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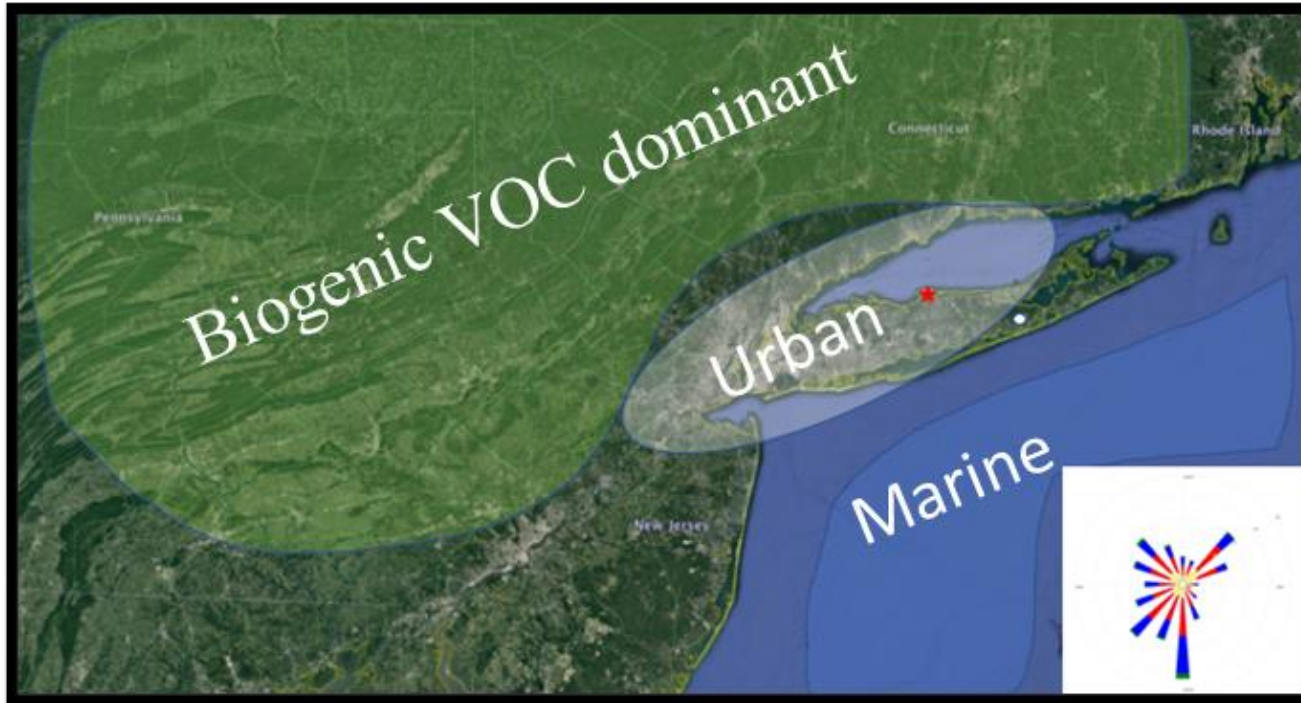
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# GOTHAAM Objectives

Where: New York Metropolitan Area

When: July-August 2023



Summertime winds  
mainly out of South

1. Quantify the relative contributions from various **volatile organic compound (VOC) sources** (biogenic, fossil fuel, combustion, consumer products) and how they contribute to chemical reactivity.
2. Determine the relative potential contribution of each VOC class to **secondary organic aerosol (SOA)** as the anthropogenic plume evolves.
3. Quantify the relative importance of **oxidation pathways** for both gas phase and aerosol species and characterize how processes vary diurnally and between chemical systems (biogenic/urban/marine).
4. Investigate how **nighttime processes** influence next-day chemistry and composition.

# GOTHAAM C-130 Payload and Mission Plan

Instrument	Measurement
CIMS (CU)	OH, HO <sub>2</sub> , RO <sub>2</sub> , H <sub>2</sub> SO <sub>4</sub>
I-CIMS (UW)	VOCs, oxidation products, chlorinated species, ClNO <sub>2</sub> , Cl <sub>2</sub> , HONO, N <sub>2</sub> O <sub>5</sub> , etc
PTRTOFMS Vocus (UW)	VOCs (VCPs, VOC <sub>ff</sub> , BVOC)
Mini WAAS (ACOM)	VOCs
TOGA-TOF (ACOM)	Organic gases
ISAF (UMD/NASA)	CH <sub>2</sub> O
Fast NO <sub>x</sub> , NO <sub>y</sub> , O <sub>3</sub> (ACOM)	NO <sub>x</sub> , NO <sub>y</sub> , O <sub>3</sub>
PANs (ACOM)	PAN
Picarro (ACOM)	GHG/CO/SO <sub>2</sub>
ATOFMS (UM)	Individual particle composition, including sea salt
AMS (CSU)	SOA composition
TRAC (SBU)	Aerosol impaction collector
UHSAS, cloud probe	Aerosol size distributions

- 100 flight hours (12 – 14 flights)
- 40% nighttime/sunrise flights
- Most flying in the boundary layer or lower free troposphere. Missed approaches likely, full spirals unlikely.
- Potential for direct emission and deposition measurements via eddy covariance

# GOTHAAM and TEMPO Opportunities

- Validation of  $\text{NO}_2$ ,  $\text{CH}_2\text{O}$ , near-surface  $\text{O}_3$ , and aerosol products (horizontal and vertical variability, high-density observations)
- Ozone production regimes ( $\text{HCHO}/\text{NO}_2$ )
- $\text{NO}_x$  lifetime (direct measurements of OH and speciated  $\text{NO}_y$ )
- Relationship between HCHO and VOC oxidation
- Quantification of  $\text{NO}_x$  and VOC emissions, ozone deposition
- Relationships between aerosol optical properties and composition
- Novel applications of “night lights”