

DEVELOPMENT OF TWO MOBILE MEASUREMENT STATIONS FOR AMBIENT AIR TOXIC MONITORING IN COMMUNITIES

Andrea Polidori*



South Coast Air Quality Management District (AQMD)
21865 Copley Dr, Diamond Bar, CA 91765

*apolidori@aqmd.gov

INTRODUCTION

Background

- Multi-year Community-Scale Air Toxics Monitoring grant from EPA (November 2008)

Specific Objectives

- Develop two rapidly deployable mobile measurements stations (MMS) for ambient air toxics monitoring
- Characterize ambient air toxics levels in communities surrounding LAX and LGB
- Supplement a concurrent LAWA air quality study by providing additional capabilities for air toxics monitoring

MOBILE MEASUREMENT STATIONS DEVELOPMENT

MMS Characteristics

- Fast-response deployment
 - *Wide spatial coverage and rapid adjustment*
- Flexibility of operation
 - *Land-based power and self-contained generator or battery power*
- Gaseous and particulate pollutants characterization
- Multiple monitoring technologies
 - *Continuous (e.g. 1- to 5-min)*
 - *Integrated (e.g. 24-hr)*
- Address AQMD and community concerns
 - *Local impacts of pollution sources*

MOBILE MEASUREMENT STATIONS DEVELOPMENT

Particulate Matter

Gaseous Species

Wind System

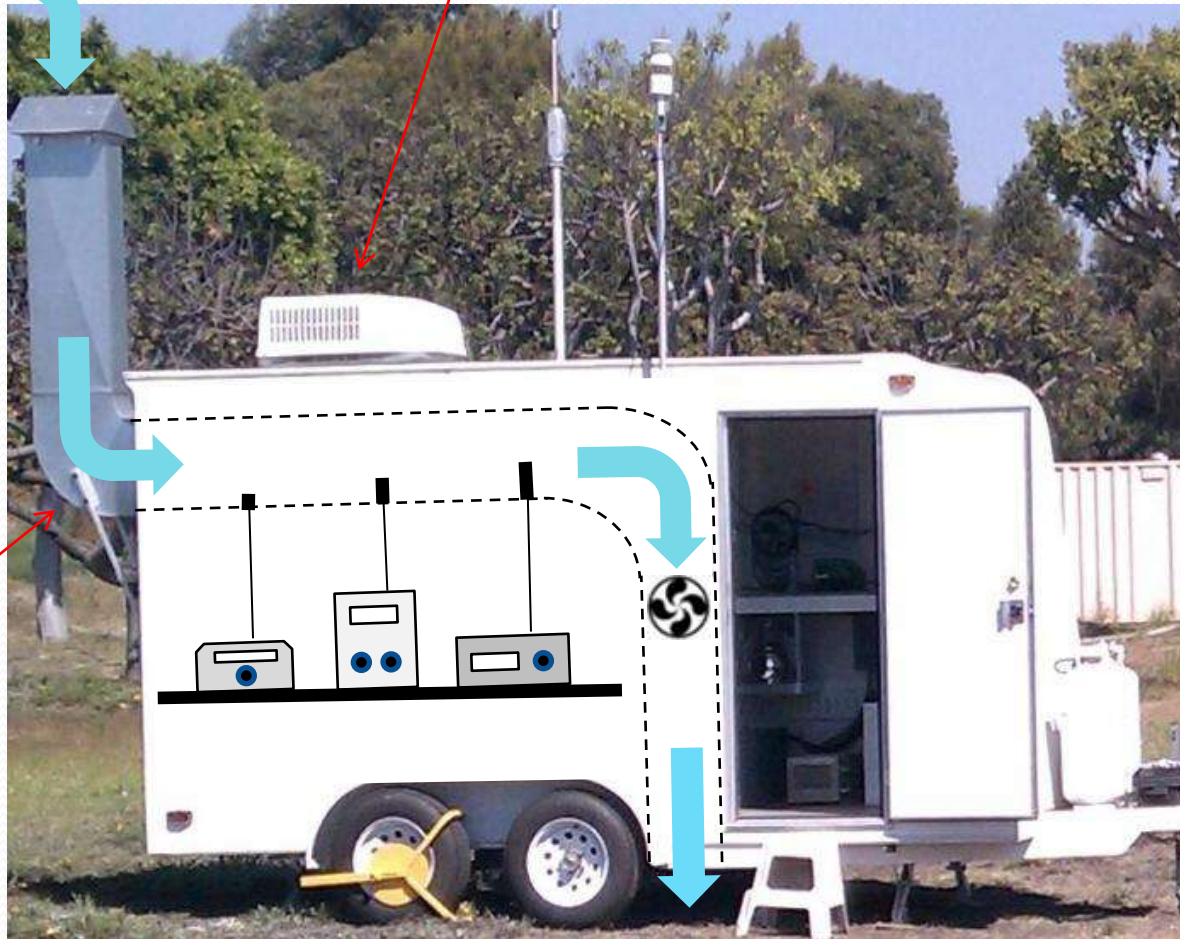


MOBILE MEASUREMENT STATIONS DEVELOPMENT

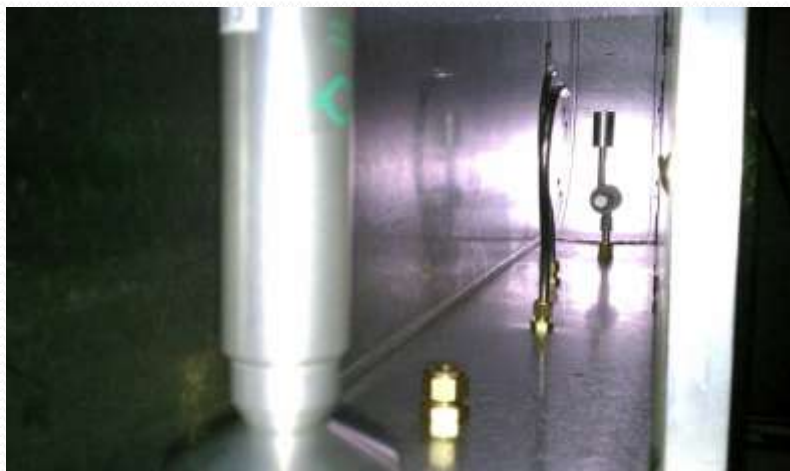
Air flow
(adjustable)

Air conditioner

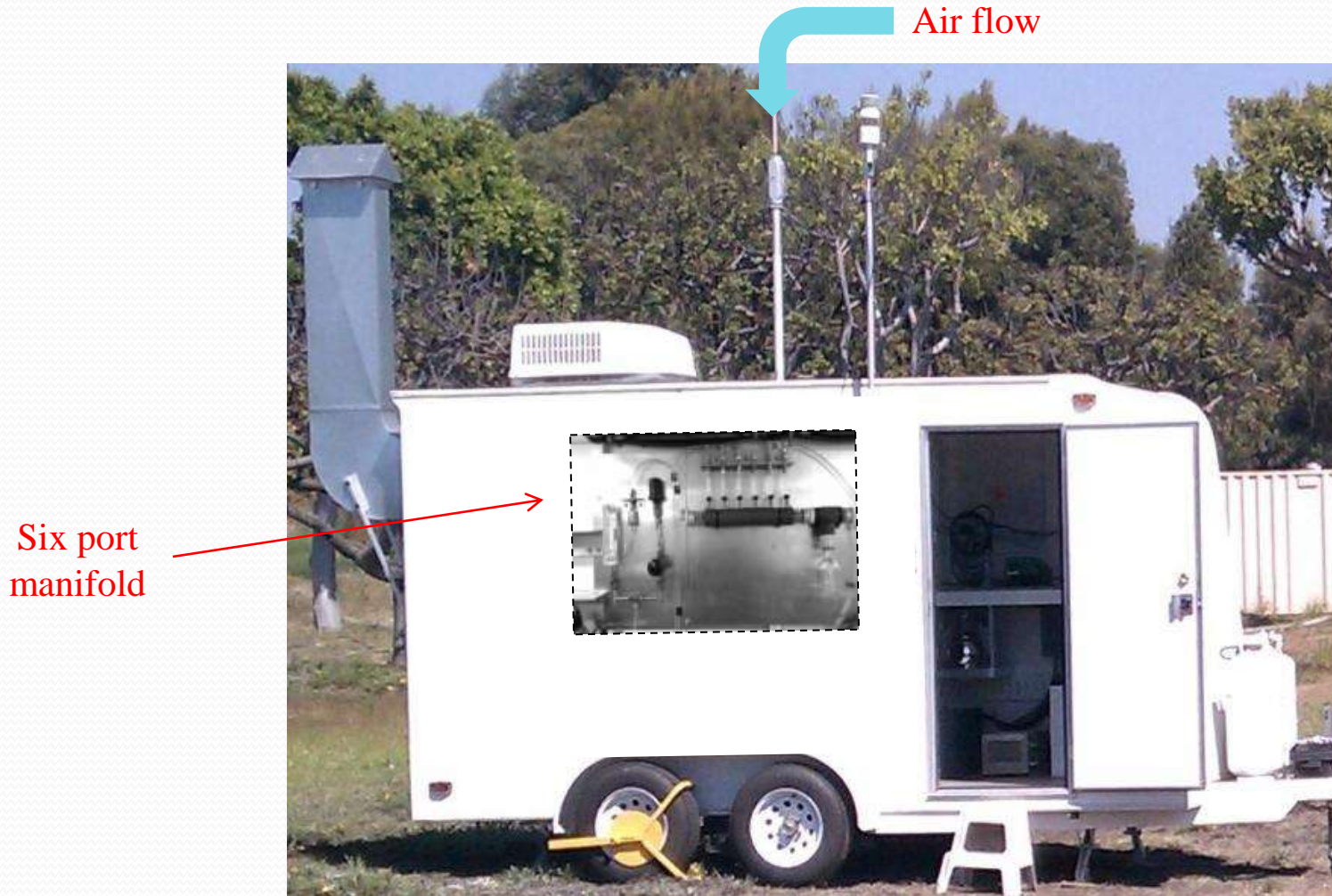
HVAC duct
(8" x 16")



MOBILE MEASUREMENT STATIONS DEVELOPMENT



MOBILE MEASUREMENT STATIONS DEVELOPMENT



Power options: Shore power, Battery bank, and Propane generator; (Solar panels)

MOBILE MEASUREMENT STATIONS DEVELOPMENT

Instrumentation

- Continuous

- *DustTrak DRX (TSI, Inc.): PM_{1} , $PM_{2.5}$, PM_{4} , PM_{10} , and TPM ($\mu\text{g}/\text{m}^3$)*
- *w-CPC (TSI, Inc.): UFP ($\#/ \text{cm}^3$)*
- *Aethalometer (Magee, Inc.): BC ($\mu\text{g}/\text{m}^3$)*
- *NOx Monitor (2B Technologies): NO, NO₂, and NOx (ppb)*
- *Baseline-Mocon Series 9000 (Mocon, Inc.): Methane and NMHC (ppm)*
- *Syntech Spectras GC (Syntech, Inc.): Individual organic compounds*
- *Q-Trak (TSI, Inc.): CO and CO₂*
- *Weather Station (Climatronics, Inc.): T, RH, WS, WD, and P*

- Integrated

- *BGI (Omni, Inc.) filter-based PM sampler*
 - *Speciated analysis*
- *Xontech multi-canister sampling (Xontech, Inc.)*
 - *VOCs*

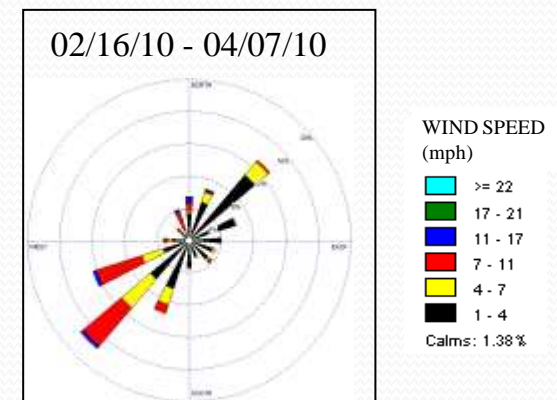
MOBILE MEASUREMENT STATIONS DEVELOPMENT



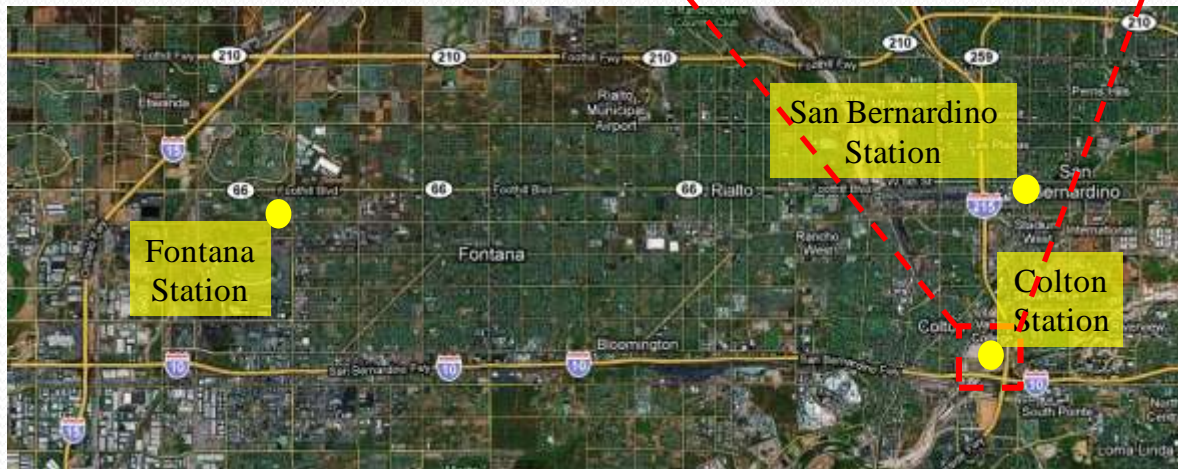
AIT TOXICS MONITORING IN COLTON



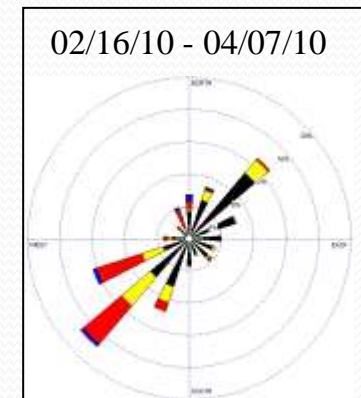
- **Sampling location:** proposed recreational park
- **Sampling period:** 02/16/10 to 04/07/10
- **Objective:** determine I-10 / I-215 emission contributions
- **Pollutants measured:** PM₁₀, UFP, and BC



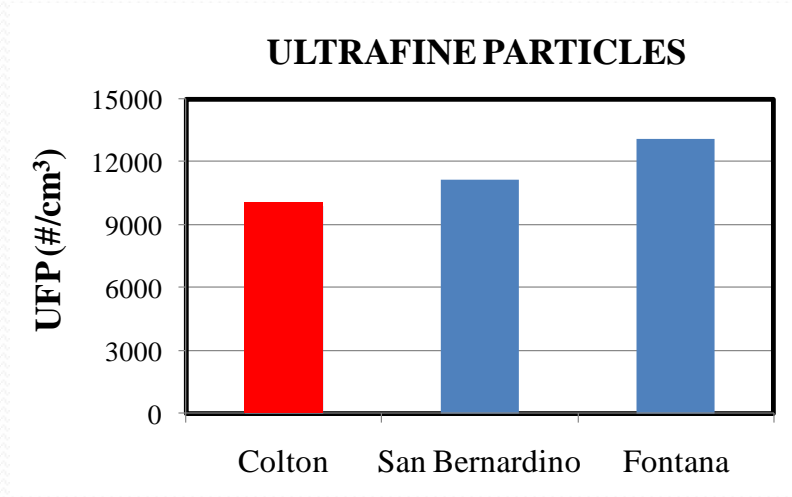
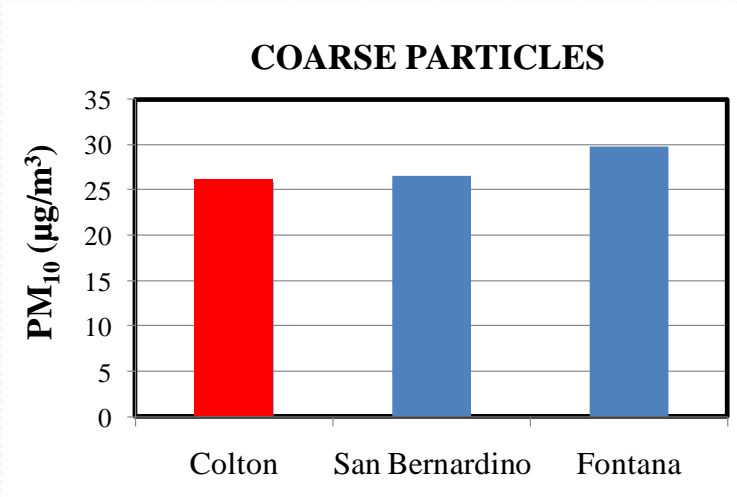
AIT TOXICS MONITORING IN COLTON



- **Sampling location:** proposed recreational park
- **Sampling period:** 02/16/10 to 04/07/10
- **Objective:** determine I-10 / I-215 emission contributions
- **Pollutants measured:** PM₁₀, UFP, and BC



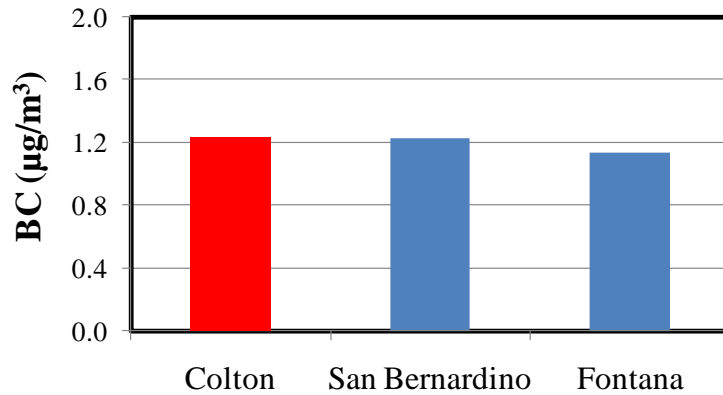
AIT TOXICS MONITORING IN COLTON: RESULTS



- PM₁₀ Colton < PM₁₀ San Bernardino < PM₁₀ Fontana (background) < PM₁₀ MATES III (37.0 µg/m³) <<< NAAQS (150 µg/m³)
- UFP Colton < UFP San Bernardino < UFP Fontana (background) < UFP South Coast Air Basin

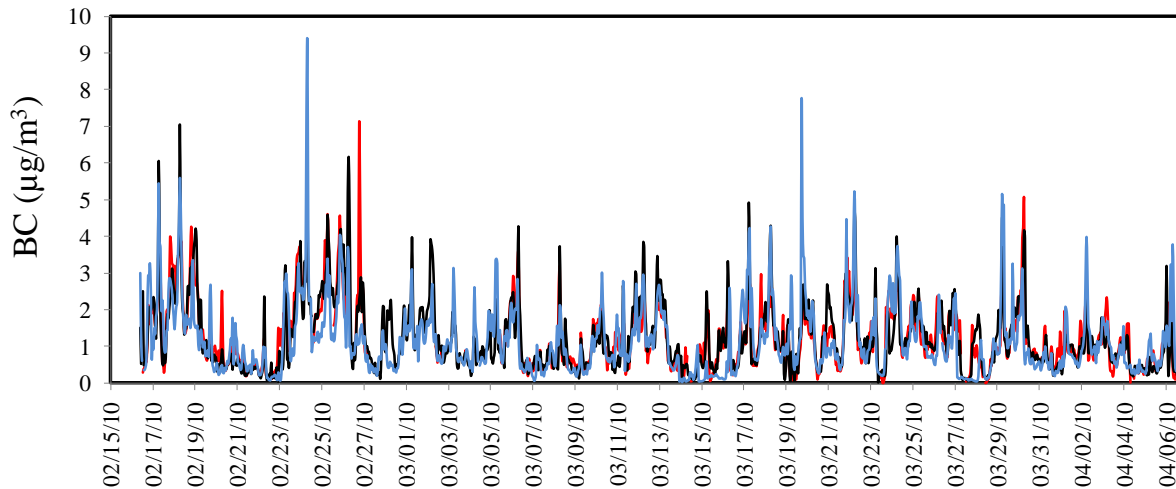
AIT TOXICS MONITORING IN COLTON: RESULTS

BLACK CARBON

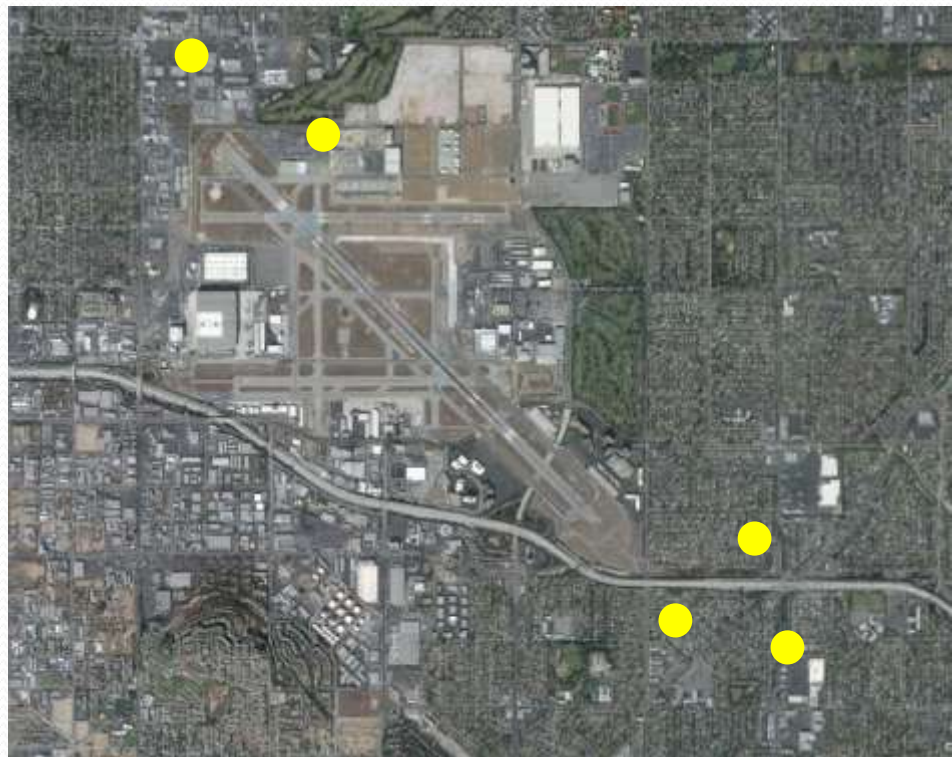


- BC Colton ~ BC South Coast Air Basin
- BC at all three sampling sites tracked each other well

— Colton — San Bernardino — Fontana



FUTURE WORK: LGB Airport Study Plan



Objectives

- Air toxics levels in LGB communities
- Concentration gradients driven by proximity to LGB
- Area impacted by aircraft emissions and airport activities
- Freeway contributions
- Baseline data for longer term measurements

Part of EPA funded community-scale air monitoring grant

SUMMARY

- Two MMS for fast response deployment in communities of the South Coast Air Basin were successfully developed
- One of the MMS was tested at a proposed recreational park in Colton. Measured air pollution levels were typical for the region
- A follow-up study will be conducted in 2011 during different seasonal conditions
- The two MMS will soon be deployed at LGB and LAX

ACKNOWLEDGEMENTS

Steve Boddeker, Richard Parent and the SCAQMD Special Monitoring group