

## Overview

- 1) Comparison of 3 Meteorological Models for the July-August 2000 Episode**
  - ◆ MM5
  - ◆ MM5/CALMET
  - ◆ Weather Research & Forecast (WRF) model
- 2) Comparison of CAMx Ozone Simulations Using the 3 Meteorological Models**

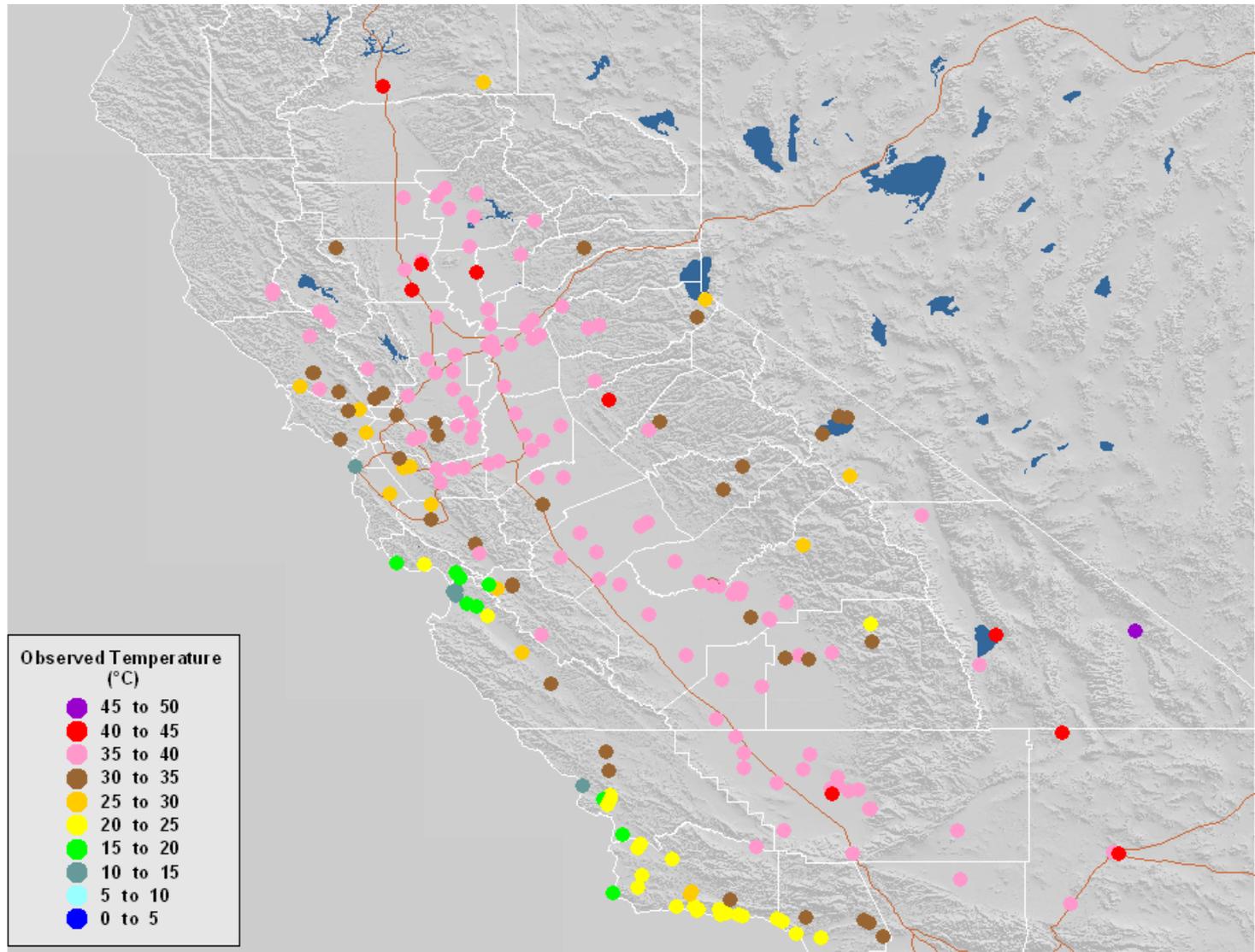
# Meteorological Model Setups

- **MM5**
  - ◆ *NOAA Simulation*
  - ◆ *Land Surface Module (LSM)*
  - ◆ *Four-Dimensional Data Assimilation (FDDA)*
- **MM5/CALMET**
  - ◆ *ARB MM5 Simulation*
  - ◆ *Surface and Aloft Measurements for CALMET*
- **WRF**
  - ◆ *NOAA Simulation*
  - ◆ *LSM*
  - ◆ *No FDDA*



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# Observed Surface-Level Temperature



**Observed Temperature (°C)**

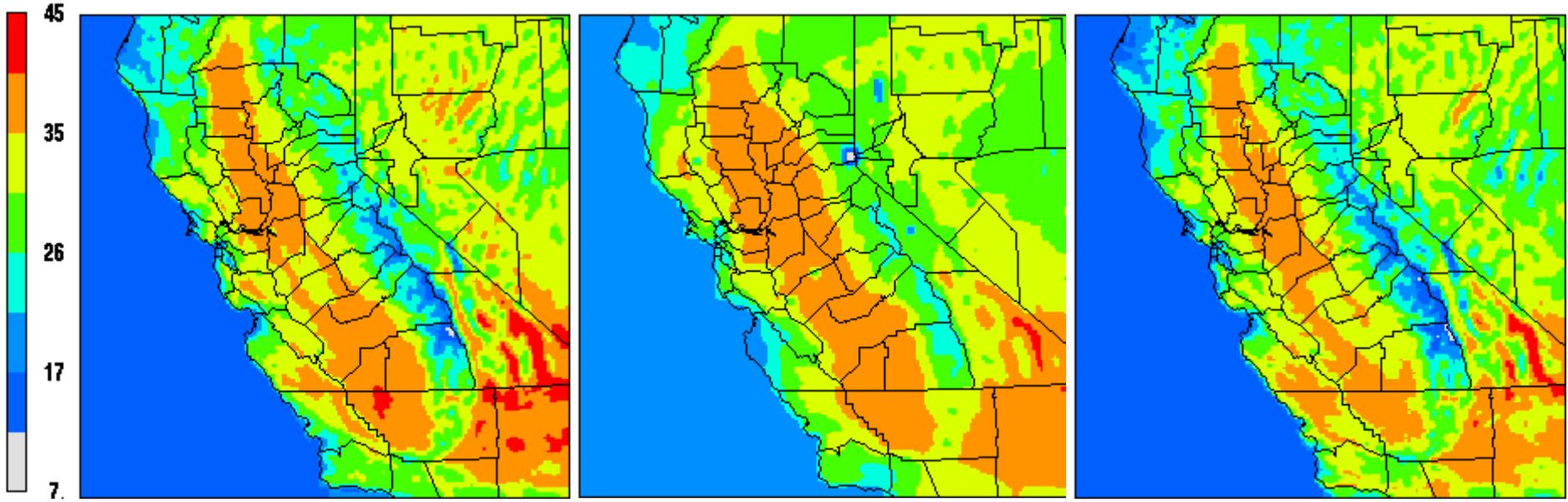
●	45 to 50
●	40 to 45
●	35 to 40
●	30 to 35
●	25 to 30
●	20 to 25
●	15 to 20
●	10 to 15
●	5 to 10
●	0 to 5

Date: July 31 2000, 14:00 PST



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

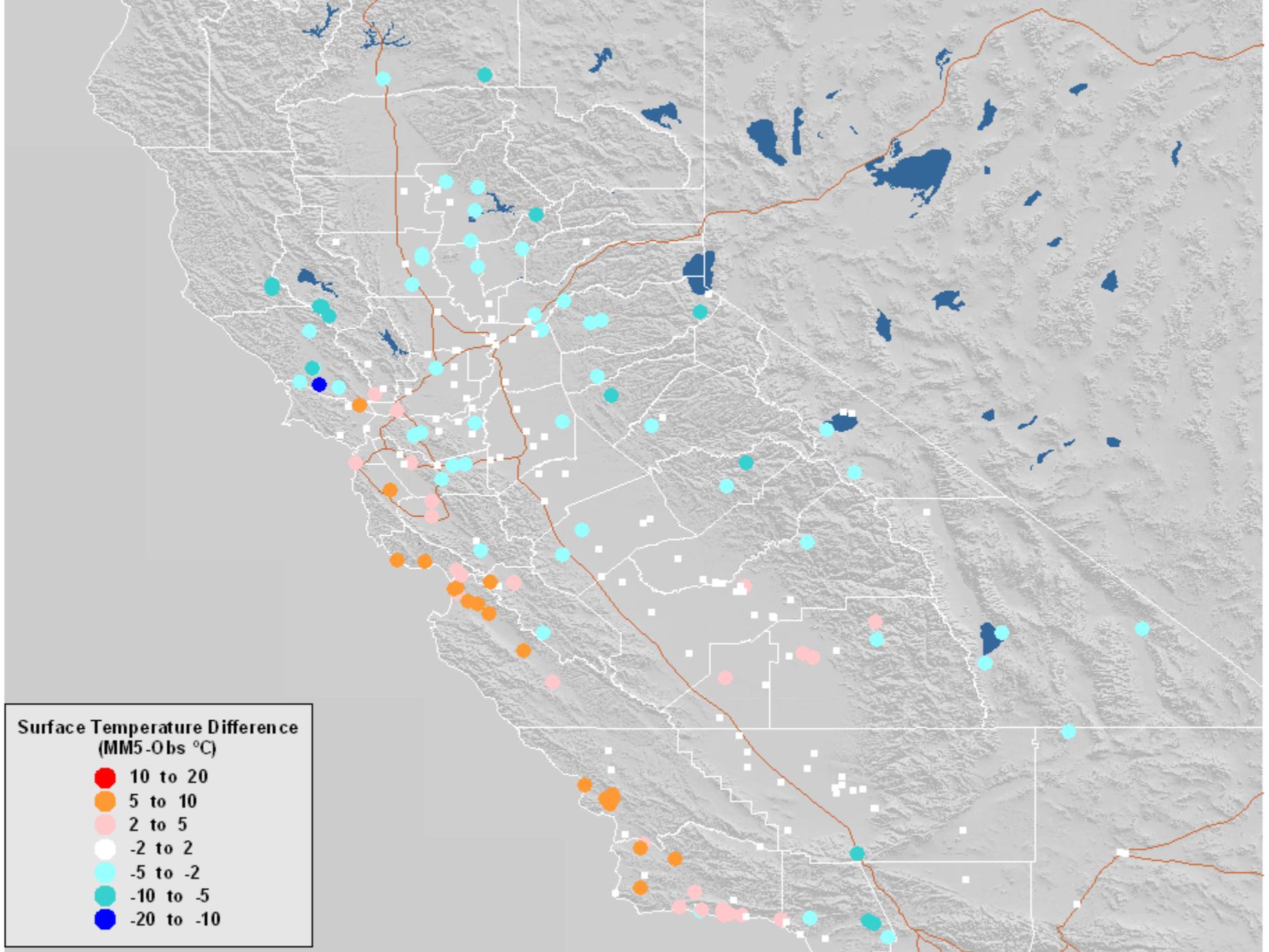
# Simulated Surface-Level Temperature Fields July 31, 2000, 1400-1500 PST



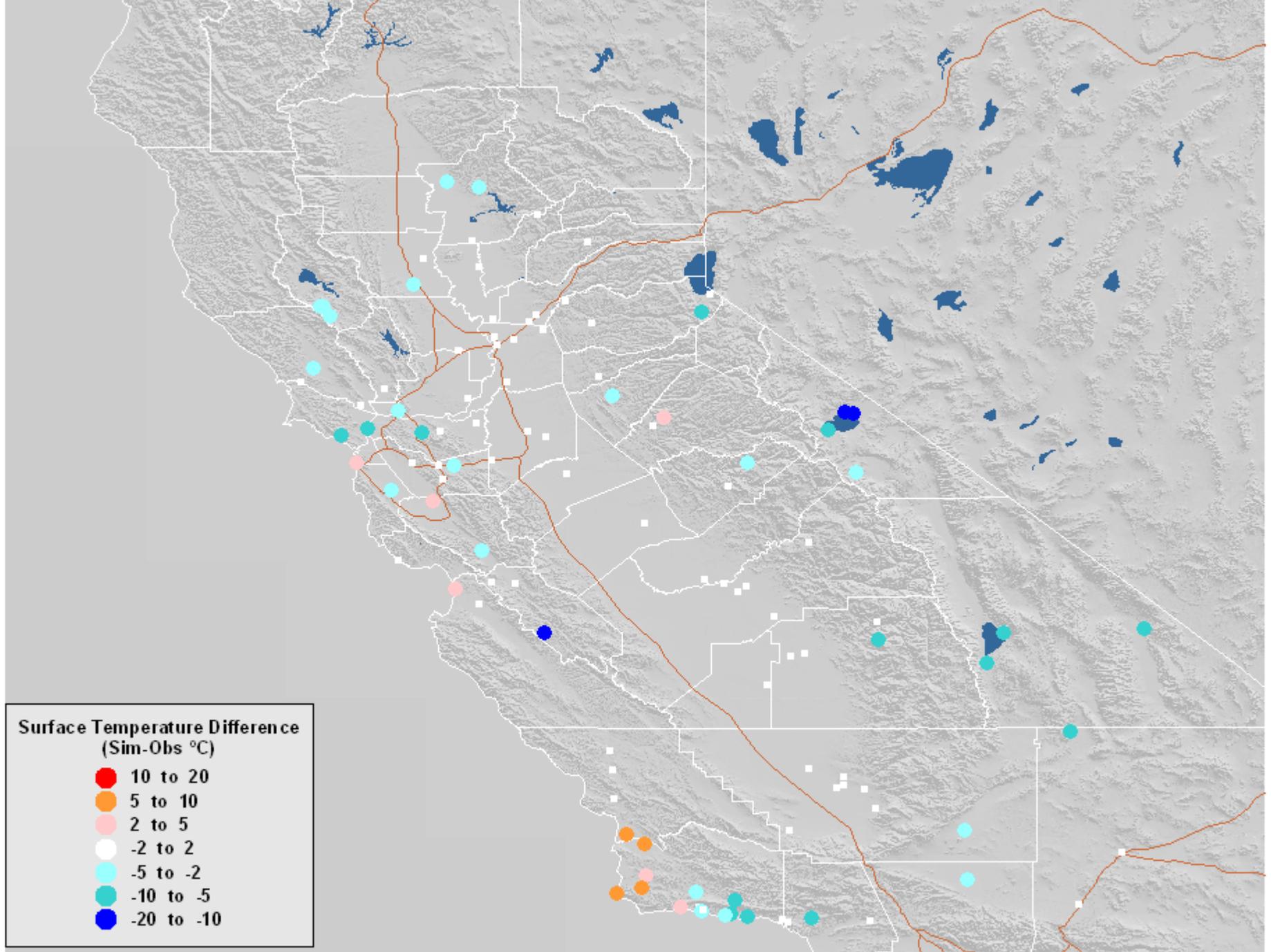
MM5

MM5/CALMET

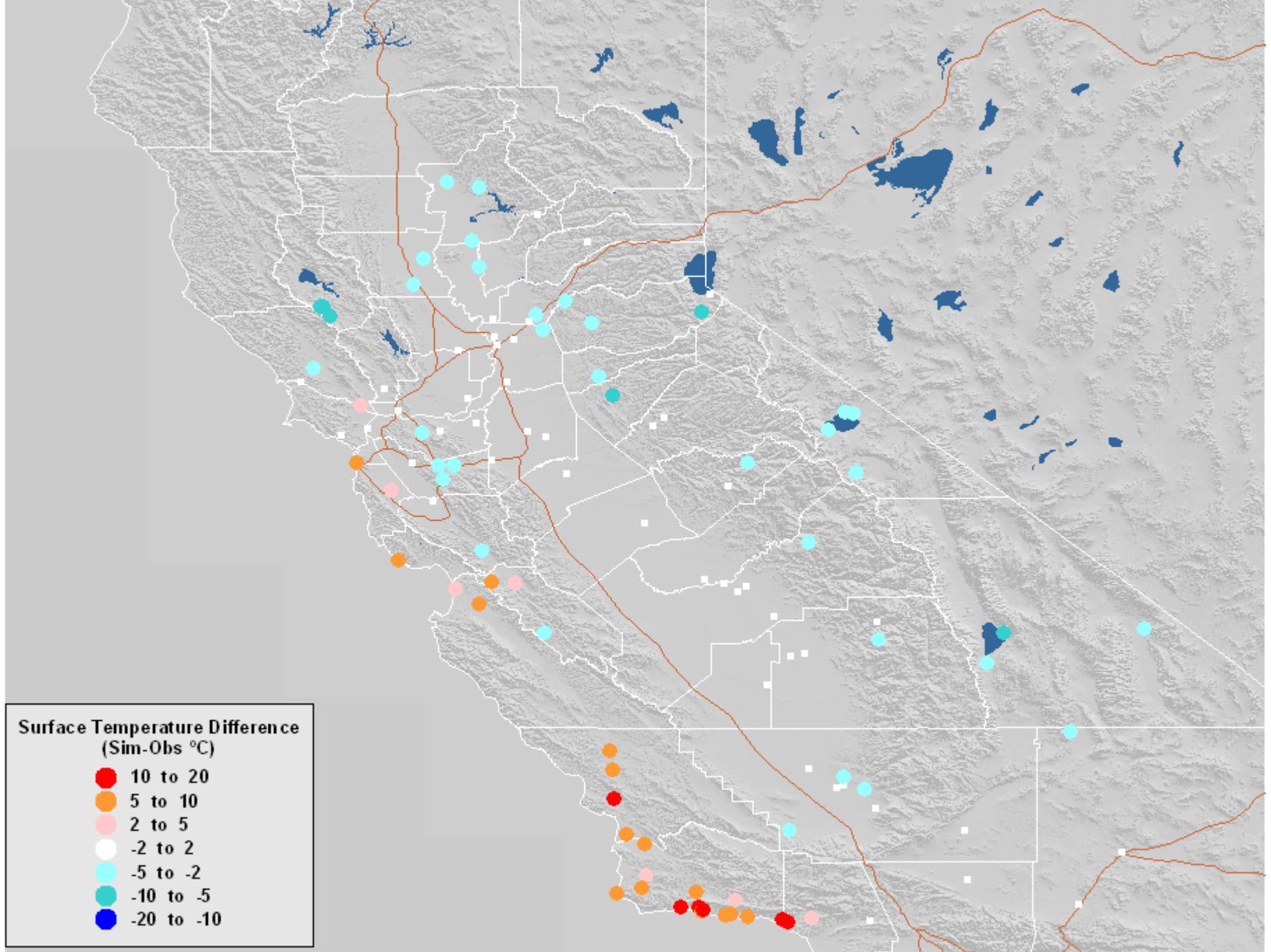
WRF



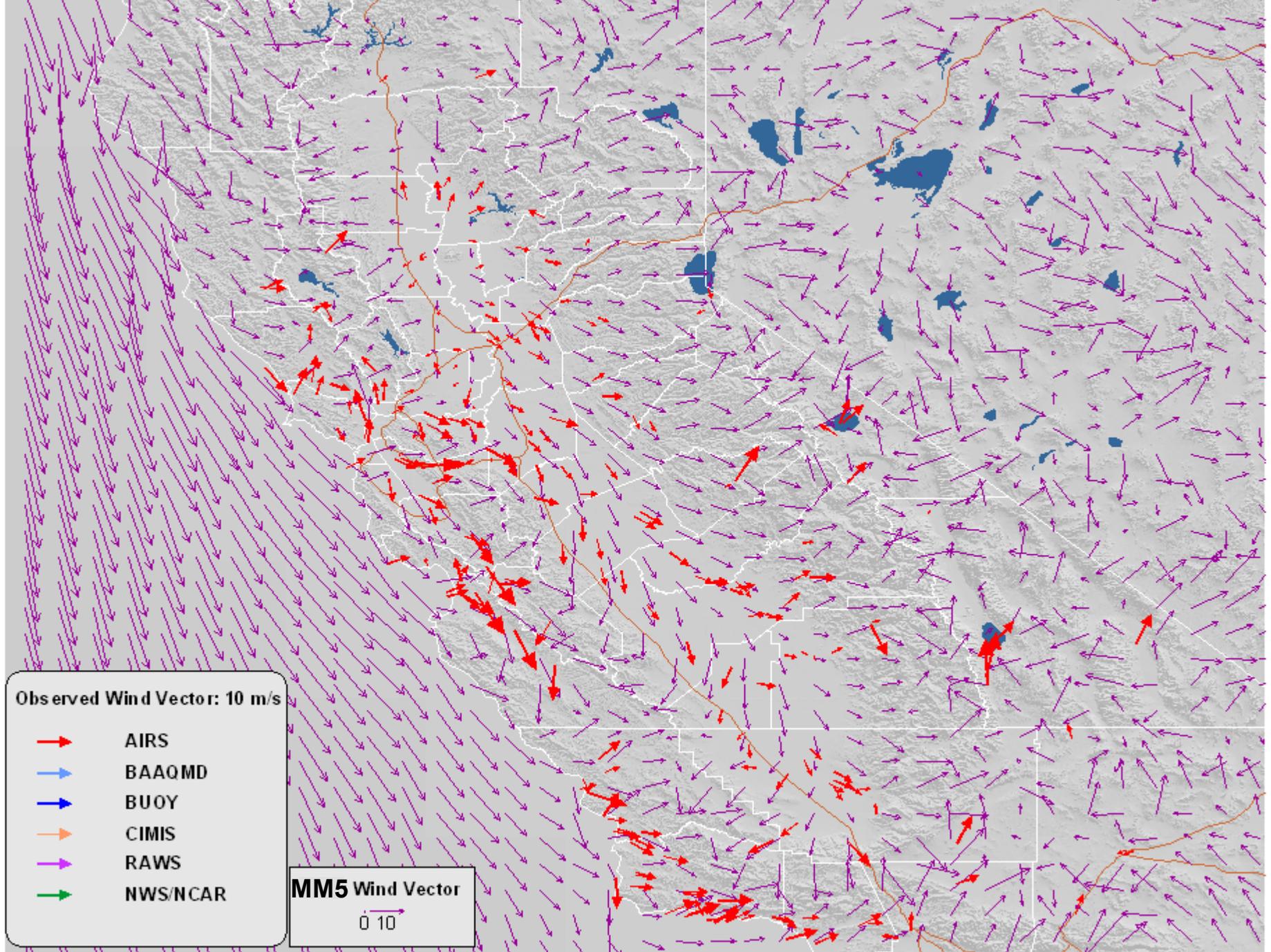
MM5: noaa LSM, Date: July 31 2000, 14:00 PST



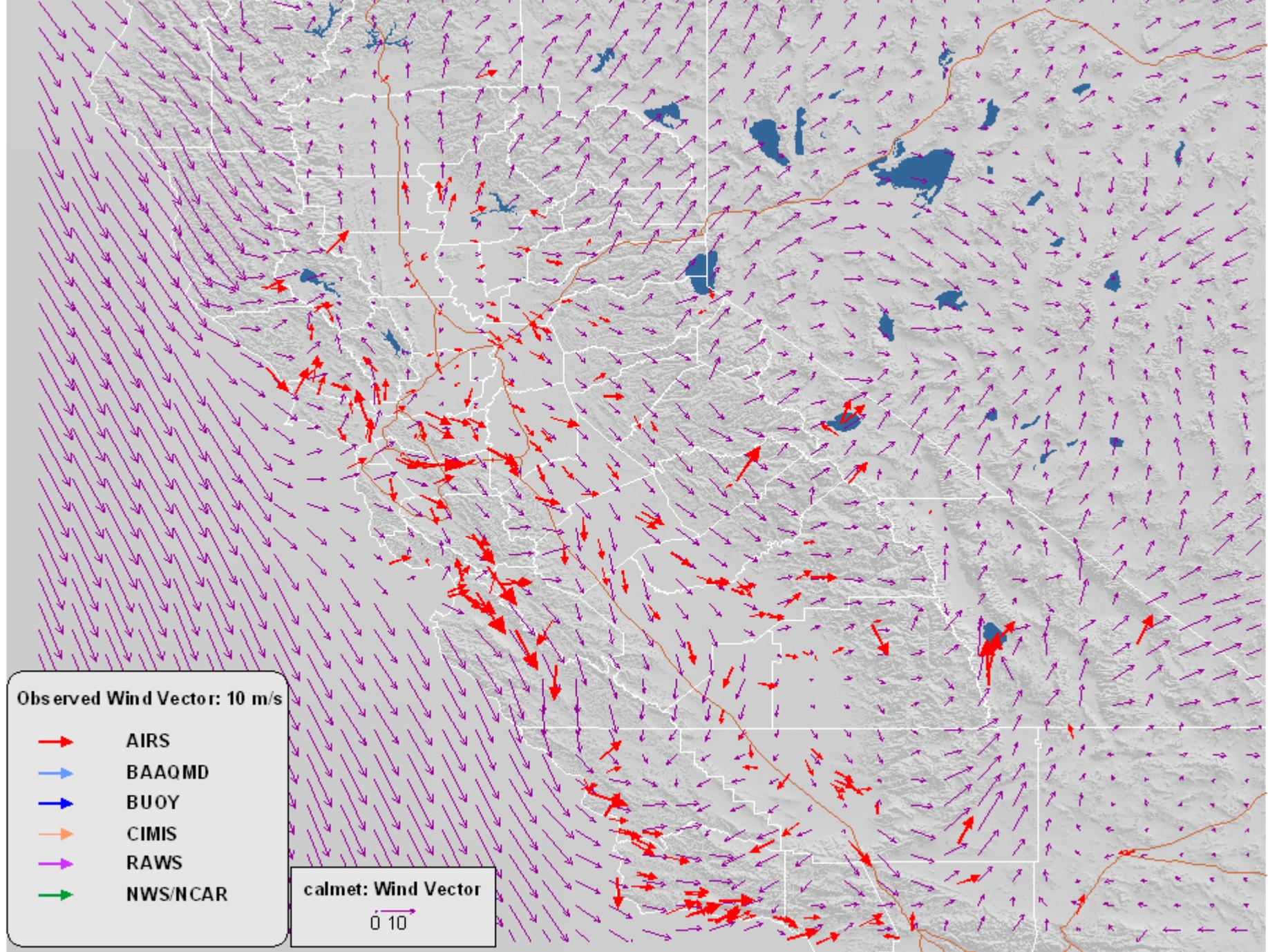
CalMet Date: July 31 2000, 14:00 PST



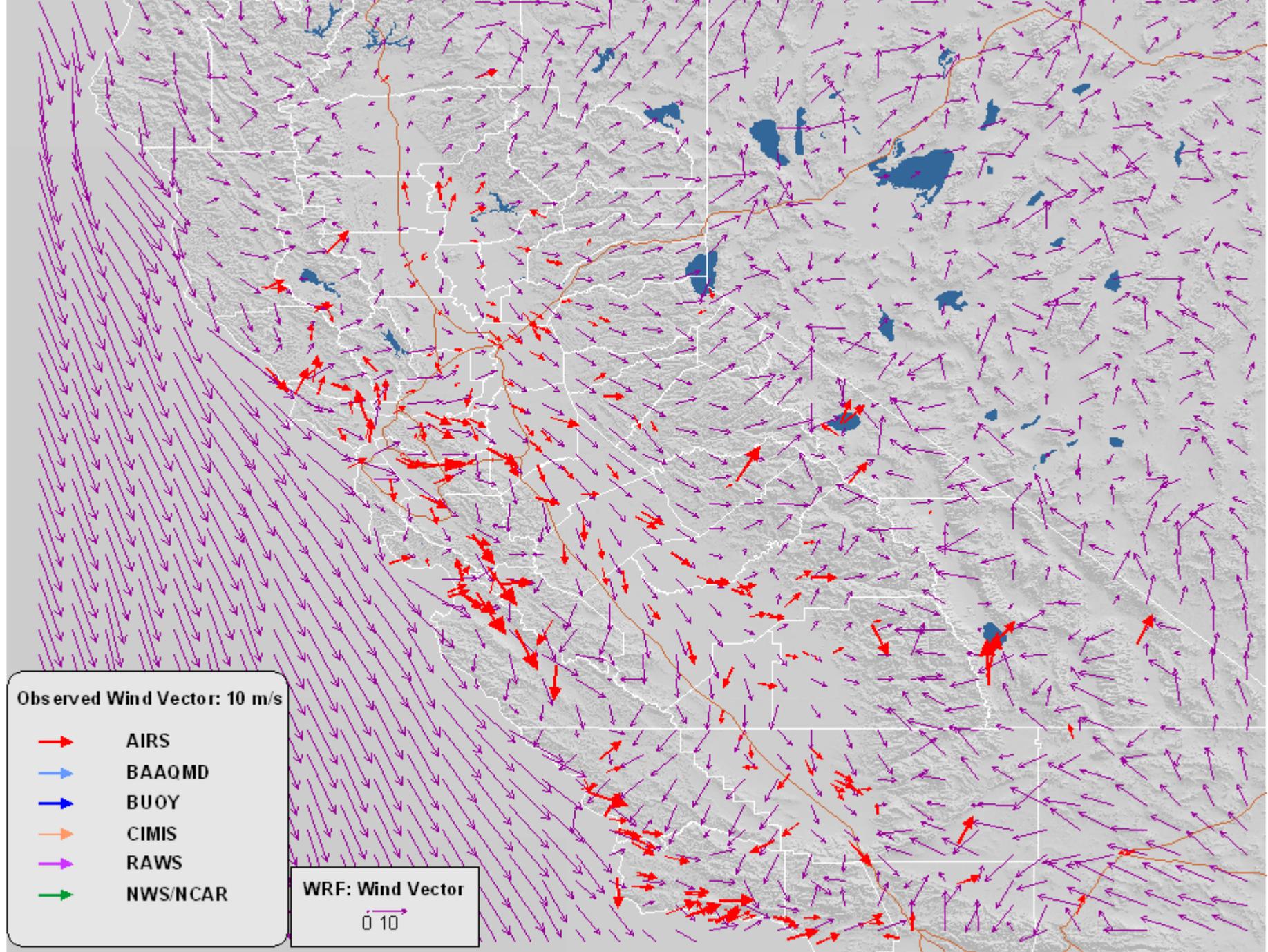
WRF Date: July 31 2000, 14:00 PST



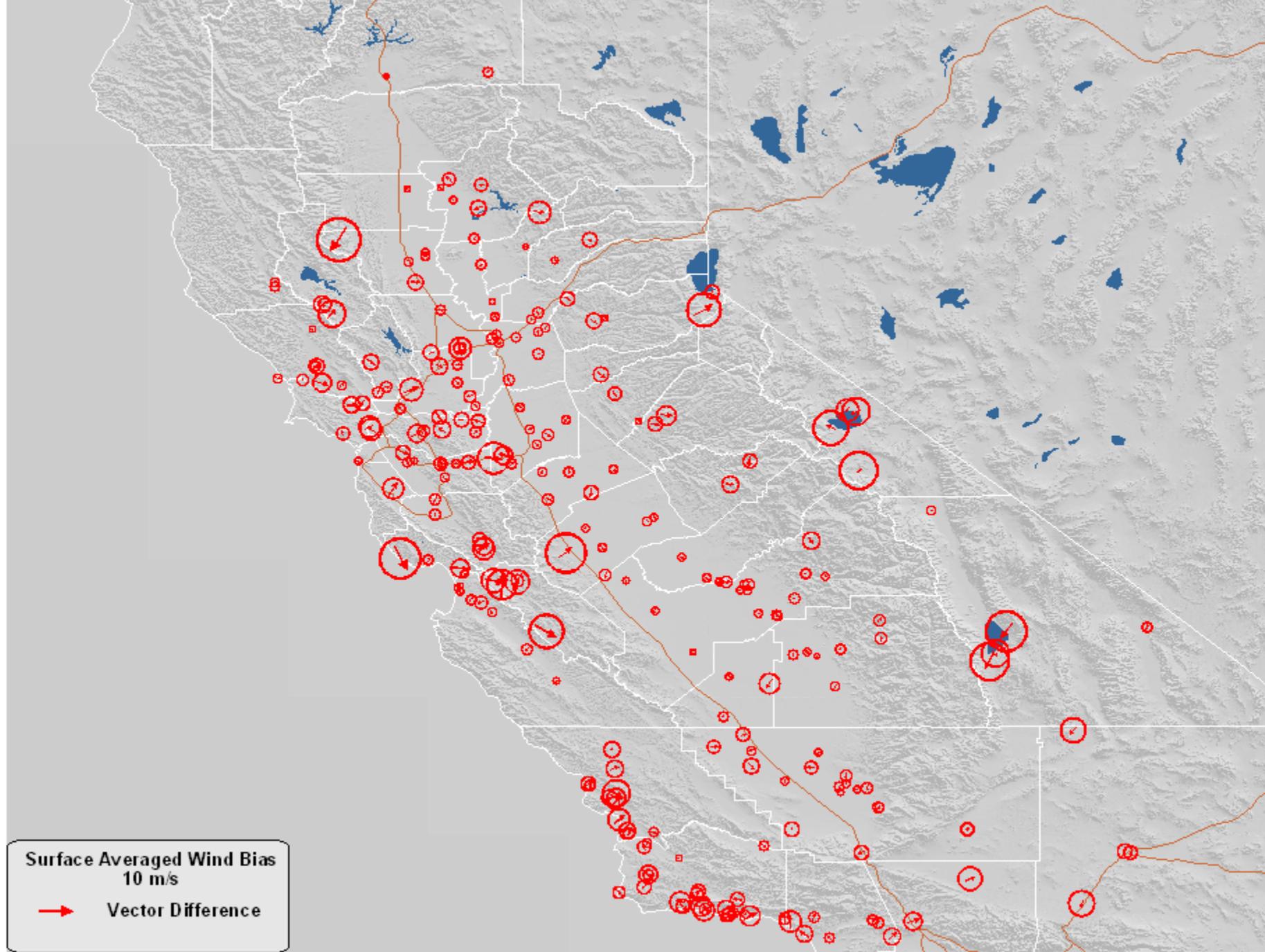
Date: July 31 2000, 14:00 PST



Date: July 31 2000, 14:00 PST

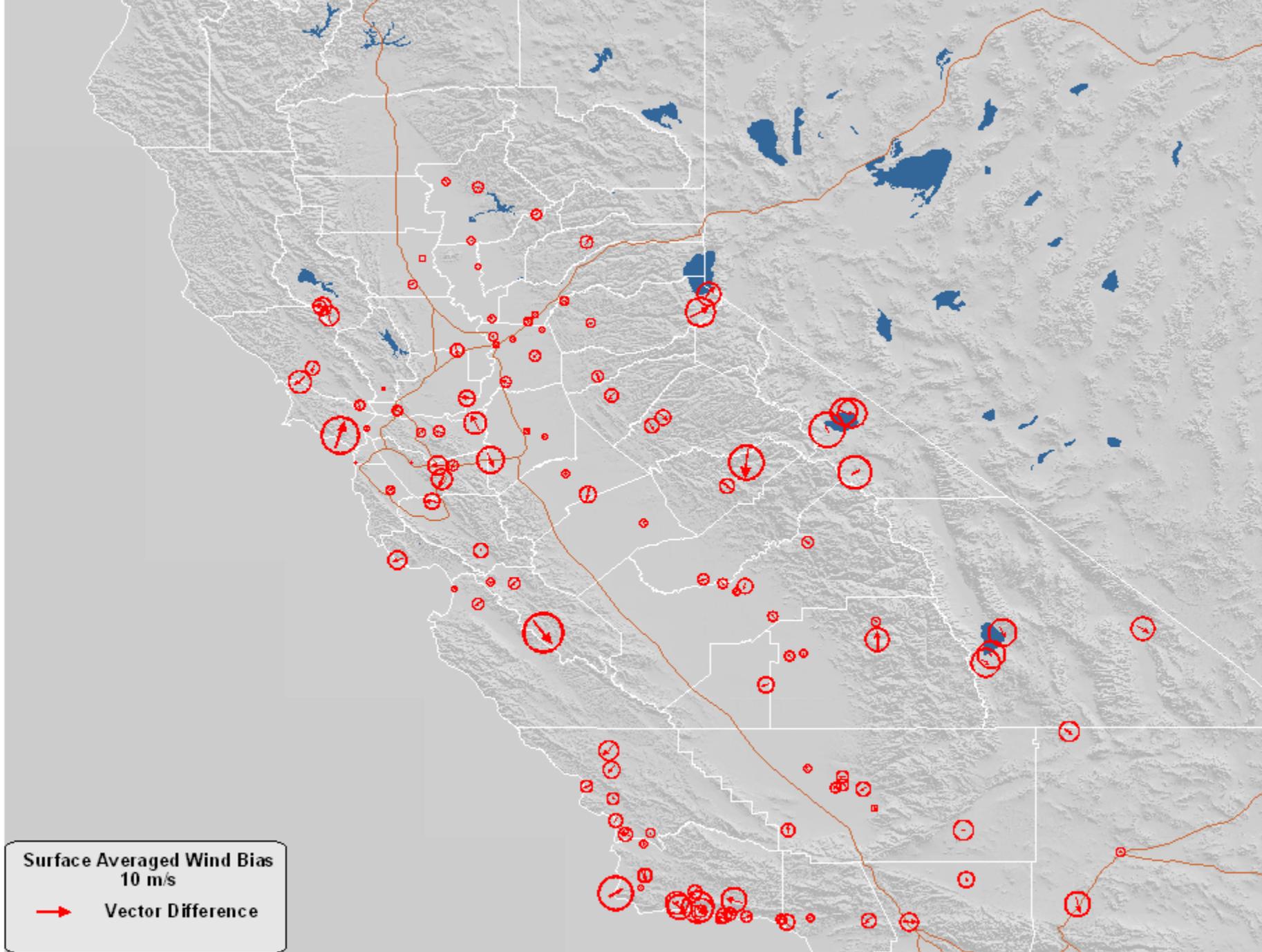


Date: July 31 2000, 14:00 PST

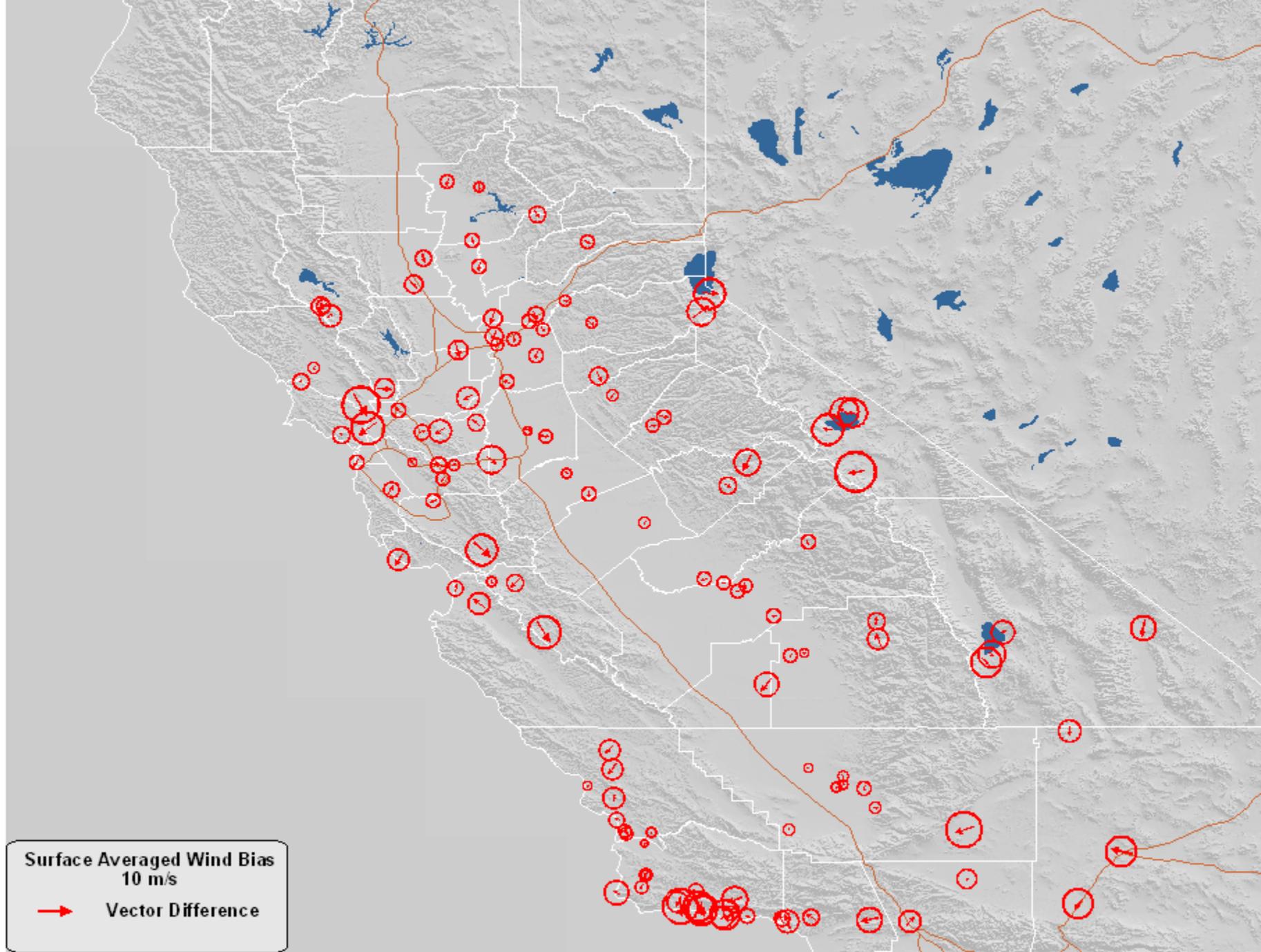


MM5

Date: July 29-August 3, 2000 Daytime Hours (08-19 PST)



CalMet: Date: July 29-August 3, 2000 Daytime Hours (08-19 PST)

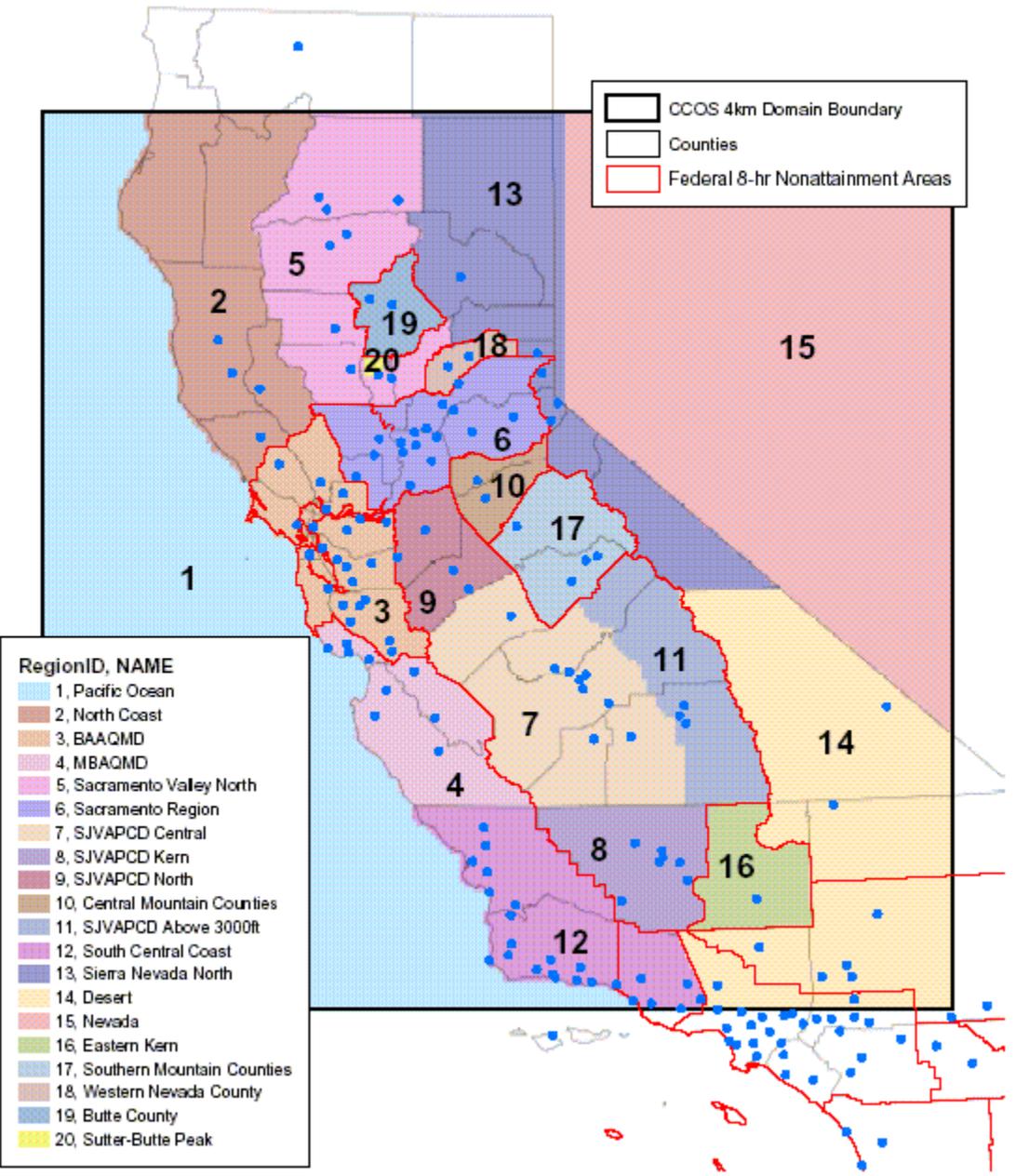


WRF: Date: July 29-August 3, 2000 Daytime Hours (08-19 PST)

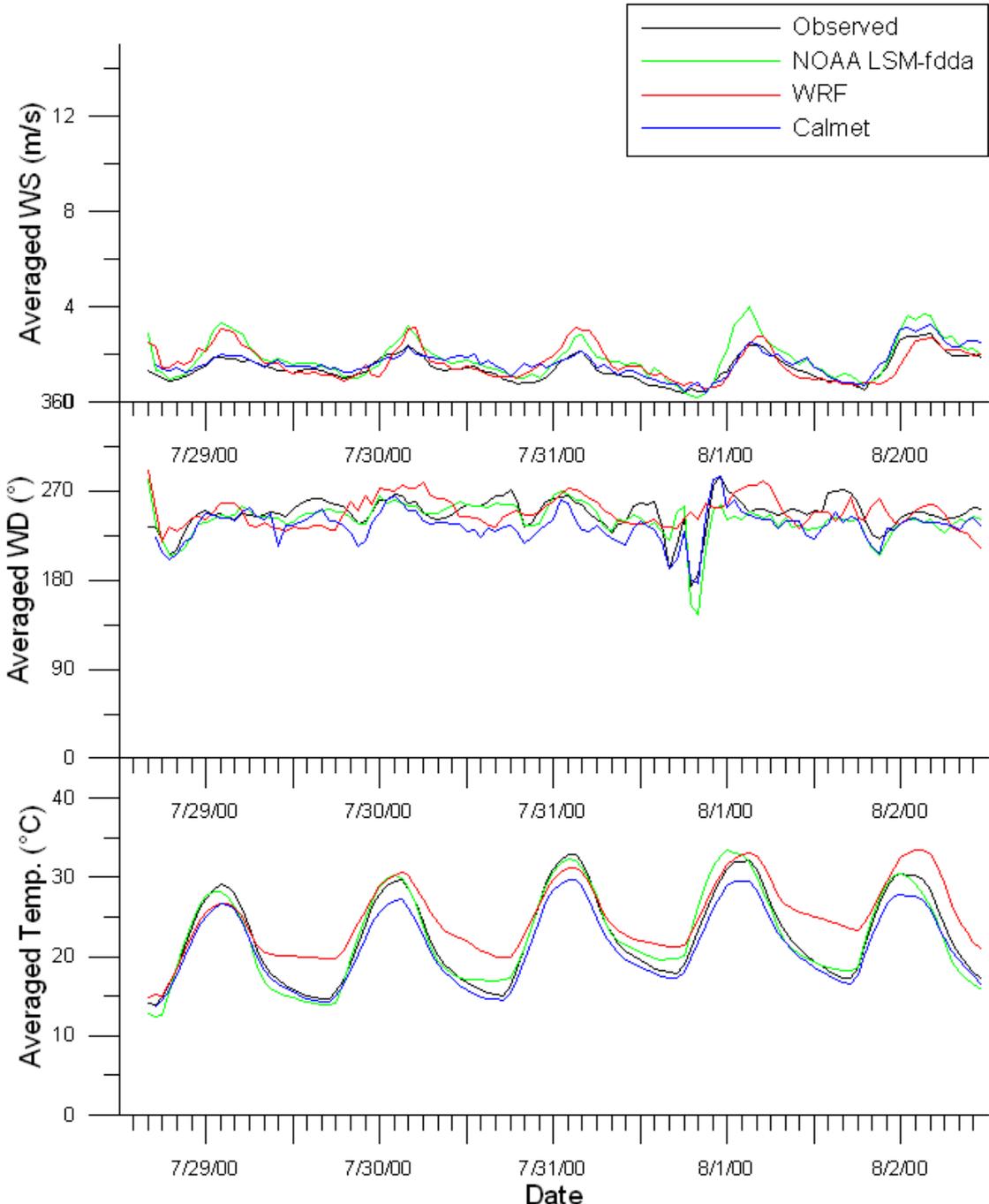


BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

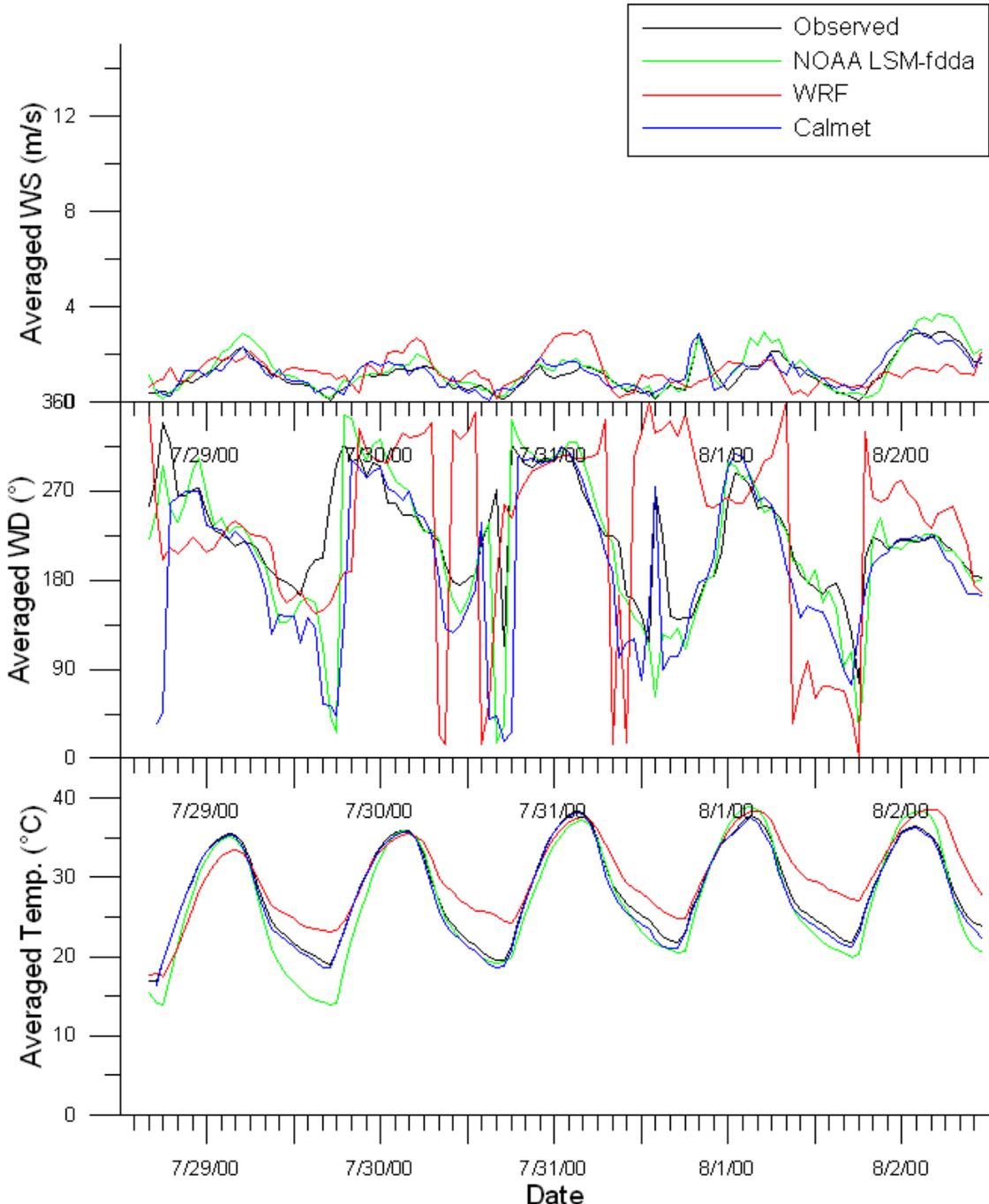
# O3 SIP Performance Regions v5.0 with 2004 Ozone Monitoring Sites



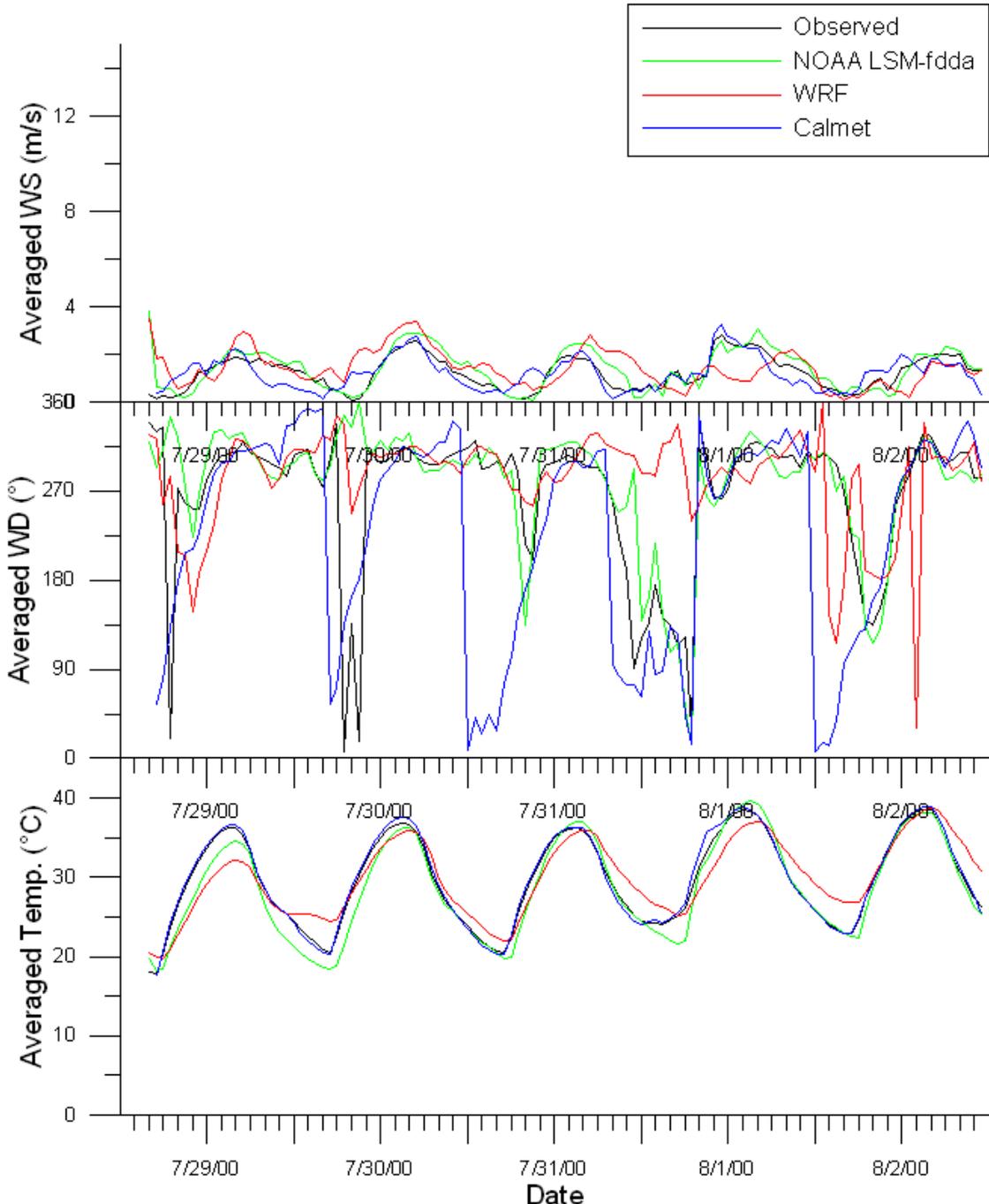
**Bay Area  
(Sub-region 3)**



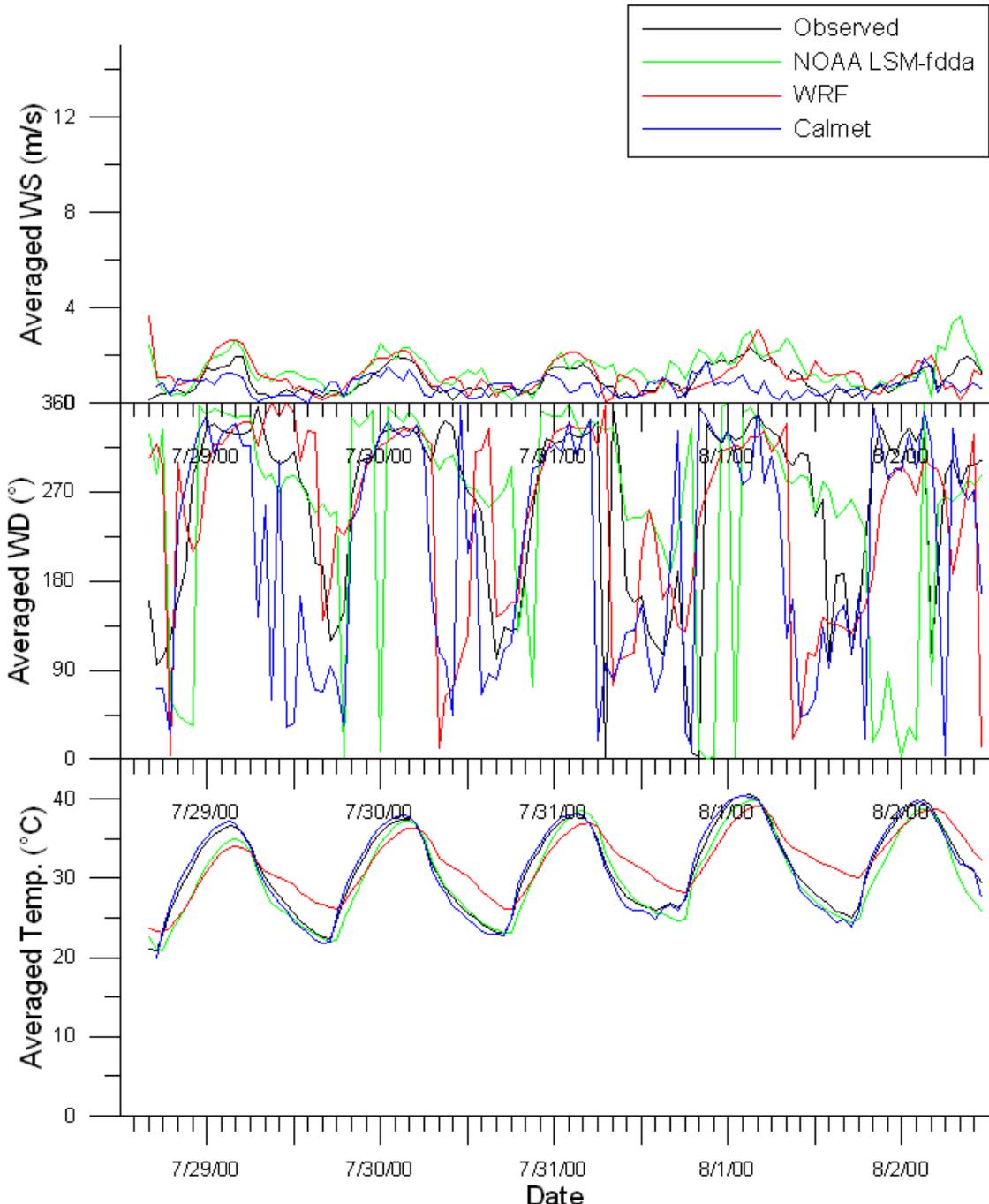
**Sacramento  
(Sub-region 6)**



**Central SJV  
(Sub-region 7)**



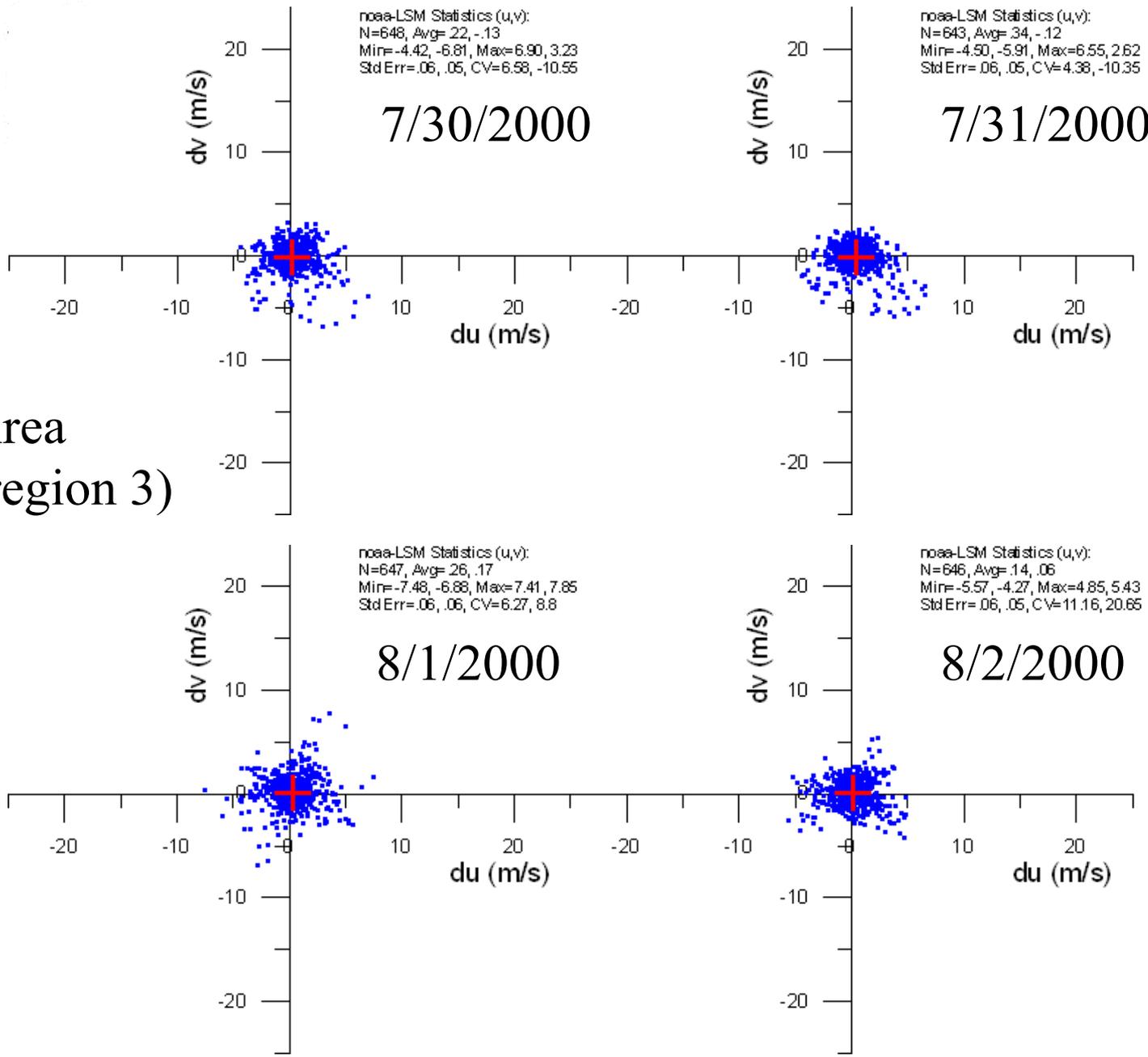
**Southern SJV  
(Sub-region 8)**





# BAY AREA

## Bay Area (Sub-region 3) MM5

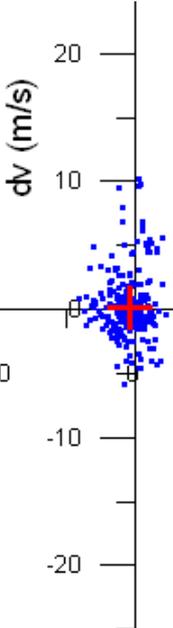




# BAY AREA

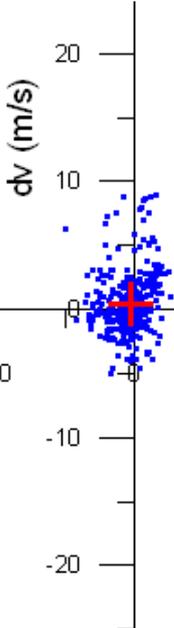
CalMet Statistics (u,v):  
N=432, Avg=-.36, .16  
Min=-4.05, -5.82, Max=2.19, 10.17  
Std Err=.05, .09, CV=-2.71, 12.11

## 7/30/2000



CalMet Statistics (u,v):  
N=432, Avg=-.28, .41  
Min=-4.95, -5.06, Max=3.53, 8.88  
Std Err=.06, .1, CV=-4.33, 5.16

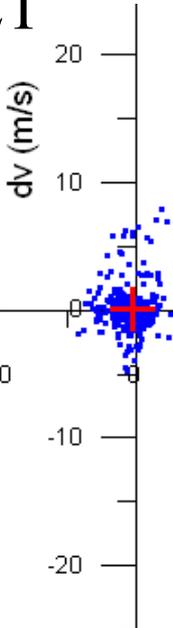
## 7/31/2000



### Bay Area (Sub-region 3) MM5/CALMET

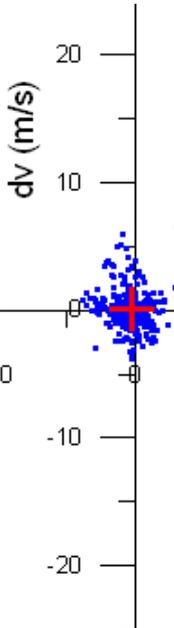
CalMet Statistics (u,v):  
N=432, Avg=-.27, .08  
Min=-4.20, -4.76, Max=3.93, 7.86  
Std Err=.05, .07, CV=-3.98, 20.61

## 8/1/2000



CalMet Statistics (u,v):  
N=432, Avg=-.24, .11  
Min=-3.88, -3.78, Max=4.35, 6.56  
Std Err=.06, .06, CV=-4.85, 12.09

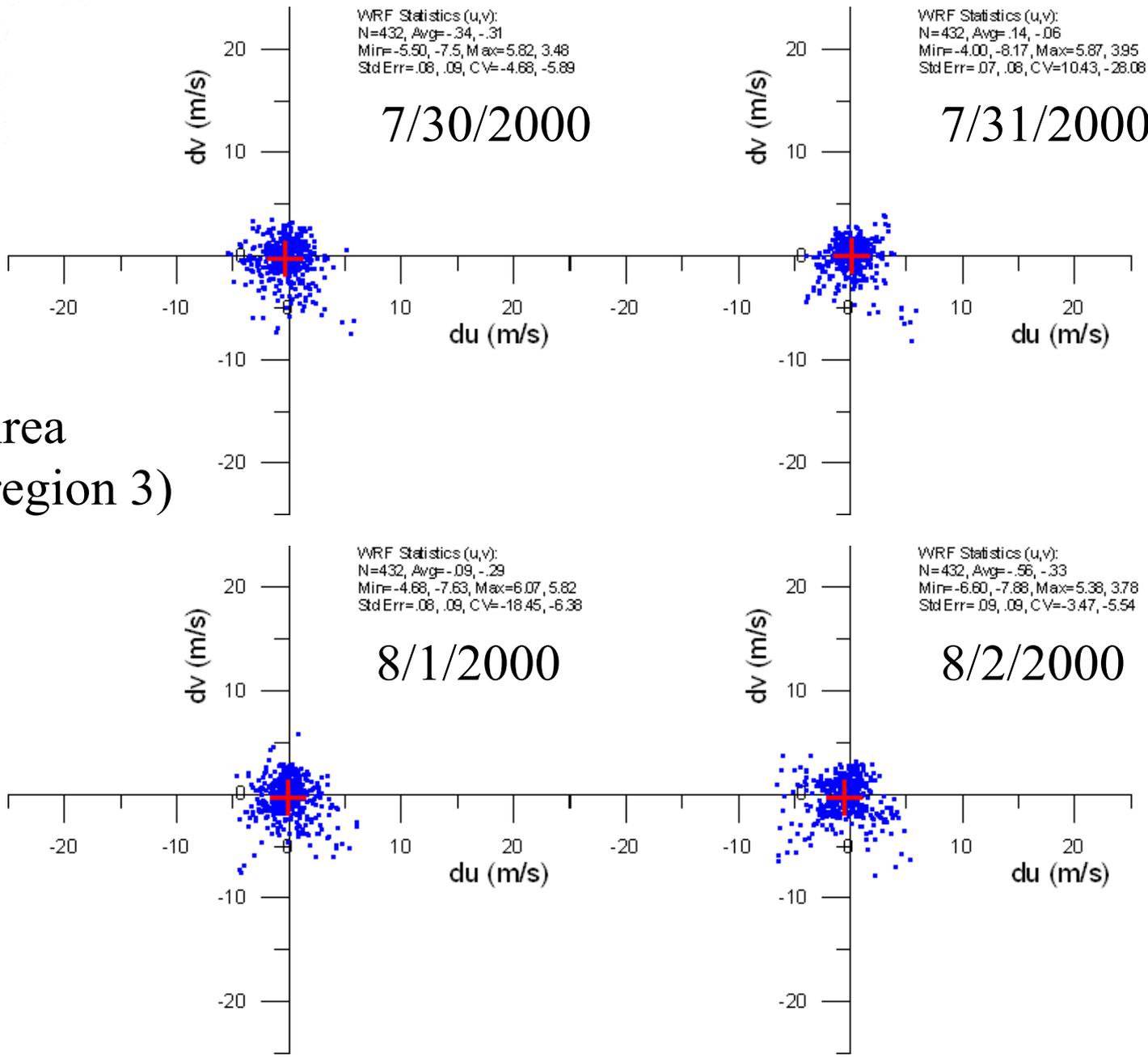
## 8/2/2000





# BAY AREA

## Bay Area (Sub-region 3) WRF





BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

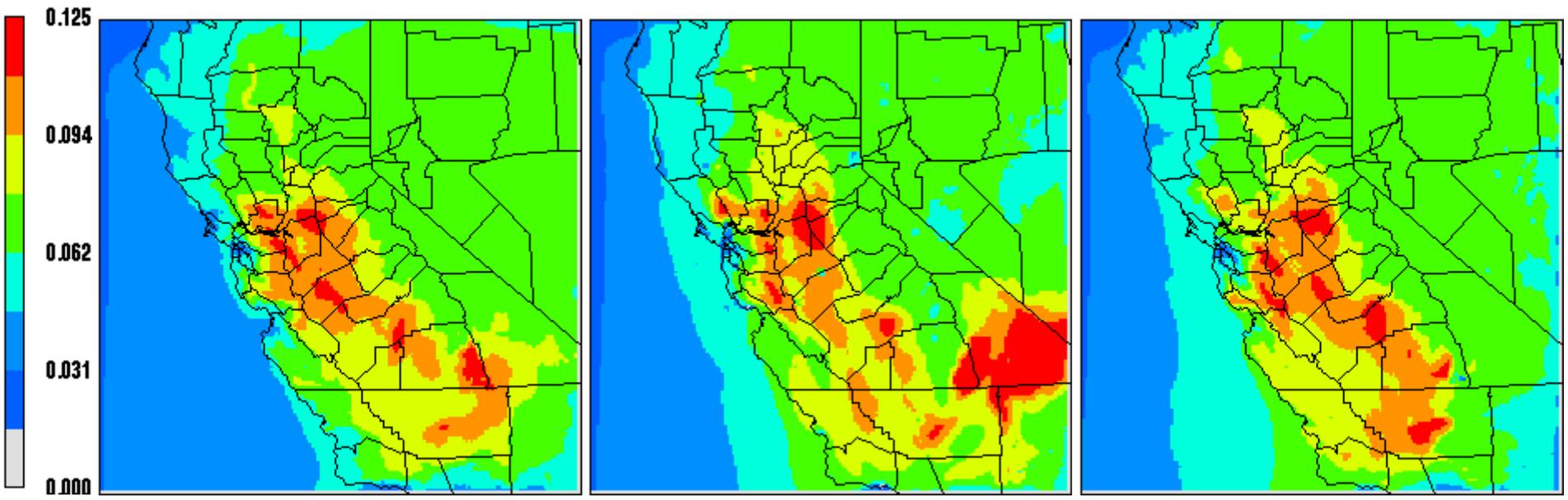
## Observed Maximum Ozone Values (ppb)

Date	1-Hour				8-Hour			
	SFB	SAC	Central SJV	Southern SJV	SFB	SAC	Central SJV	Southern SJV
7/31/2000	126	103	118	115	89	89	103	95
8/1/2000	94	133	118	116	76	108	109	104
8/2/2000	98	115	119	151	84	107	106	112



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# Surface-Layer Simulated Ozone Fields July 31, 2000, 1400-1500 PST



MM5

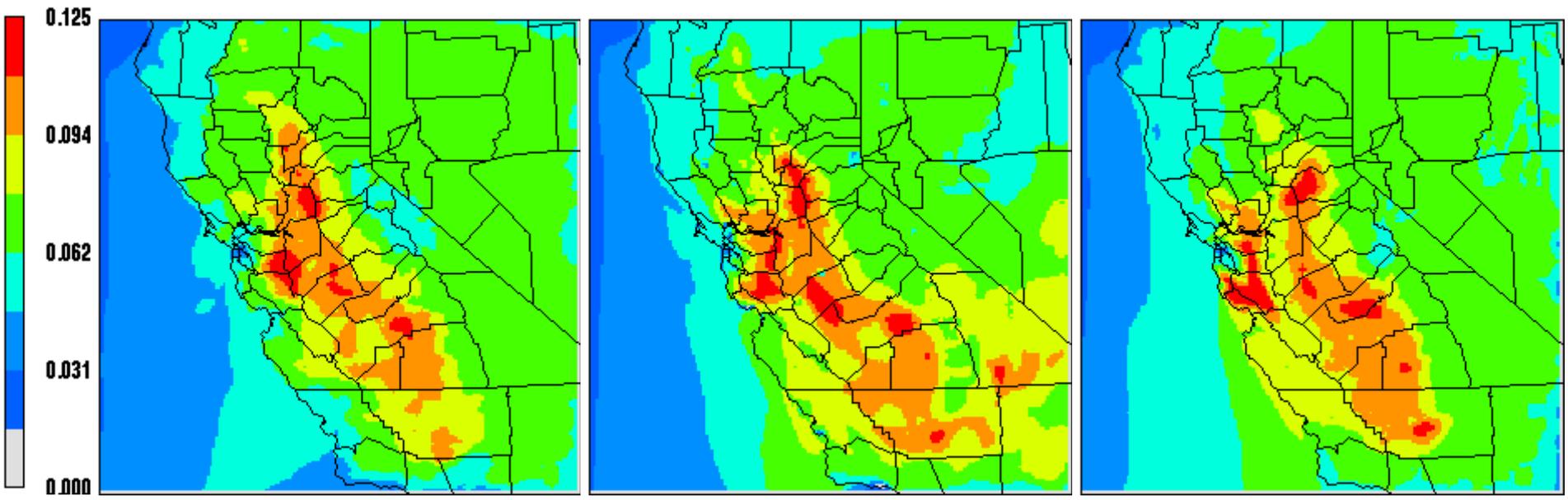
MM5/CALMET

WRF



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# Surface-Layer Simulated Ozone Fields August 1, 2000, 1400-1500 PST



MM5

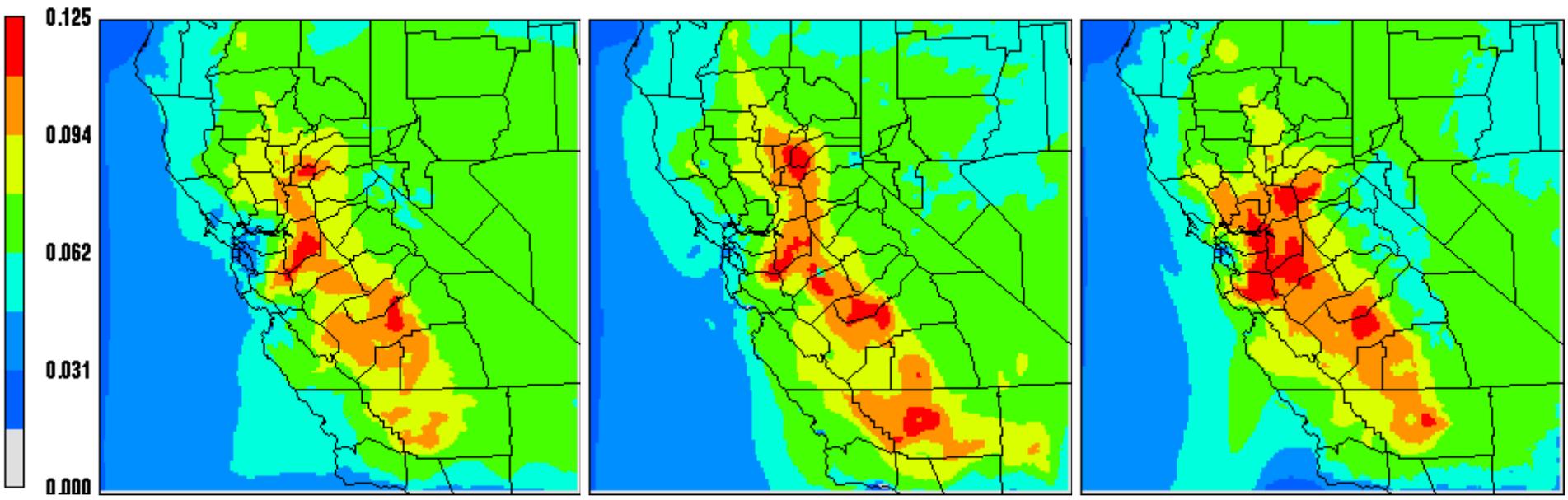
MM5/CALMET

WRF



BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

# Surface-Layer Simulated Ozone Fields August 2, 2000, 1400-1500 PST



MM5

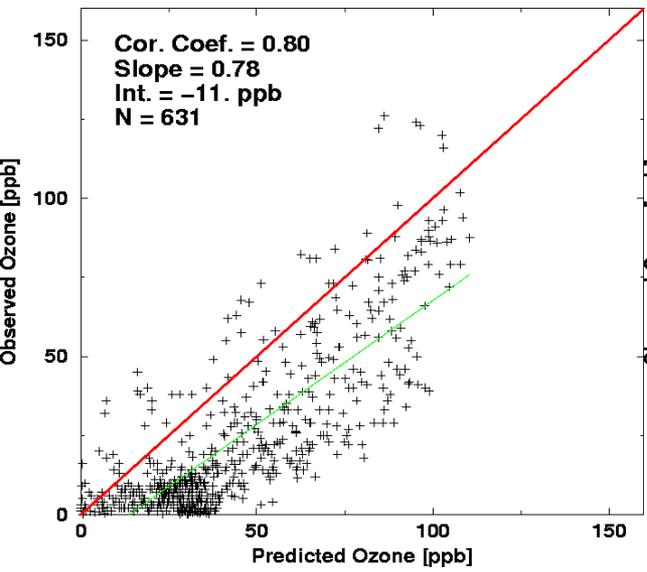
MM5/CALMET

WRF

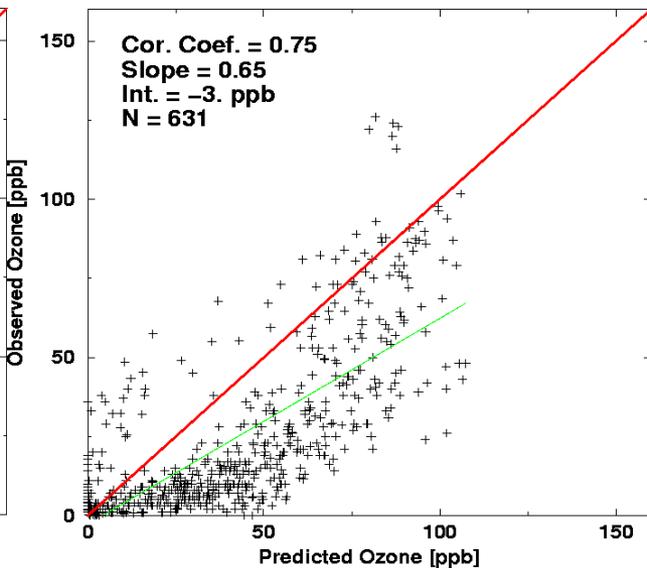


BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

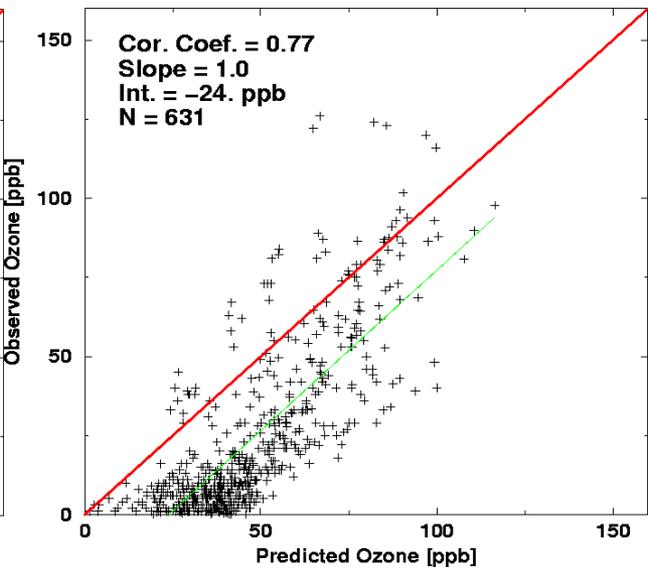
# Observed vs. Predicted Ozone S.F. Bay Area: July 31, 2000



MM5



MM5/CALMET

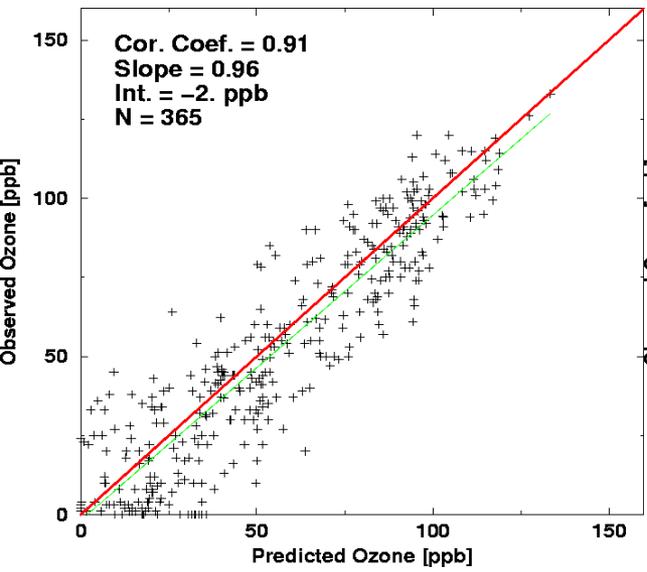


WRF

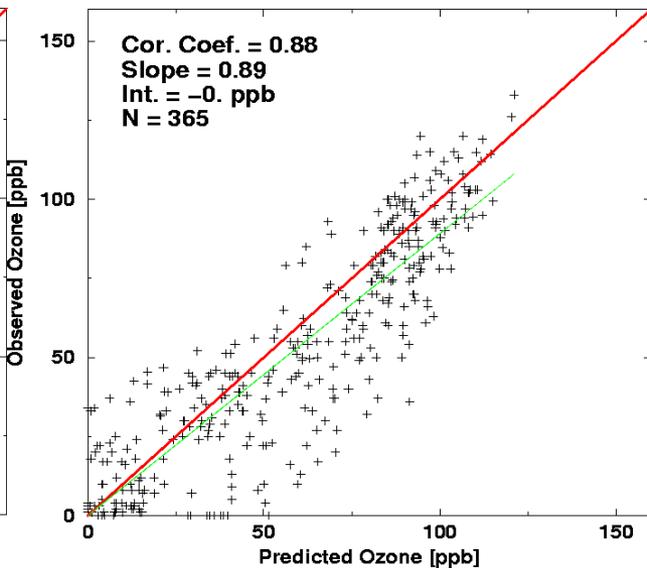


BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

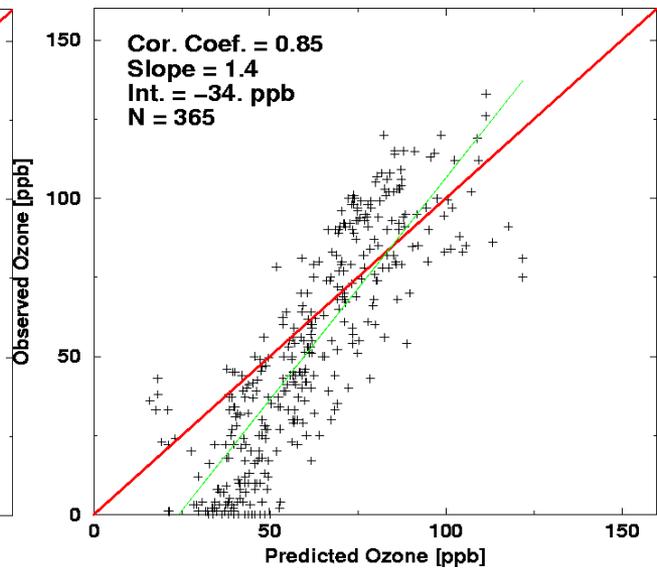
# Observed vs. Predicted Ozone Sacramento Area: August 1, 2000



MM5

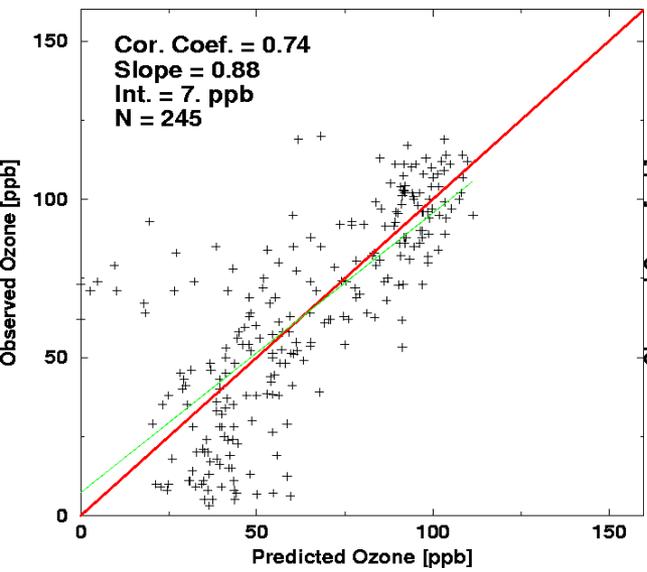


MM5/CALMET

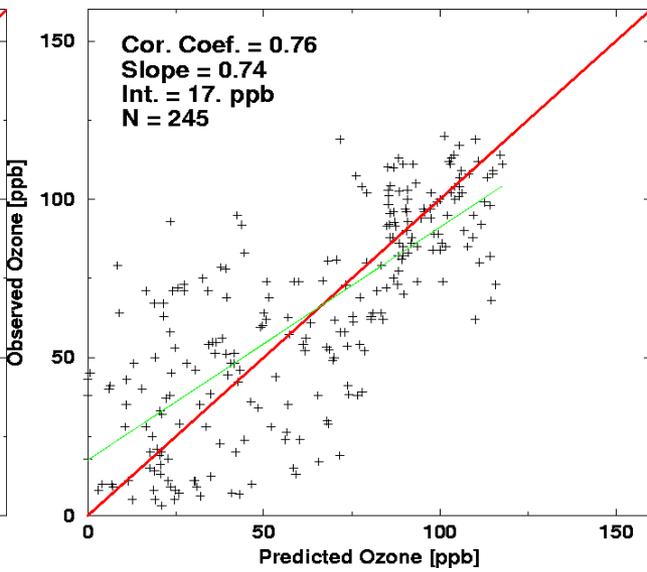


WRF

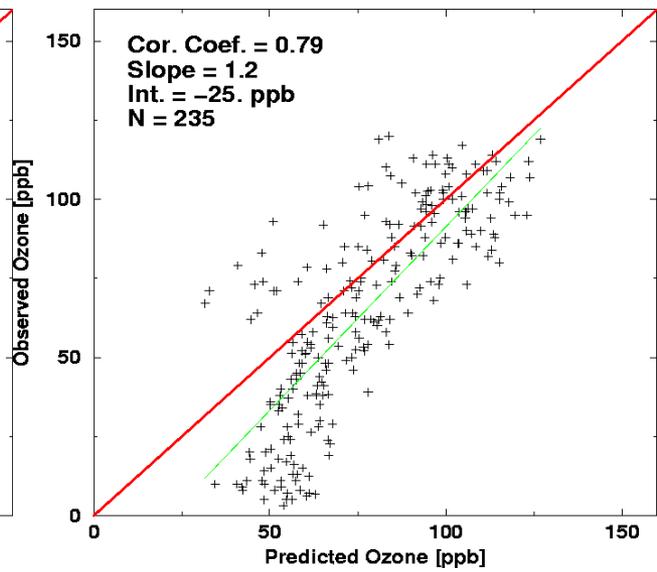
# Observed vs. Predicted Ozone Central SJV: August 2, 2000



MM5



MM5/CALMET

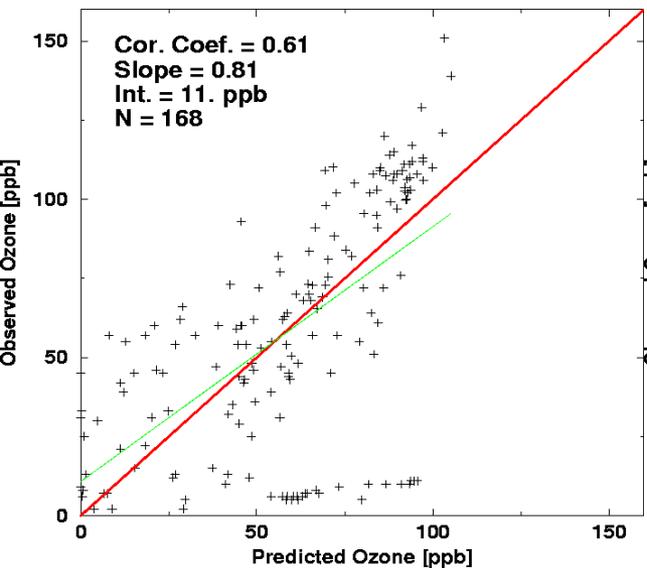


WRF

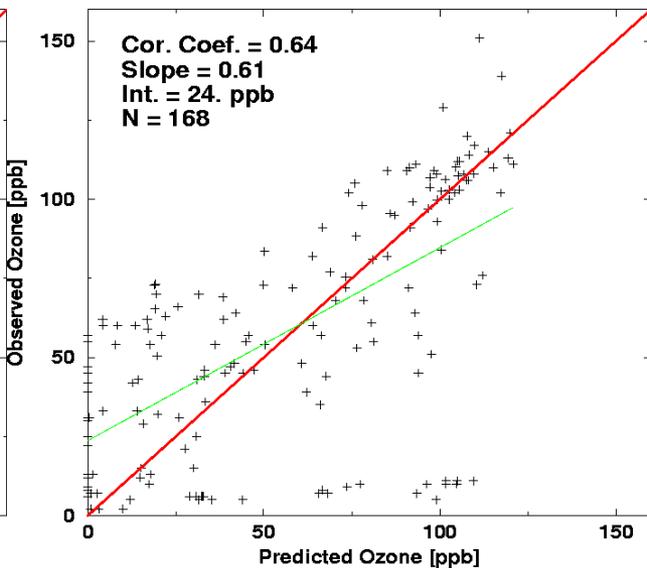


BAY AREA  
AIR QUALITY  
MANAGEMENT  
DISTRICT

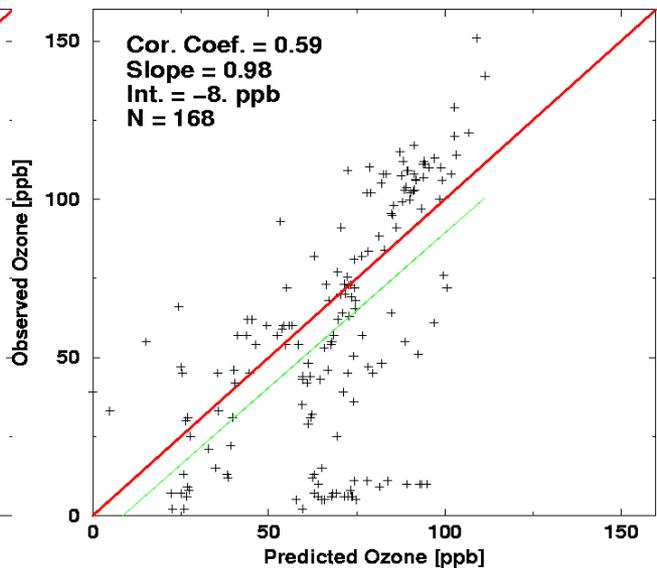
# Observed vs. Predicted Ozone Southern SJV: August 2, 2000



MM5



MM5/CALMET



WRF

# Ozone Statistics Summary

