

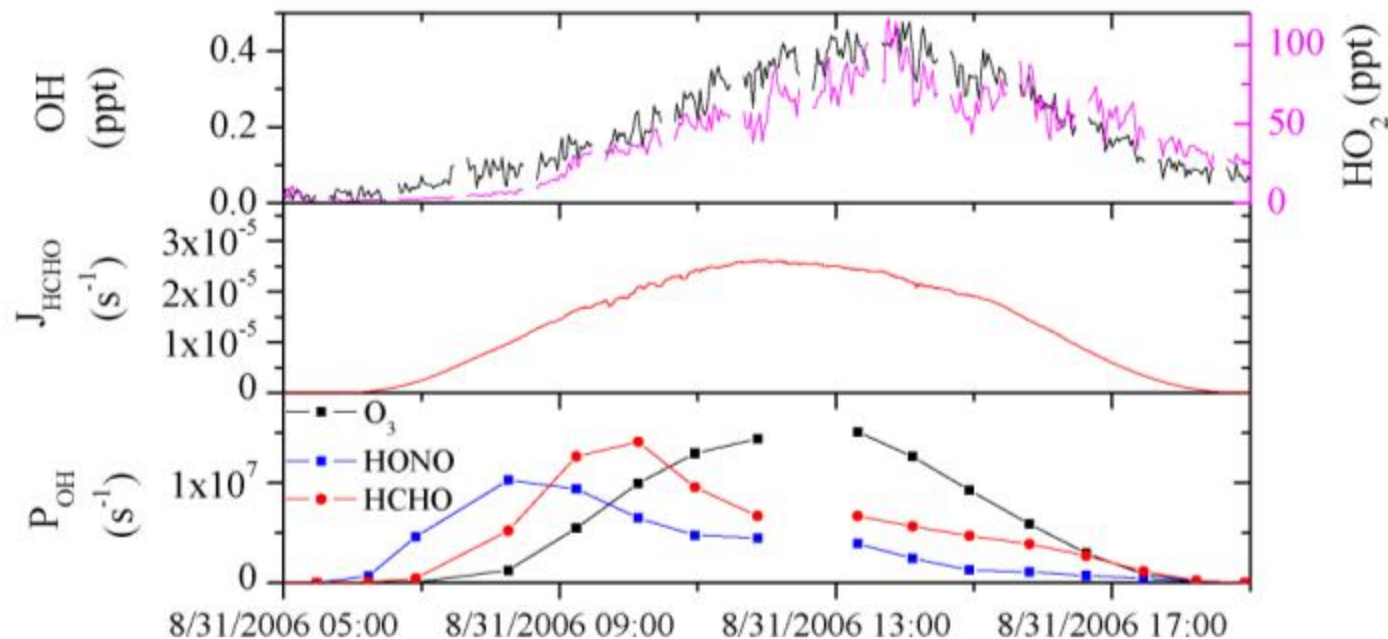
Formaldehyde Fluxes from Industrial Sources in Houston

Jochen Stutz, UCLA

George Mount, WSU

Barry Lefer, UH

HCHO is important for the radical budget in Houston

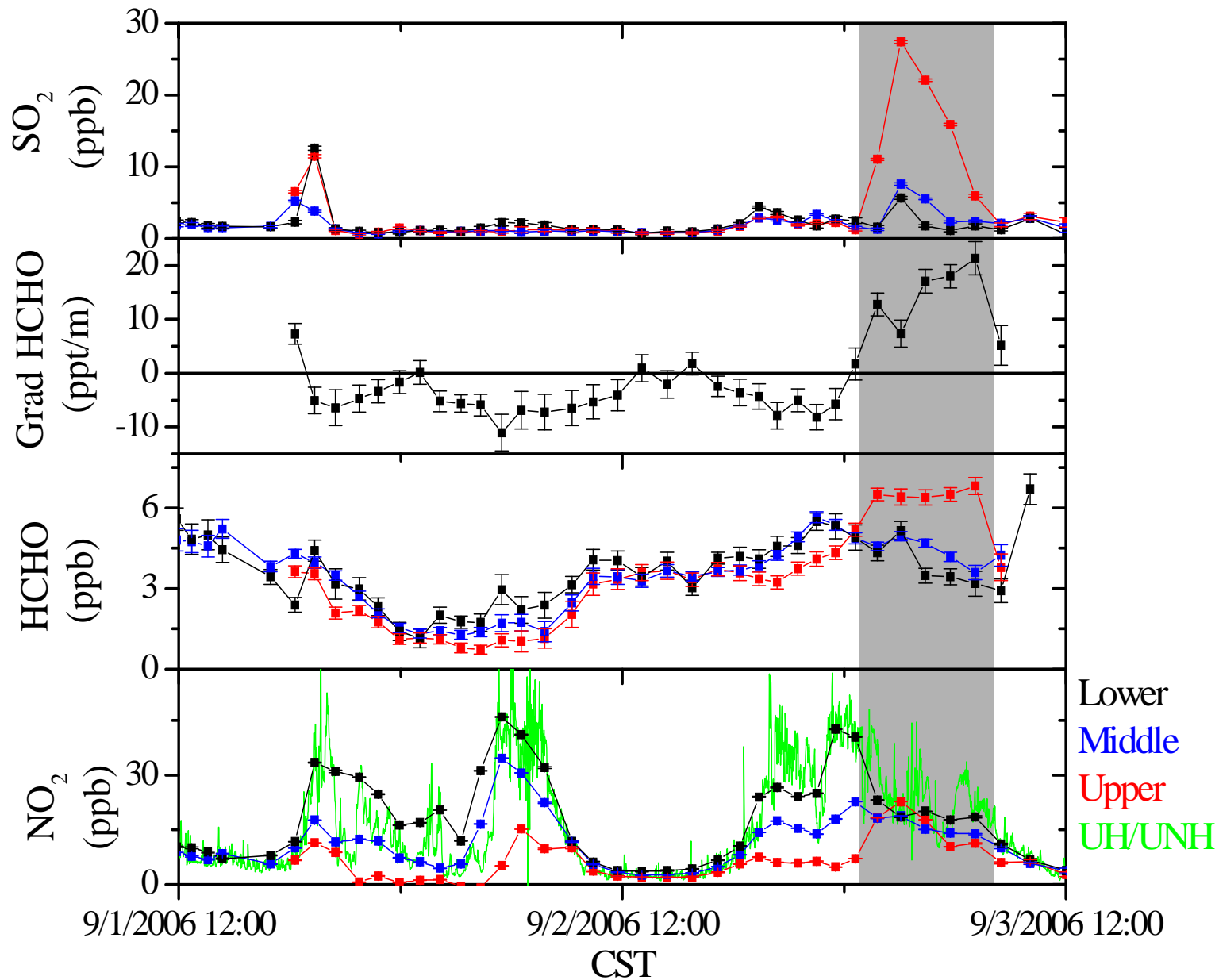


Direct sources are poorly defined for the Houston area.

TERC-SRP (sections 1.3, 4.2, and 6.2) calls for a better determination of the HCHO emission fluxes in Houston:

“direct measurements of formaldehyde from operational flares”

Observation of HCHO Plumes during TRAMP 2006

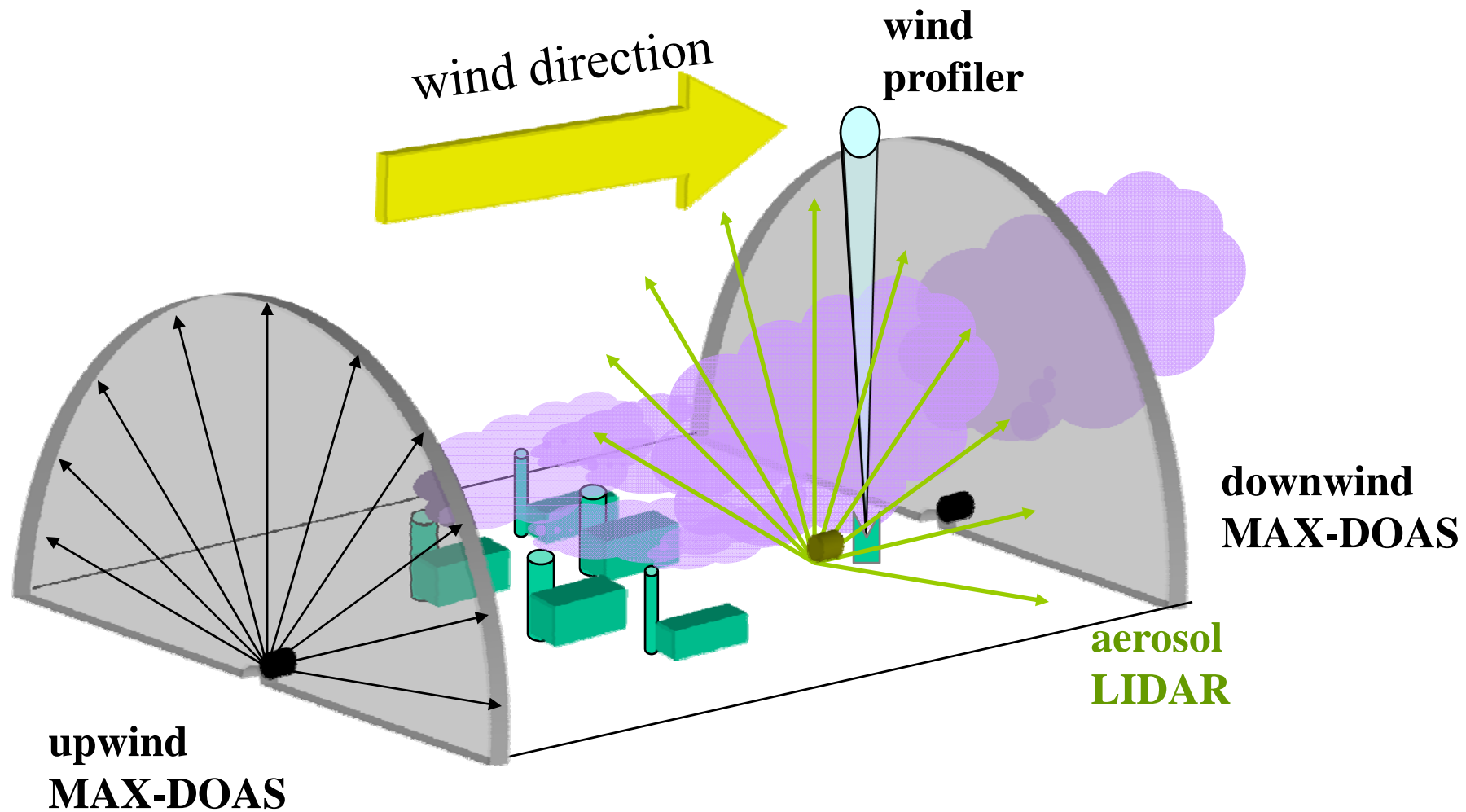


Measure the flux of formaldehyde from sources (e.g. flares, refineries) near the ship channel in Houston, TX

- 1. Area-average flux from large number of facilities in the ship channel (UCLA, WSU)**
- 2. Flux from individual flares and other point sources (UCLA, UH)**

Activities are part of Formaldehyde and Olefin from Large Industrial Sources (FLAIR) project.

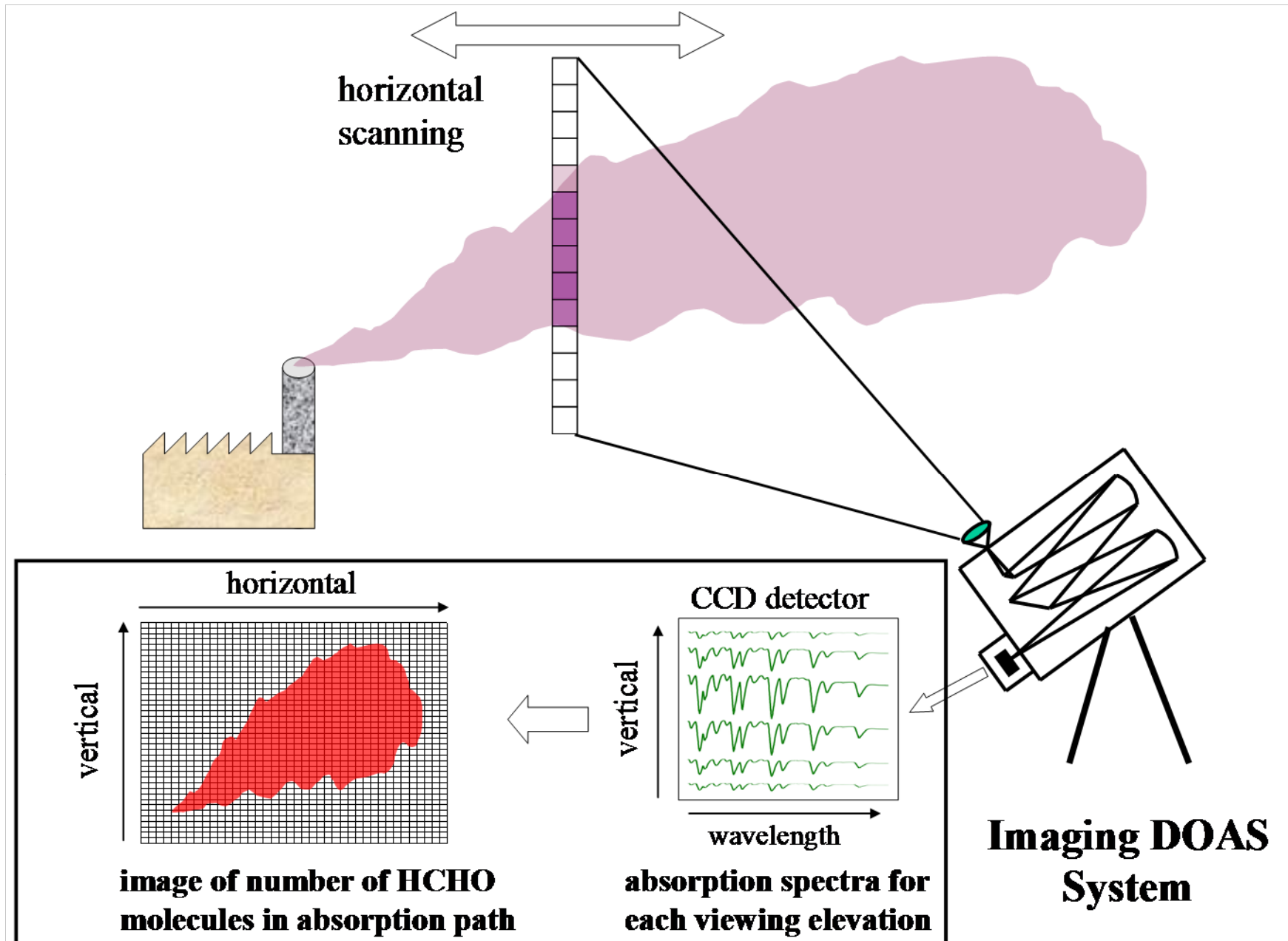
Overall goal: Improve Houston radical budget by providing accurate emission fluxes for HCHO



- Setup of two stationary Multi-Axis DOAS instruments, a wind profiler, and an aerosol LIDAR during 2009 field intensive to determine the area-averaged HCHO flux between the two vertical slices (~10km wide and ~5km high).
- Location of instruments will be determined based on consultations with local authorities and modeling community.
- Exploratory horizontal scans to study the distribution of sources located between the two instruments and the LIDAR are planned.
- Collaborative Project between UCLA and WSU.

Benefits / Deliverables

- Measurement provides unique view on HCHO emissions in ship channel over a 1 month period.
- Fluxes can be directly incorporated as emissions into Houston airshed model.
- Prototype measurements for possible future HCHO emission monitoring.



- Development (2008) and deployment (2009 and after) of Imaging DOAS instrument to measure integrated HCHO concentrations across a single plume.
- I-DOAS is an accurate remote sensing instrument. Plumes can be up to 2 km away from instrument. Access to source not necessary!
- Instrument will be portable (30 pounds), mobile (mounted on tripod), and operate on batteries or a small generator.
- Collaborative Project between UCLA and UH.

Benefits / Deliverables

- Novel method to remotely monitor single point sources of HCHO, HONO, NO₂, and SO₂.
- Portability will allow the monitoring of many sources. The statistics on these emissions will be incorporated as emissions into Houston airshed model, improving the estimate of the radical budget and ozone levels.

- Determination of HCHO emission fluxes are needed to improve the description of the radical budget and the ability to model ozone formation in Houston .
- Remote sensing methods are ideally suited to quantify these fluxes.
 - Dual MAX-DOAS approach measures an area-averaged HCHO flux over an extended time period.
 - I-DOAS measures the emission flux from a single point source at a given time.
- The combination of both approaches will give unique information on the role HCHO emissions play in Houston.