Wilmington Tracer Studies

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- Objective
- Background
- Approach
- Results

California Air Resources Board

Objective

To develop methods to estimate the impact of elevated (power plant) and surface sources in Wilmington on air quality in the surrounding community

Sponsored by the California Air Resources Board (ARB) and the California Energy Commission (CEC)

Communities Next to Roads

Small Neighborhood Businesses among Residences

Major Industrial Activities

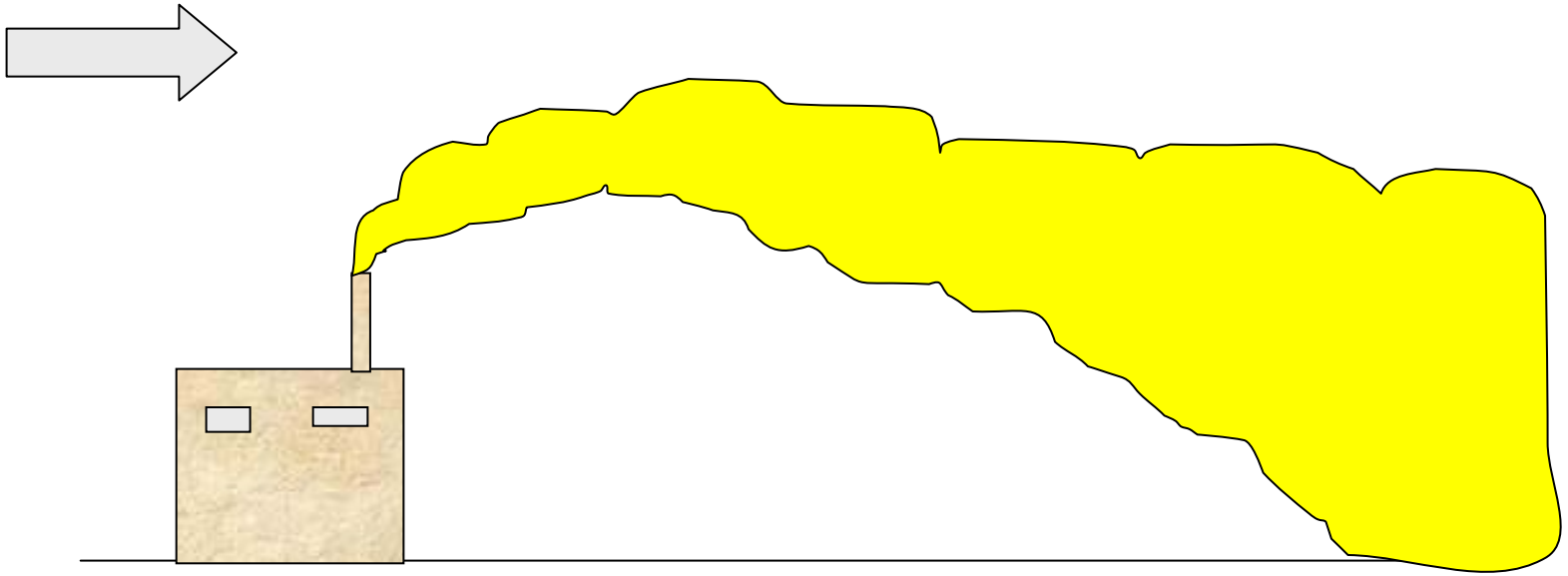
LADWP Power Plant

Background

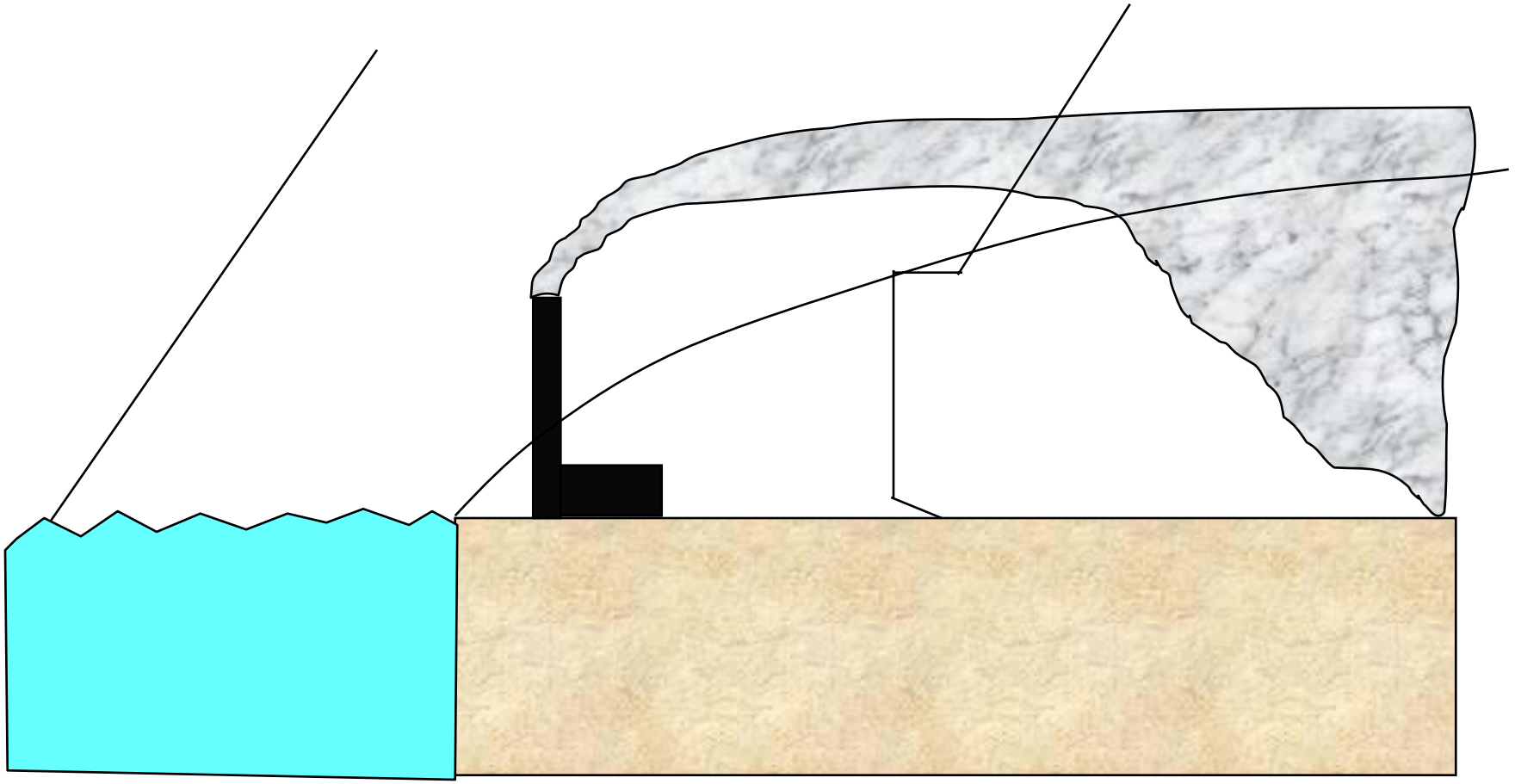
Impact

- increases with emission rate
- decreases with wind speed
- decreases with size of plume

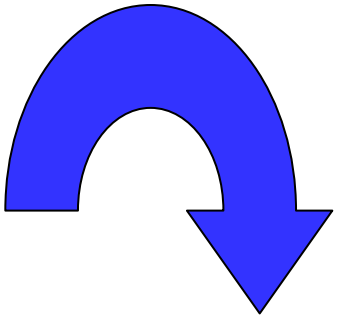
Wind



Shoreline Dispersion



What do we measure ?



- Dilution rate
  - Sampler concentrations
- Dimensions of plume
  - Sampler concentration patterns
- Winds and temperatures
  - Meteorological instrumentation

Approach

- Release harmless tracer from source
- Sample tracer at locations in the community
- Figure out how material was transported
- Summarize observations into method (model) that can used to estimate air quality impact of any source

Tracer Studies

- Conducted tracer studies in Wilmington, LA to obtain data on dispersion from near surface and elevated releases in urban areas
  - August 26th to September 10th 2004- 8 days
  - June 24th to June 28th 2005- 4 days

Acknowledgements

Special thanks to:

- Marla Mueller, CEC
- Vlad Isakov, ARB
- Jesse Marquez, community representative
- The Los Angeles Department of Water and Power
- The Los Angeles Sanitation District

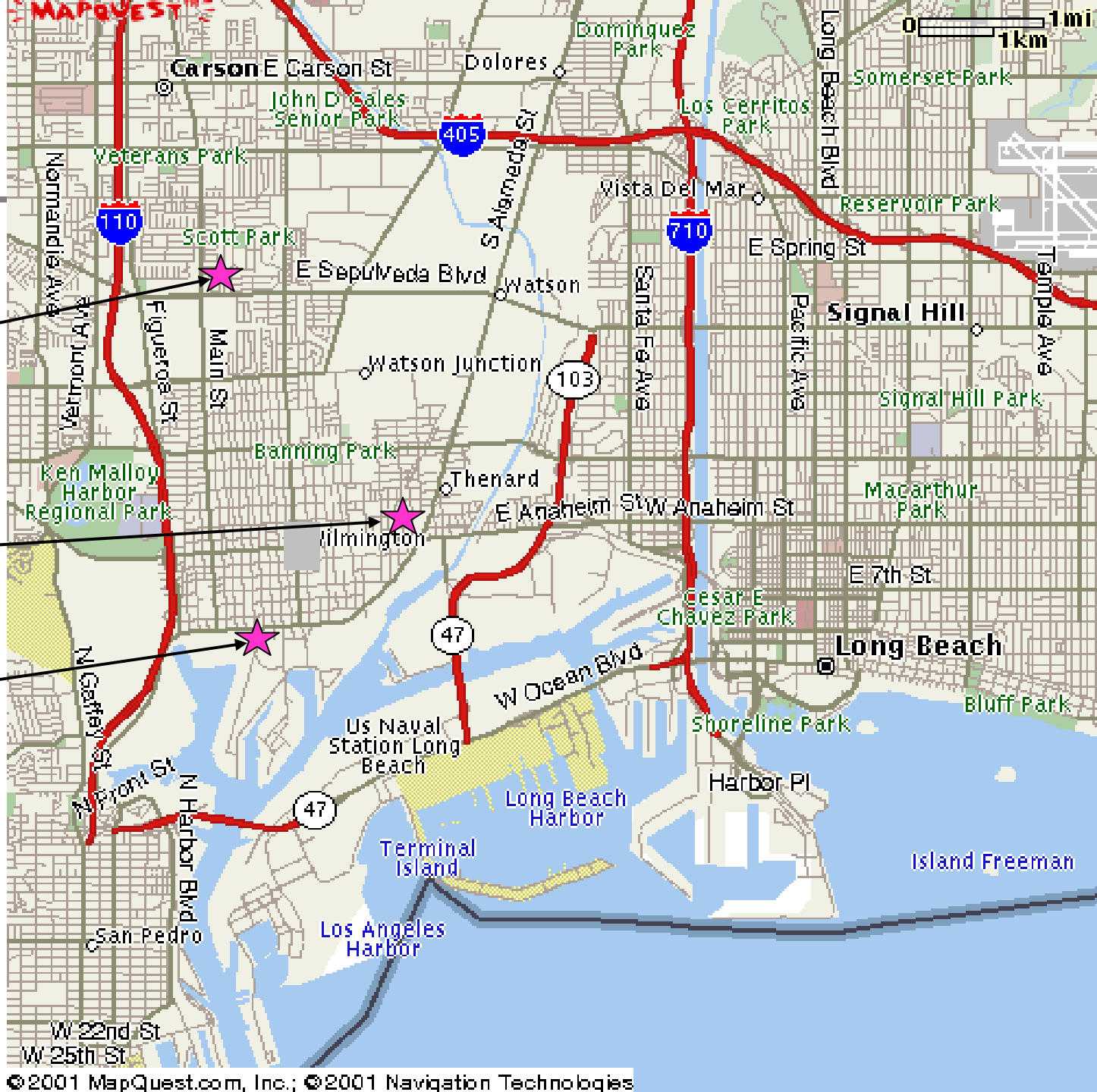
We appreciate the help from the residents and business owners who participated in the studies

Map of the study area: Wilmington / Long Beach

Locations of sodar and sonic tower

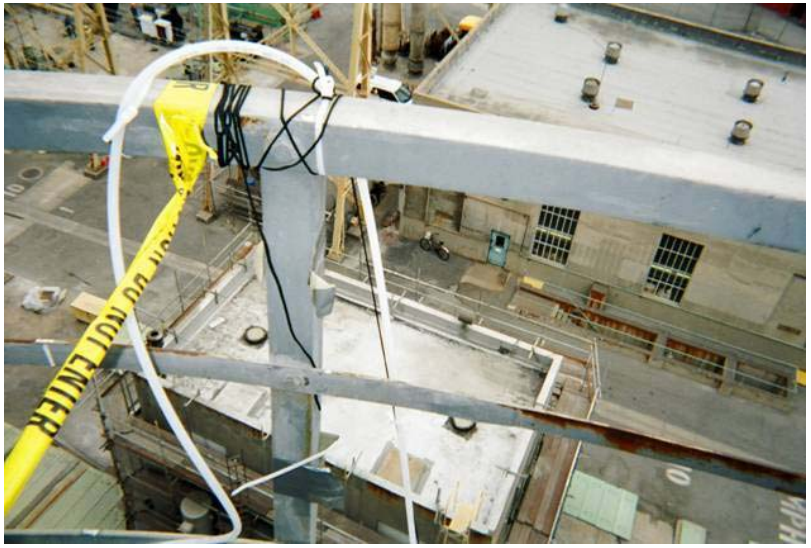
Wilmington Park Elementary School

LADWP tracer release sonic mini-sodar



Wilmington Surroundings

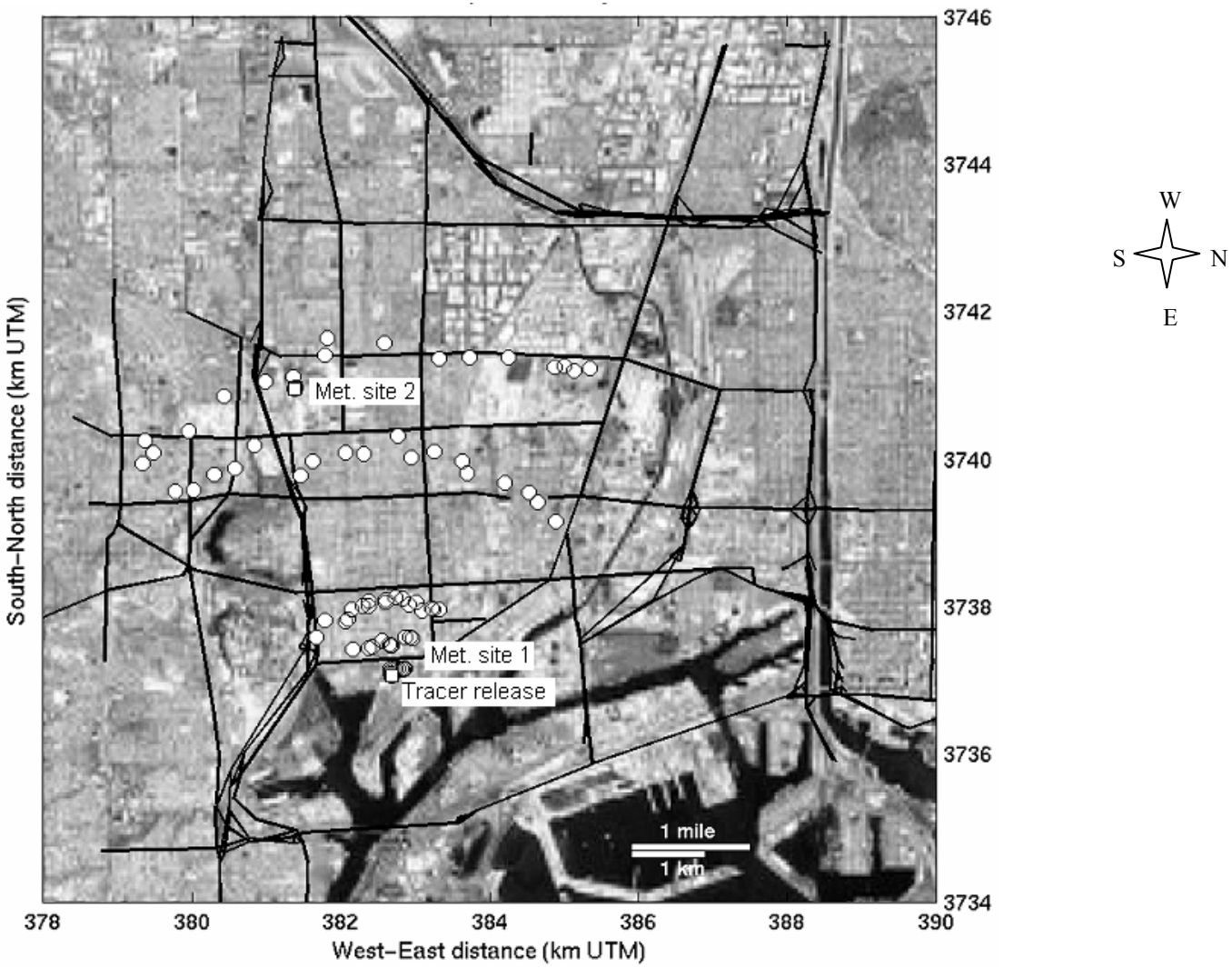
Tracer Release



Project team at the release site

Sampling System

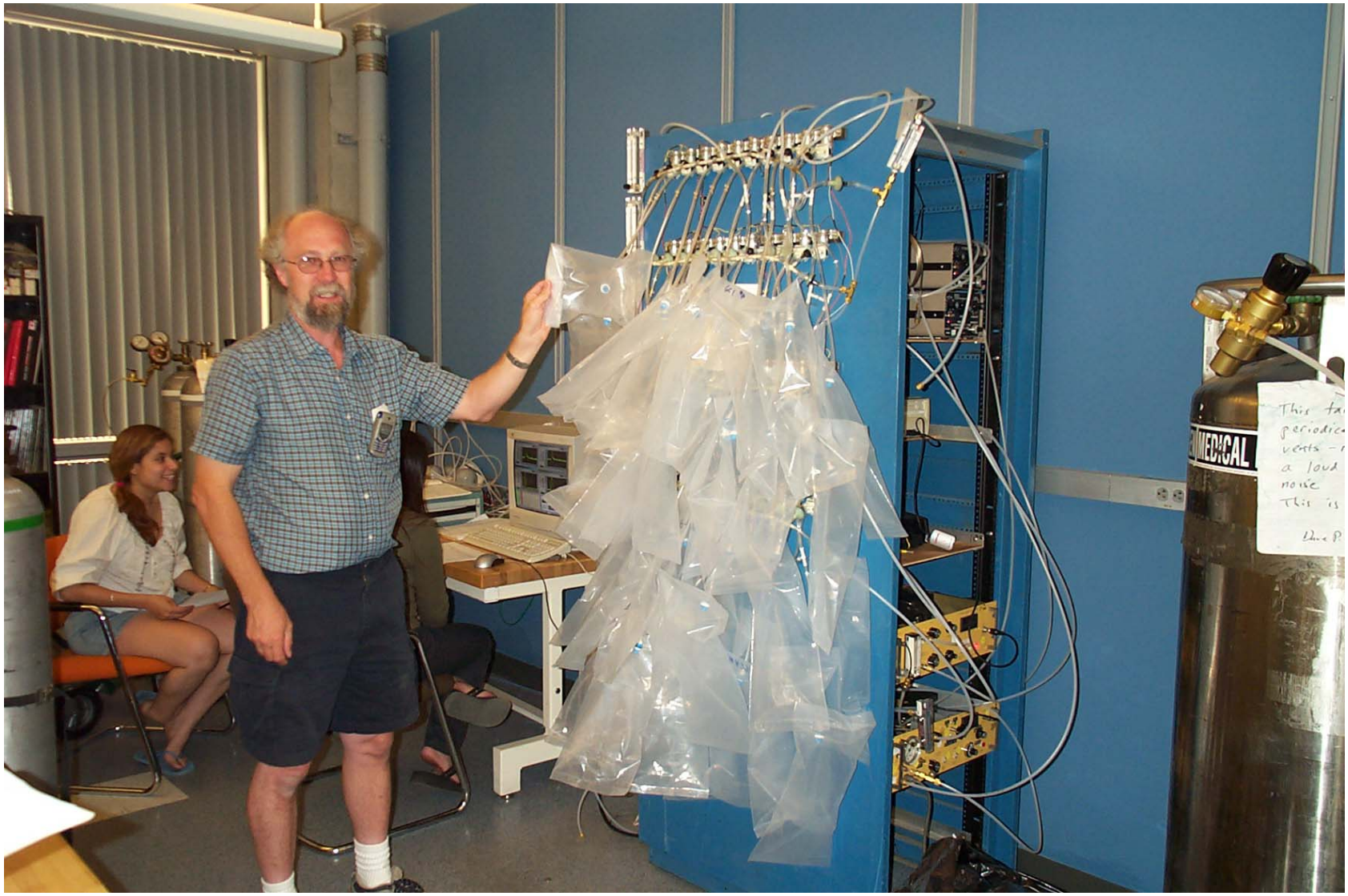
The locations of samplers



72 Sampler Locations Provided by Wilmington Residents and Businesses

Stationary Tracer Sampler

Tracer Bag Analysis - UCR Lab



The Lab at UCR

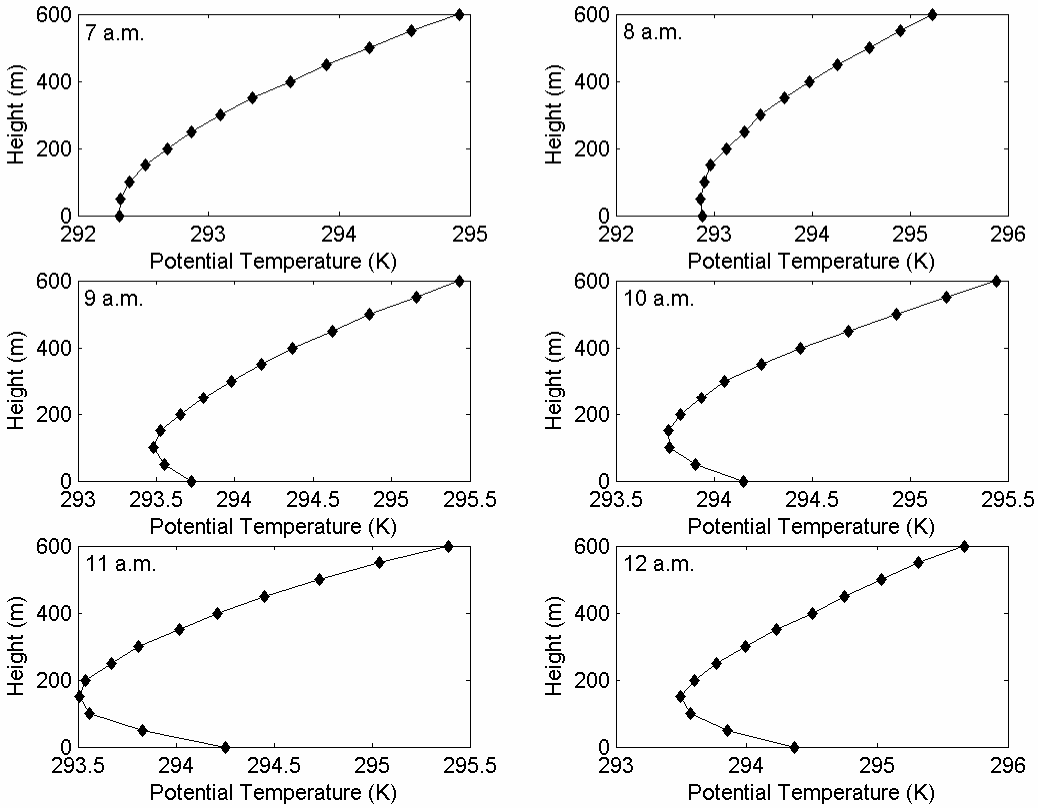
Meteorological Measurements

CE-CERT Parking Lot

Dugway Experiment

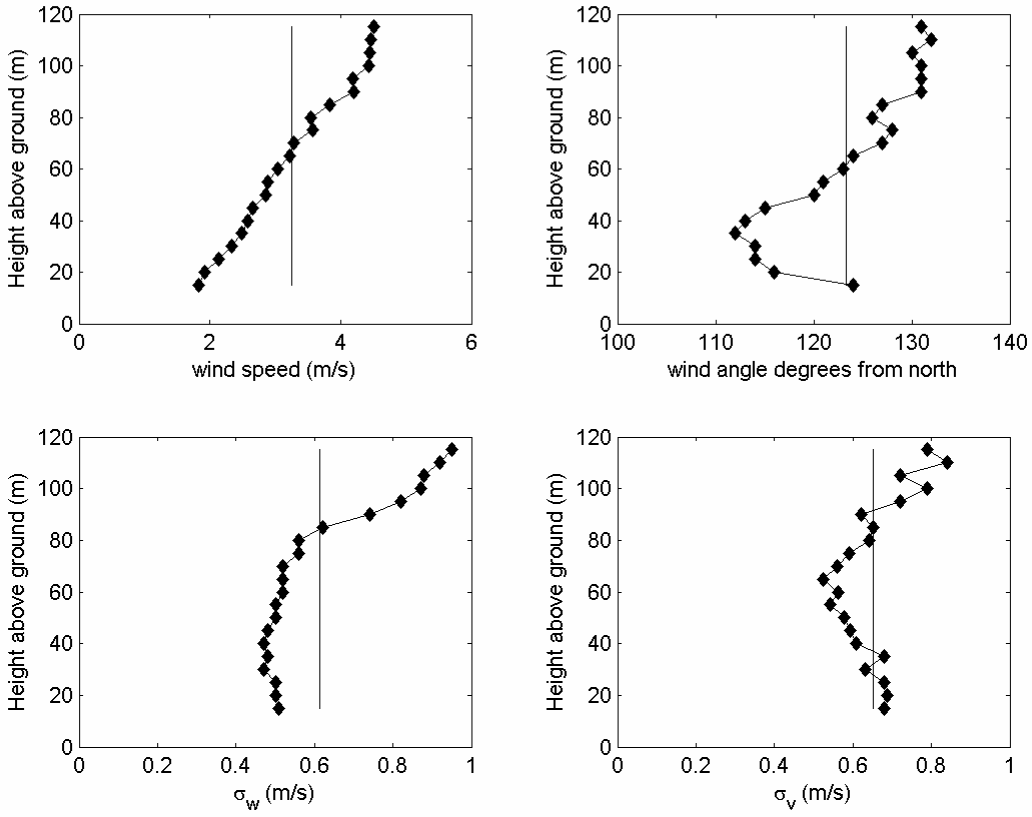
Temperature Sensor and Sodar at the JWPCP site

Temperature Profiles

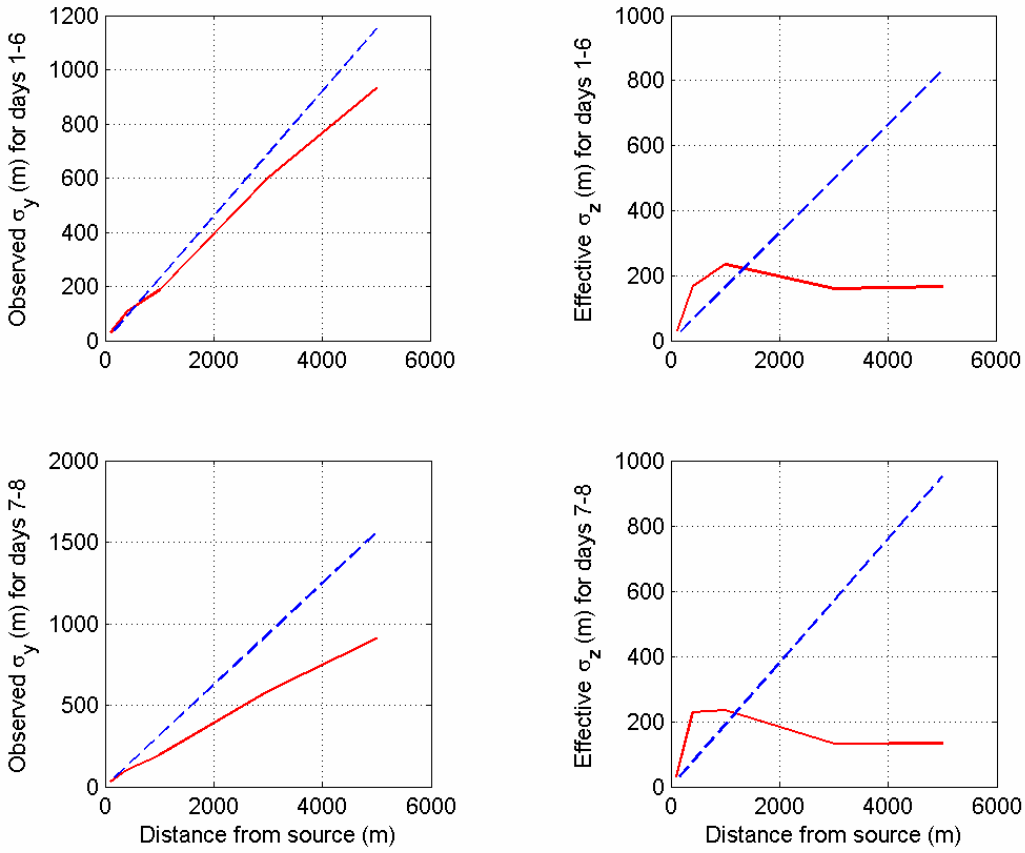


Sonic and mini-sodar at the LADWP site

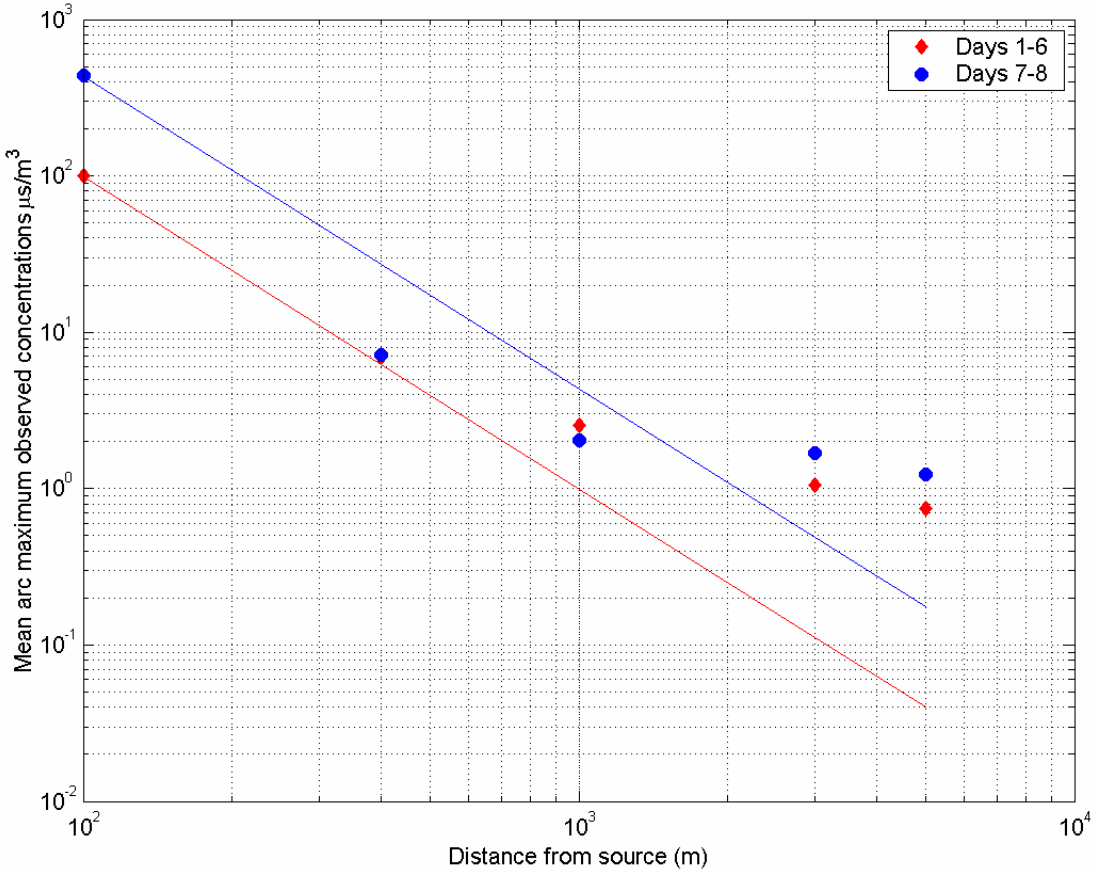
Meteorological Profiles



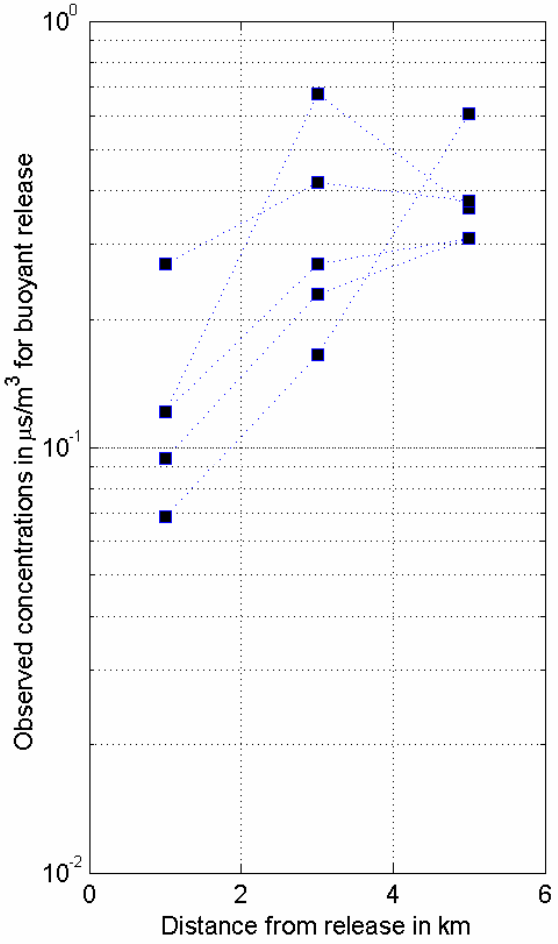
Plume Spread

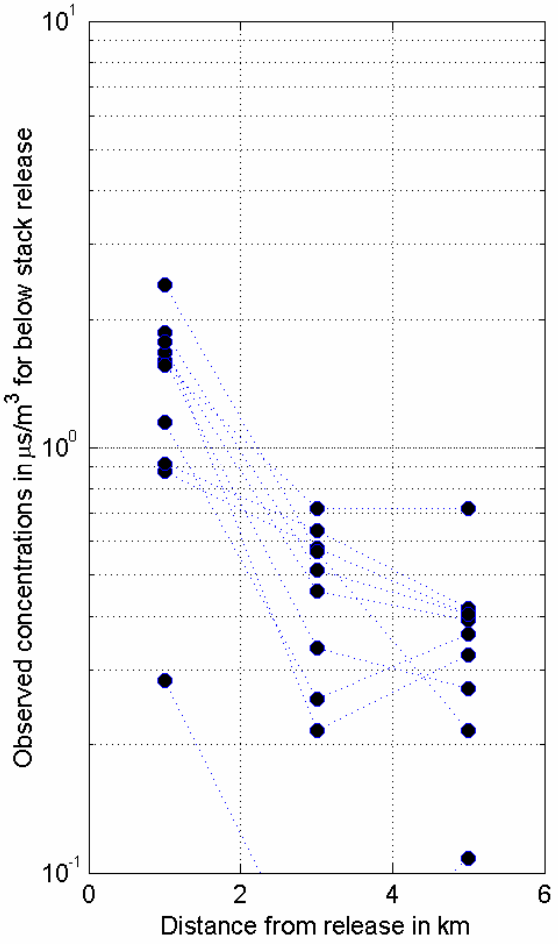


Results from Wilmington 2004 Shoreline Study



Results from Wilmington 2005 Shoreline Study





Conclusions from Field Studies

1. Observed dilution rates range from 100 $\mu s/m^3$ at 100 m to 1 $\mu s/m^3$ at 1000 m
2. Elevated sources have a maximum impact of 1 $\mu s/m^3$ at 5000 m
3. We can make estimates of the impact of sources if local meteorology is measured

The Players

- Over 25 students and staff involved in the study
- Volunteers from Wilmington

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