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Task 1.3: Surface and Upper-air Meteorological Representativeness in the San Joaquin Valley

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Presented to:
CRPAQS Data Analysis Workshop
Sacramento, CA
March 9-10, 2004

Introduction

- Many air quality monitoring sites in the San Joaquin Valley are not collocated with meteorological data
- Surface and upper-air measurements may not be representative of conditions at nearby air quality monitoring sites
- Goal: Develop a method for estimating the spatial “representativeness” of the surface and aloft meteorological measurements (Area of representativeness = spatial extent around an observation where that observation is considered to be valid)

Approach

- Use wind data from winter 2000-2001
 - Surface data from 2-m and 10-m towers
 - Upper-air data from wind profilers
- Calculate seasonal averages by time of day (morning, afternoon, night) and atmospheric layer (surface, ~100 to 800 m, 800 to 1600 m, and greater than 1600 m)
- Create Representativeness Index of all meteorological monitoring sites in domain for each time of day and atmospheric layer

Representativeness Index

- Defined an index that ranged from 1 to 3:
 - 1 = Most Representative
 - 2 = Representative
 - 3 = Not Representative
- Used a GIS weighting scheme based on several parameters:
 - Distance
 - Elevation
 - Slope of terrain
 - Average wind speed
 - Average wind direction
 - Atmospheric layer heights
- Created web site with tool to use Representativeness Index (Site Search, Maps)

Web Site – Site Selection

Results - Microsoft Internet Explorer

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Address <http://www.sonomatechdata.com/crpaqsmetrep/SiteSearch.cfm> Go Links >>



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You searched for fedl

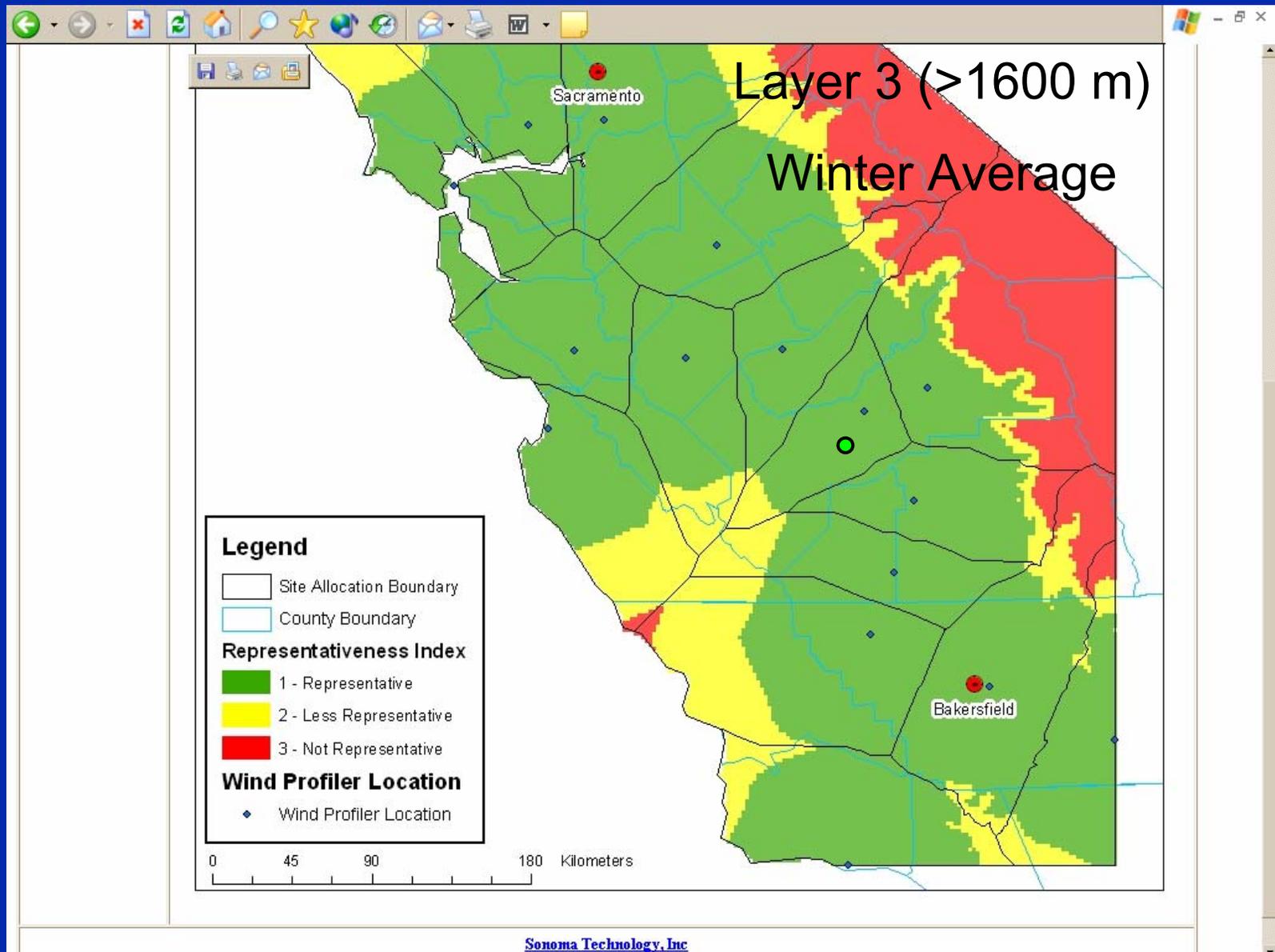
Station Code	Station Name	Season	Layer	Time	Best Available Met	Representativeness
FEDL	Feedlot or Dairy Stn	winter	Surface	night	FAT10MH	Representative
FEDL	Feedlot or Dairy Stn	winter	Surface	afternoon	FIV2MH	Less Representative
FEDL	Feedlot or Dairy Stn	winter	Surface	morning	FAT10	Representative
FEDL	Feedlot or Dairy Stn	winter	100 - 800 m	morning	FAT	Representative
FEDL	Feedlot or Dairy Stn	winter	100 - 800 m	night	FAT	Representative
FEDL	Feedlot or Dairy Stn	winter	100 - 800 m	afternoon	FAT	Representative
FEDL	Feedlot or Dairy Stn	winter	800 - 1600 m	all	FAT	Representative
FEDL	Feedlot or Dairy Stn	winter	> 1600 m	all	FAT	Representative

Station Code: FIV2MH
Site Name: Fivepoints/WSFS USDA
2 Meter Height
Latitude: 36.336
Longitude: -120.113
Elevation (m): 87.0

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javascript:void(0); Internet

Web Site - Maps



Web Site - Details

<http://www.sonomatechdata.com/crpaqsmetrep/>

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Methodology

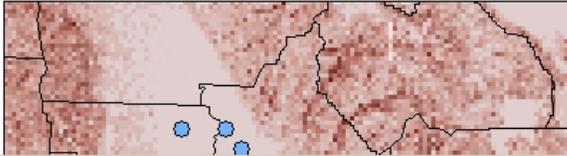
Jump to a section

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- [Parameter Preparation](#)
- [Parameter Weighted Distance](#)
- [Model Tuning](#)
- [Index of Representativeness](#)

Data Selection/Data Acquisition

Surface Meteorology

Wind speed and direction data were queried and downloaded from the [Central California Air Quality Studies \(CCAQS\)](#) data hourly and hourly averaged data from two meter and ten meter towers within the domain with valid QC flags (V2 – valid estimate, VH – valid hourly data, V0 – valid value) were selected and imported into a local database. For the few areas with both 2 m and 10 m data, only the 10 m data were used.

 2 m and 10 m
Meteorological Tower
Locations Used

Internet