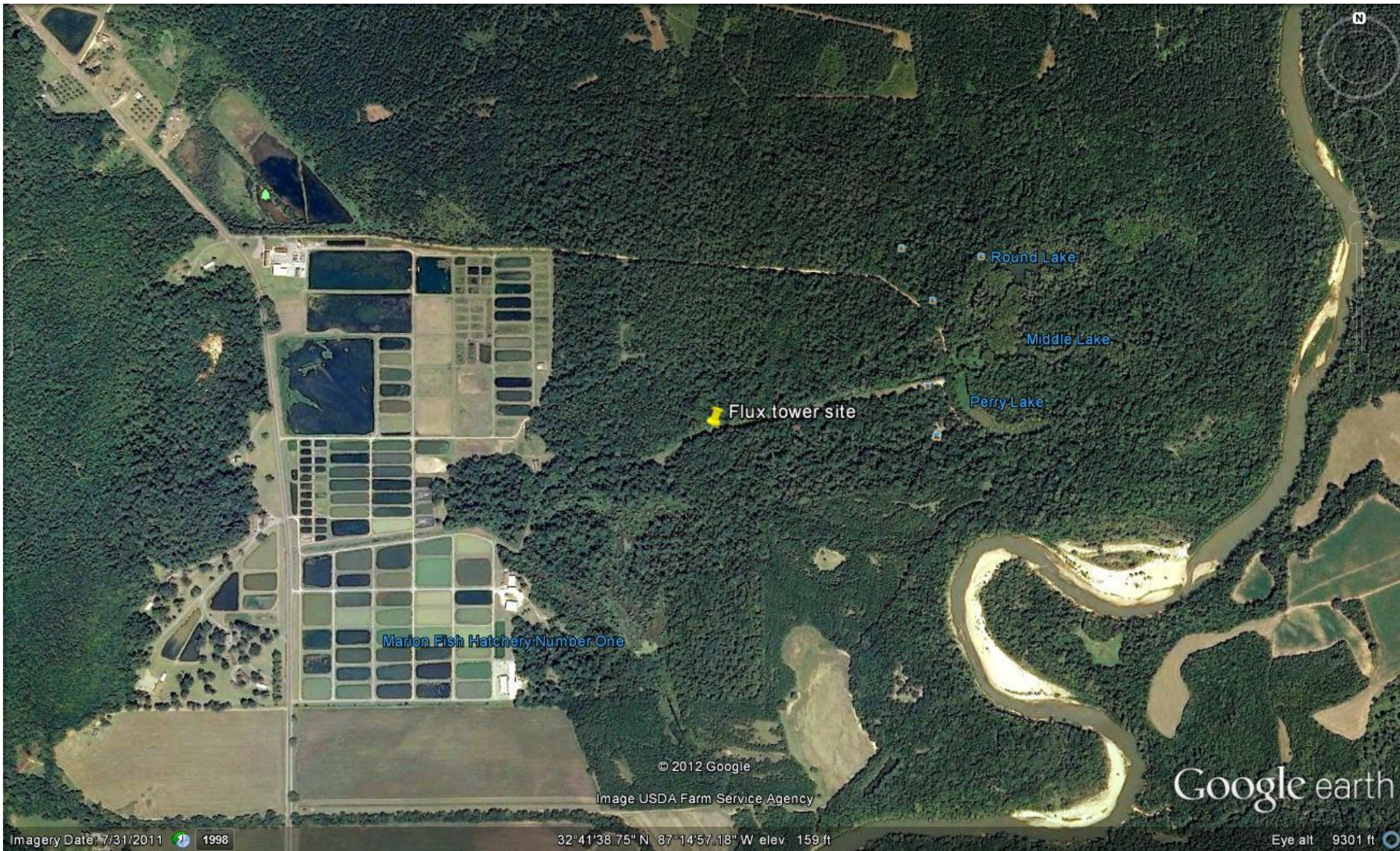
Google earth

Imagery Date: 7/31/2011

32°48'10.48" N 87°07'23.34" W elev 340 ft

Eye alt 23.22 mi

Flux tower site near fish hatchery





SEARCH site

© 2012 Google

Google earth

Imagery Date: 10/3/2010 1998

32°54'12.49" N 87°14'56.05" W elev 419 ft

Eye alt 4135 ft

Current **Met** Measurements at CTR

**Time
Resolution
(min)**

Variable

Z (magl)

Analyzer/Sensor

WS/WD

10

RMYoung 81000 sonic

5

T/RH/BP

9

Paroscientific Met4A

5

T/RH

2

Vaisala

5

PAR

2

Licor

5

precipitation

2

ETI-NOAH IV

5

aerosol/cloud
layers

50-15,000

JenOptik CHM 15k

5

Current **Chemical (gas)** at CTR

Variable	Z (magl)	Analyzer/Sensor	Time (min)
CO	10	Thermo 48i	5
SO ₂	10	Thermo 43i	5
NO	10	Thermo 42i	5
NO ₂	10	photolysis/Thermo 49i	5
HNO ₃	10	continuous denuder diff/Thermo 42i	5
NO _y	10	cat. reduction/Thermo 42i	5
NH ₃	5	continuous denuder diff/Thermo 42i	5
Tot. PANs	5	thermophotolytic/Thermo 42i	5
Tot. Alkyl Nitrates	5	thermophotolytic/Thermo 42i	5

Current Chemical (PM) CTR

Variable	Z	Analyzer/Sensor	Time
Continuous PM _{2.5} Mass	5	TEOM	5
Continuous PM _{2.5} SO ₄	5	cat. reduction/Thermo 43i	5
Continuous PM _{2.5} NO ₃	5	cat. reduction/Thermo 42i	5
Continuous PM _{2.5} NH ₄	5	cat. oxidation/Thermo 42i	5
Continuous PM _{2.5} TC/EC	5	Sunset	5
dry Babs (550 nm)	5	Radiance Research M903	5
dry Bsp	5	Magee 2ch. Aeth	5
ambient Bsp	5	Optec NGN-2a	5
Discrete PM _{2.5} Mass	5	filter/gravimetry	1440, daily
Discrete PM _{2.5} ions	5	filter/IC	1440, daily
Discrete PM _{2.5} major/minor elements	5	filter/XRF	1440, daily
Discrete PM _{2.5} water-soluble metals	5	filter/ICPMS	1440, daily
Discrete PM _{2.5} OC/EC	5	filter/TOR	1440, 1 in 3
Discrete PM ₁₀ Mass	5	filter/gravimetry	1440, 1 in 3
Discrete PM ₁₀ ions	5	filter/IC	1440, 1 in 3
Discrete PM ₁₀ major/minor elements	5	filter/XRF	1440, 1 in 3
Discrete PM ₁₀ water-soluble metals	5	filter/ICPMS	1440, 1 in 3

Speciated deposition measurements at CTR

Variable	Z	Analyzer/Sensor	Time
wet deposition ions	2	bucket/IC	10080
wet deposition total-Hg	2	glass btl./CVAAS	10080
wet deposition trace elements	2	poly btl./ICPMS	10080

Confirmed Flux Tower Measurements

OH, HO₂+RO₂, H₂SO₄ – CIMS

OH reactivity – comparative reactivity method

NO_x – CRDS

Peroxides, o-acids –CIMS

OH, HO₂, RO₂ - GTHOS

OH reactivity – OHR

O₃, NO, NO₂ - Thermo

Confirmed Tower Inlet

Organic acids HRTof-CIMS

Flux of BVOC and oxidation products- PTR-TOFMS

BVOC flux, relaxed eddy accumulator – GCMS

Glyoxal gradient – LIP

HCHO flux, gradients – LIF

NO₂, PANs, ANs NO fluxes and gradients – TD-LIF

NO/NO₂/NH₃ – chemillumescence

NO₃/N₂O₅ – CRDS

N₂O₅ reactivity

Submicron NR aerosol composition and size distribution – HR-ToF-AMS

2 potential aerosol mass (PAM) flow reactors

- with OH, O₃, NO₃ oxidation + AMS&SMPS

Aerosol volatility – thermal denuder

Aerosol number size distribution - SMPS

Confirmed Ground Measurements

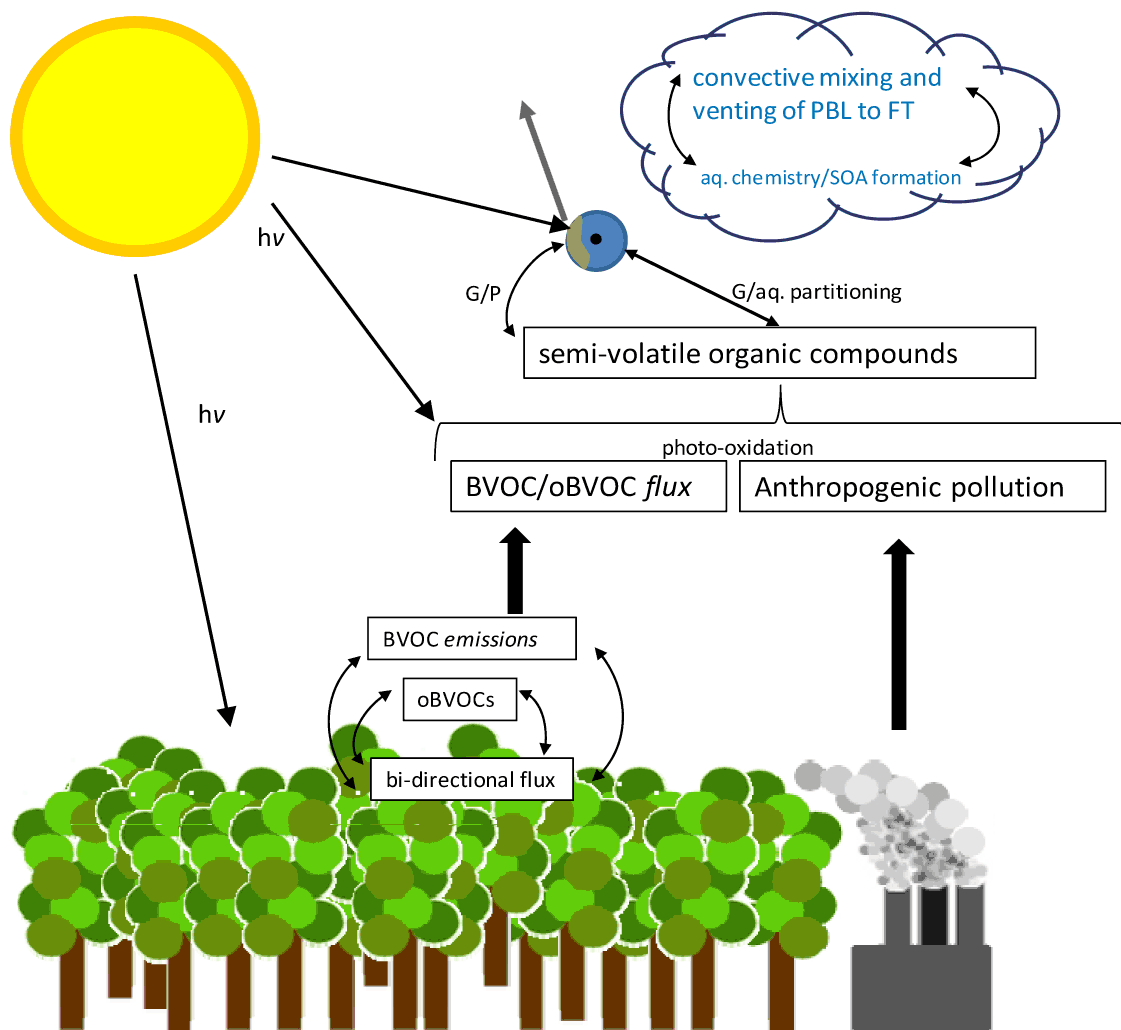
ISFS and ISS
 AVOC, BVOC, RONO₂ – 2DGC
 PAN/MPAN, GC-ECD
 RONO₂ – CIMS
 Hi-vol filter samples SOA tracers
 14C TC, EC, OC
 TD-GCxGC-VUV/EI-HTOFMS w/ and w/o derivitization
 PM₁ and PM_{2.5} – with offline chem. Analysis
 NO₃-API-ToF-CIMS
 EI-HR-MS for I/SVOCs
 Mist chambers
 PILS-AMS-CCN
 HTDMA
 Hourly speciation of org. aerosols and semi-volatiles by SVTAG
 Hygroscopicity SMPS +OPS (similar to DAASS)
 Inorganic ions + TC, Org.N, light absorption spectra of dissolved organics (SJAC-TC/ON)
 Inorg. Ions in gas+ptcl. (URG)
 Organic Aerosol Volatility and Polarity Separator (VAPS)
 CAPS PMex SSA
 GIT SCAPE trailer with PILS-BrnC-WSOC, OCEC, O₃, NO_x, NO₂,
 TEOM, 7λ aetholometer,
 PILS-IC online metals

hygroscopicity SMPS + OPS + computer (similar to DAASS; Stanier et al., 2004)
Aerosol optical properties, absorption, single particle soot with temperature and RH conditioning (2 PAXs, SP2)
Aerosol extinction as a function of wavelength (360 - 420 nm) using cavity enhanced absorption spectroscopy
Aerosol volatility, Thermal Denuder and Condenser
Mist chambers for water soluble gas experiments
Aerosol Phase
SEMS particle size distribution
MARGA gas/aerosol ion chromatography
PSM
TSI CPC
CAGE chambers w/ HR-Tof-AMS, PILS-IC, SMPS, HTDMA, CCNc, APS
ROS-HiVol(1) and PCM (2) filters
f(RH) dry/ambient nephs

Community Modeling Effort

R.Pinder: pinder.rob@epa.gov

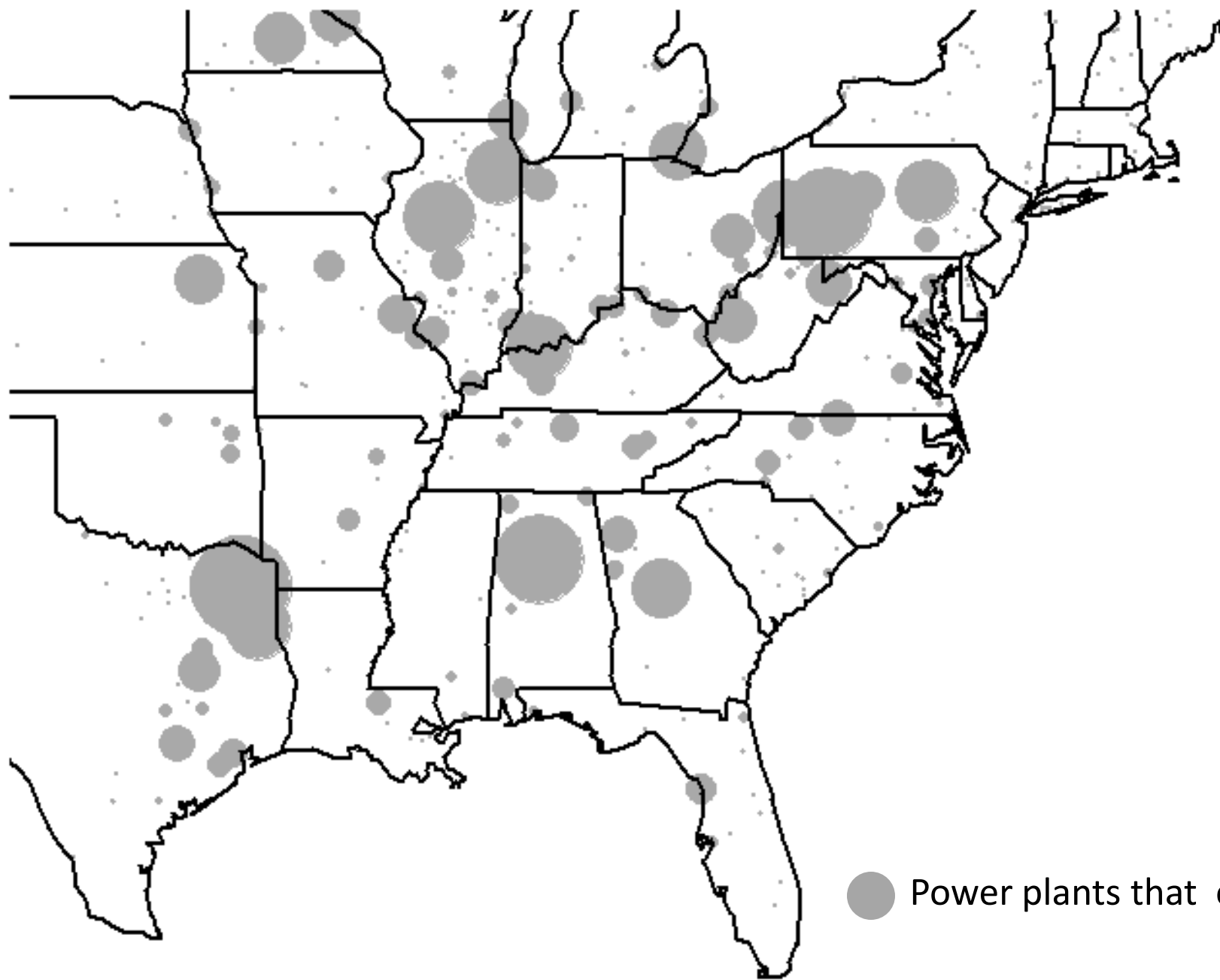
- Common datasets for emissions, meteorology, boundary conditions, and land use / cover for REILLY time period
- Enhances the scientific value of modeling studies because enables inter-comparison
- Saves \$
- Issues:
 - Projection and grid resolution
 - VOC speciation (prefer SAPRC?)



<http://tinyurl.com/SOAS-logistics>

Biogenic emissions and anthropogenic pollution interact and affect atmospheric photo-oxidation chemistry and subsequently air quality and climate.

- Extra information



- Lat and lon of look rock, TN:
- 35°38'0.24"N 83°56'30.12"W:
- 83.9417 35.6334

The National Electric Energy Data System (NEEDS) is the database of existing and planned-committed units which are modeled (as understood by EPA) that are currently operational in the electric industry are termed as “existing” units. Units that are not currently operating but are firmly anticipated to be operational in the future, and have either broken ground (initiated construction) or secured financing are termed “planned-committed”.

Unique fuels

- [1] "Bituminous"
- [2] "Natural Gas, Distillate Fuel Oil (FO)"
- [3] ~~"Hydro"~~
- [4] "Bituminous, Subbituminous"
- [5] ~~"Wind"~~
- [6] "Natural Gas"
- [7] "Distillate FO"
- [8] "MSW"
- [9] ~~"Geothermal"~~
- [10] "Biomass"
- [11] "Fossil Waste"
- [12] "Subbituminous"
- [13] "Waste Coal"
- [14] "Non-Fossil Waste"
- [15] "Petroleum Coke"
- [16] "Landfill Gas"
- [17] "Pumped Storage"
- [18] ~~"Solar"~~
- [19] ~~"Nuclear Fuel"~~
- [20] "Residual Fuel Oil"
- [21] "Natural Gas, Distillate FO, Residual Fuel Oil"
- [22] "Natural Gas, Residual FO"
- [23] "Distillate Fuel Oil, Residual FO"
- [24] "Lignite, Subbituminous"
- [25] "Tires"
- [26] "Lignite"

Regional Investigation of Local and Long-range Chemistry (REILLY)

