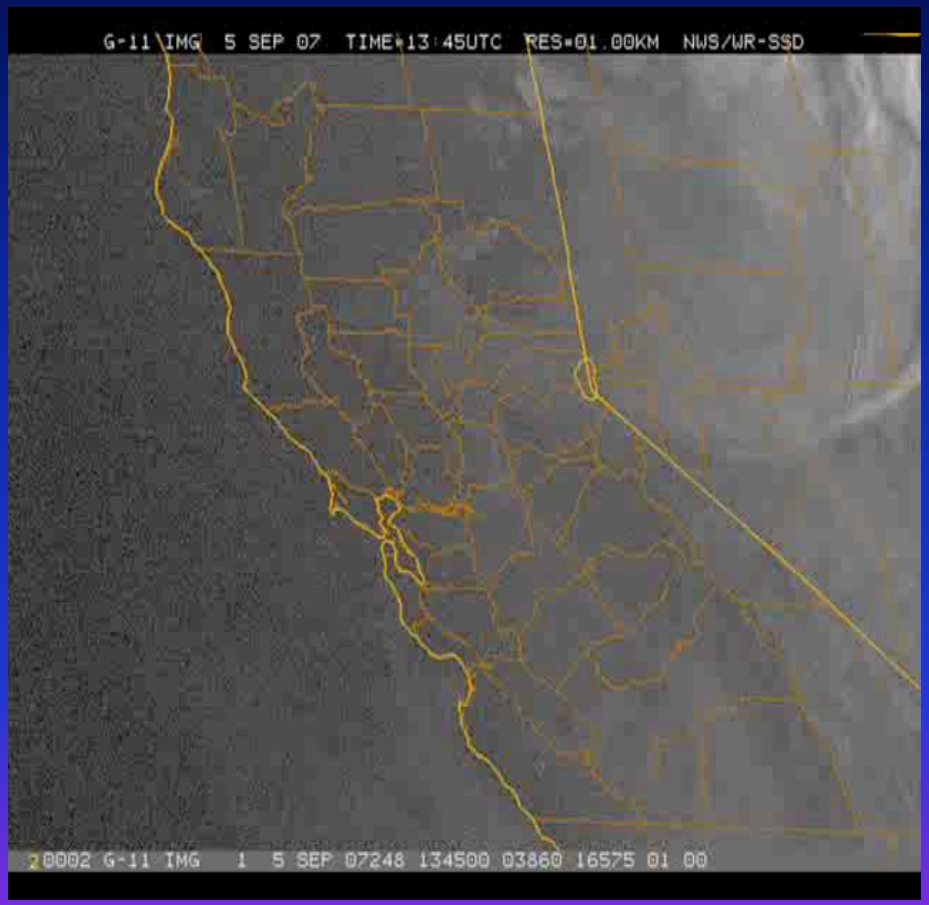
California Air Resources Board CANSAC Applications

California Environmental Protection Agency

Air Resources Board

Presentation Overview

- CARB Operations
- Smoke Management and CANSAC
- Blue Sky



AIR RESOURCES BOARD

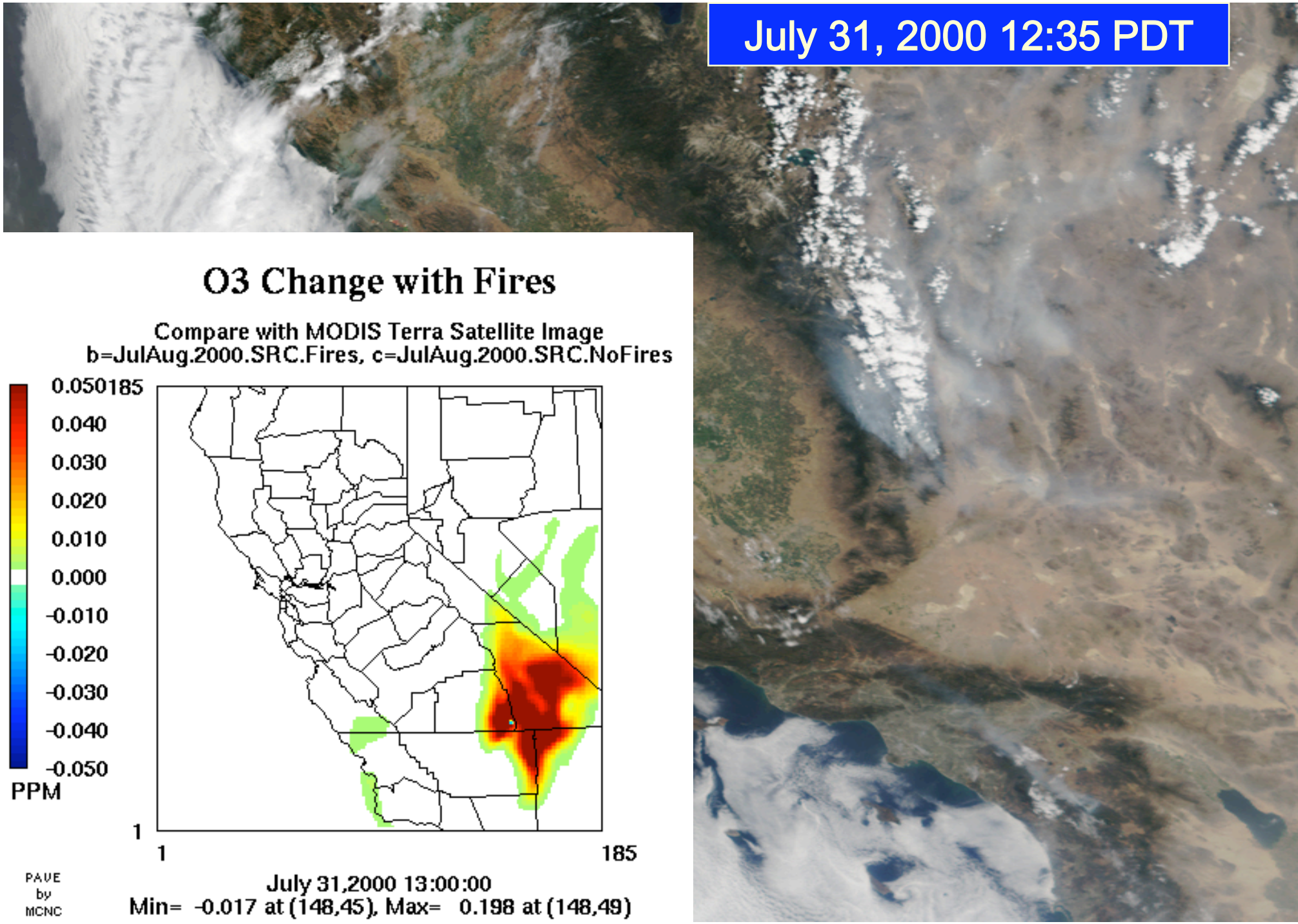
Air Resources Board

Our Mission:

To promote and protect public health, welfare and ecological resources through effective and efficient reduction of air pollutants in recognition and consideration of the effects on the economy of the state.

Vegetative Burning Pollutants

- Focus is primarily on particulate matter (PM_{10}, $PM_{2.5}$) due to health & visibility
- But also other pollutants
  - Carbon Monoxide
  - Carbon Dioxide
  - Methane
  - Hydrocarbons (VOC, ROG)
  - Toxics, Ammonia
  - Oxides of Nitrogen (NO_X)


July 31, 2000 12:35 PDT
O3 Change with Fires
Compare with MODIS Terra Satellite Image
b=JulAug.2000.SRC.Fires, c=JulAug.2000.SRC.NoFires
0.050185
0.040
0.030
0.020
0.010
0.000
-0.010
-0.020
-0.030
-0.040
-0.050
PPM
1
1
185
PAVE
by
MCNC
July 31,2000 13:00:00
Min= -0.017 at (148,45), Max= 0.198 at (148,49)

Determining Burn Day Status

- Baseline Air Quality
- 500 mb Heights
- Maximum Mixing Height
- Wind Speed (Mixing Layer)
- 3000 Foot vs. Surface Temperatures

Determining Burn Day Status

- Baseline Air Quality

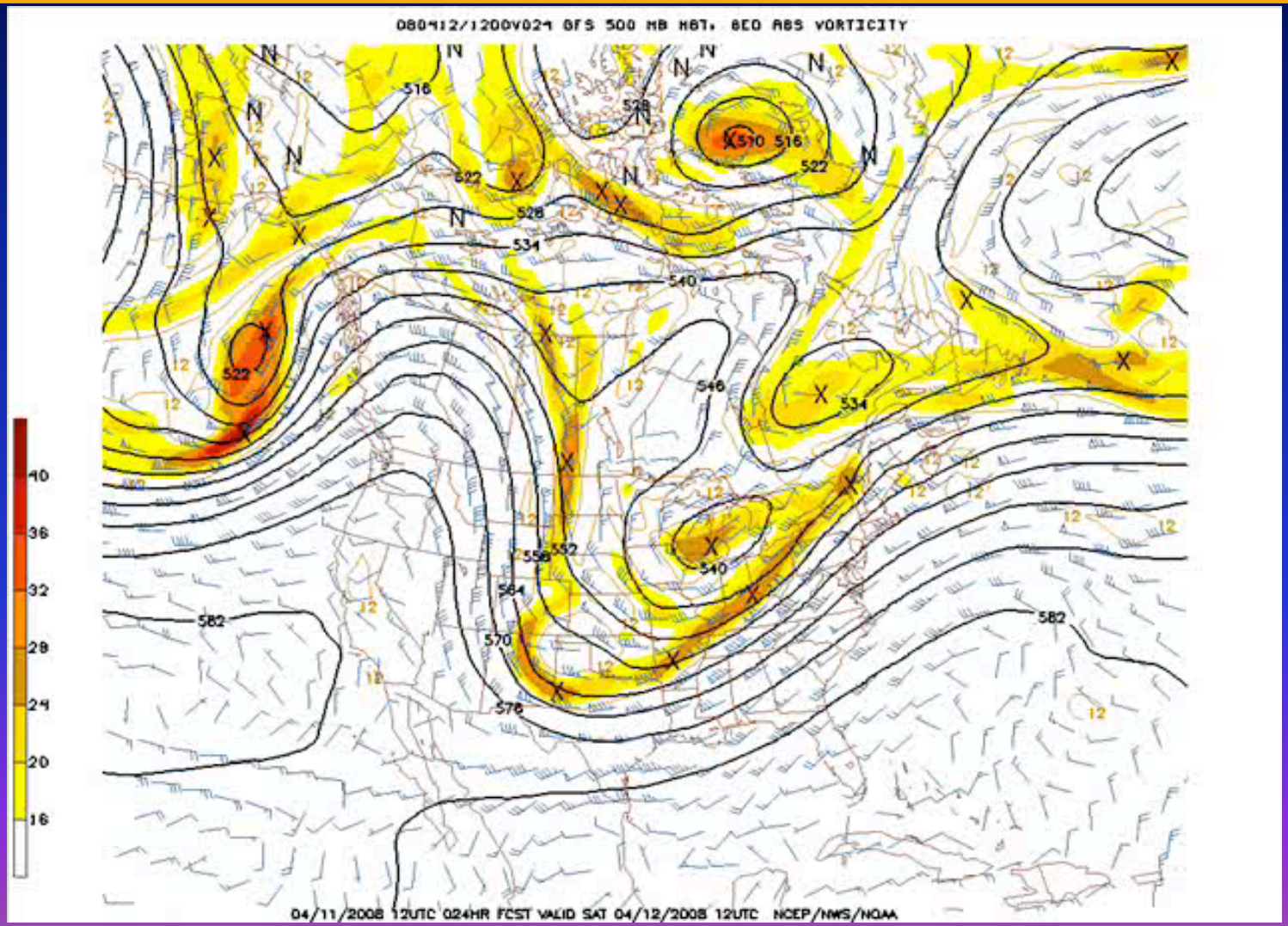
  (AQMIS) http://www.arb.ca.gov/aqd/aqinfo.htm, http://www.satguard.com/USFS4/realtime.asp, Airnow, or Local Air District.
- 500 mb Heights

  CANSAC
- Maximum Mixing Height

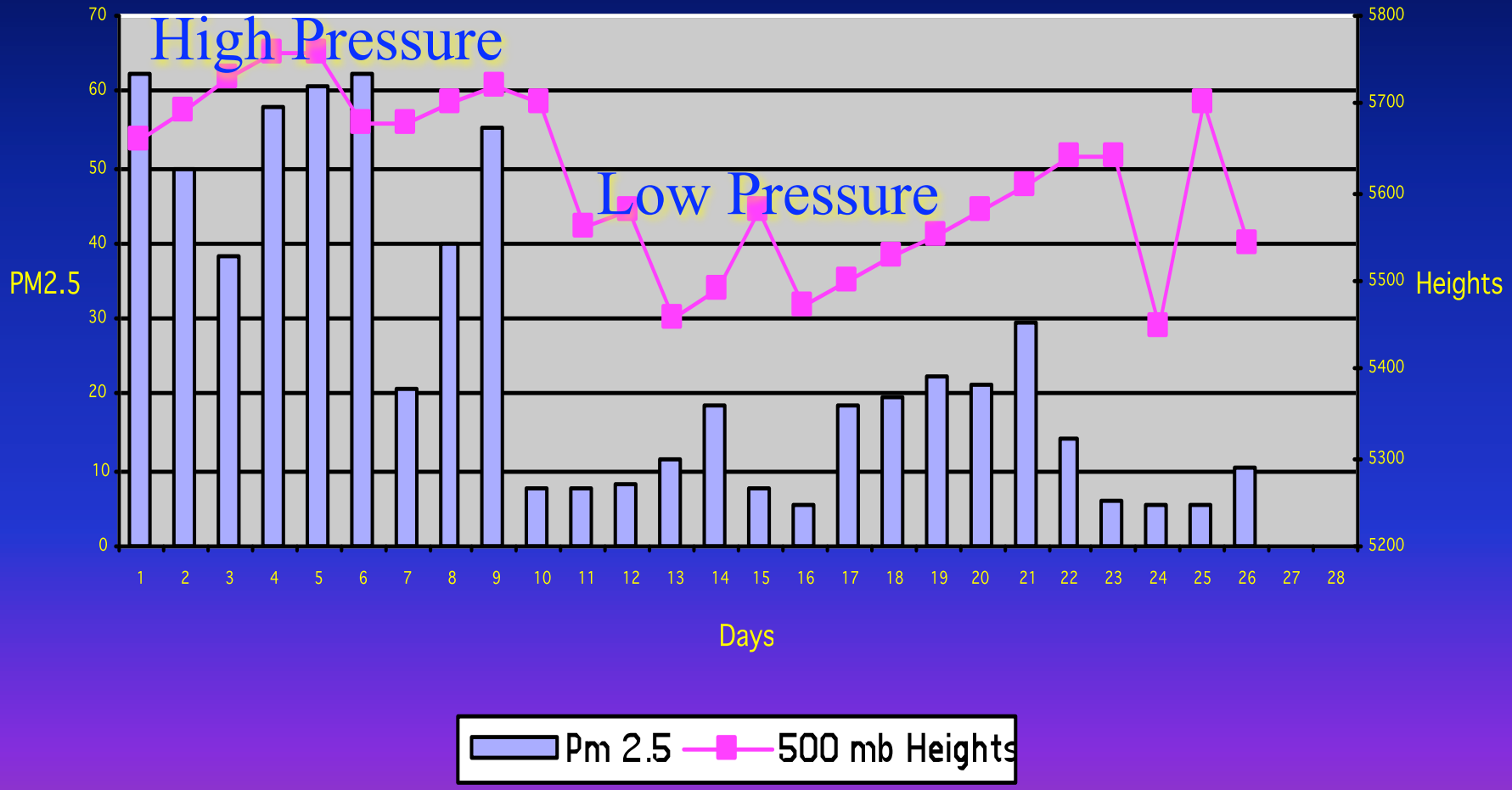
  CANSAC
- Wind Speed (Mixing Layer)

  CANSAC

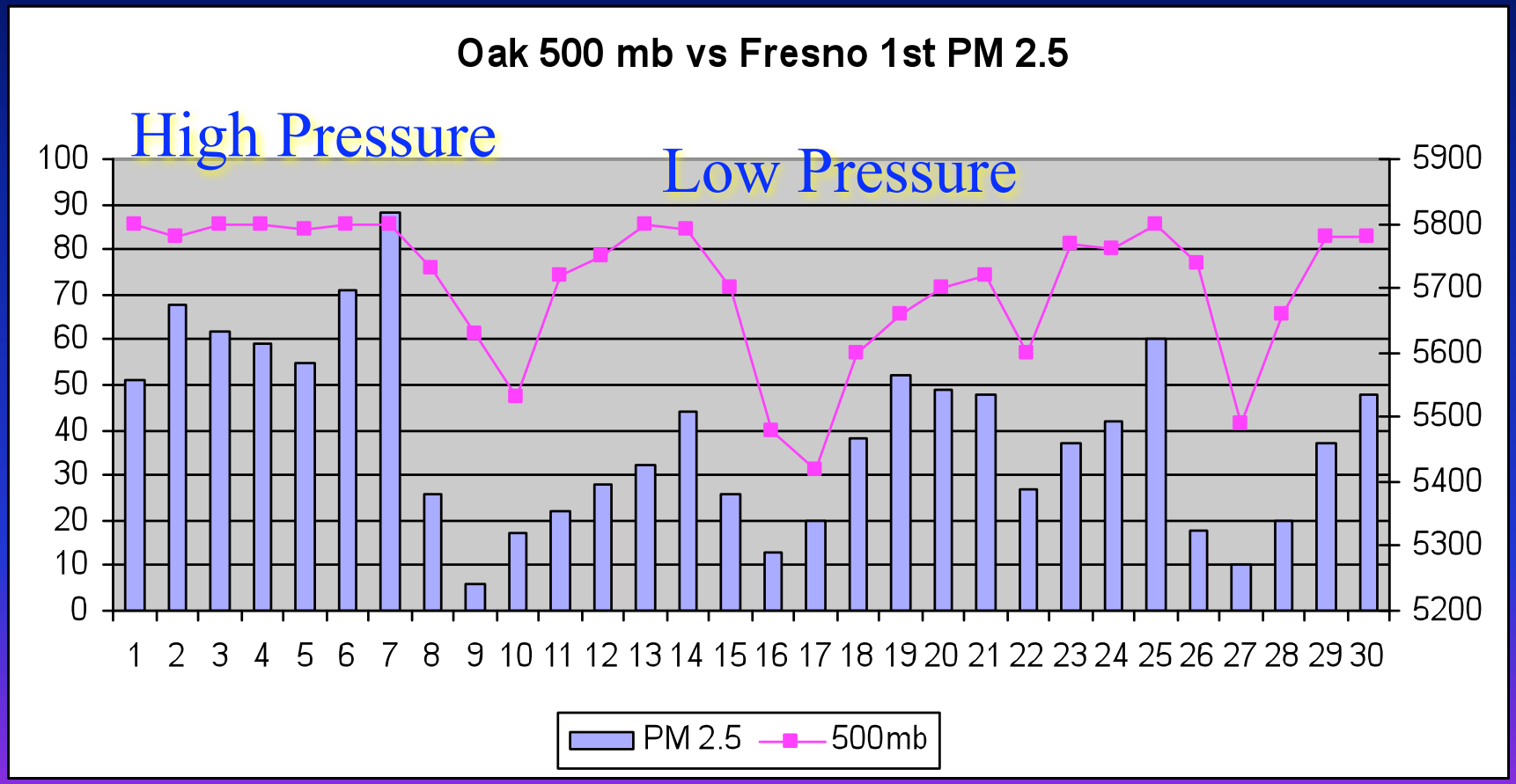
500 mb Forecast



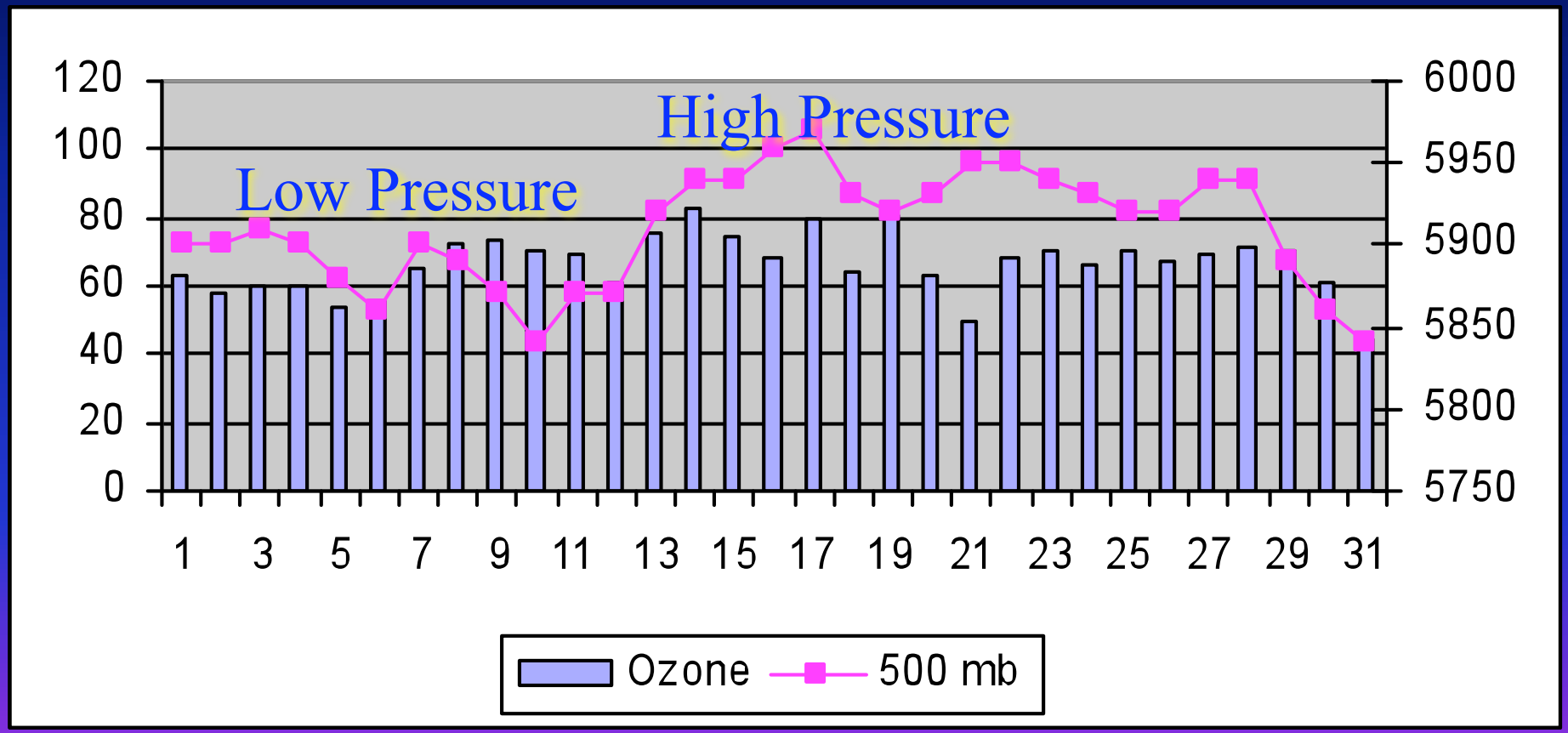
500 mb Heights vs PM 2.5 in Chico



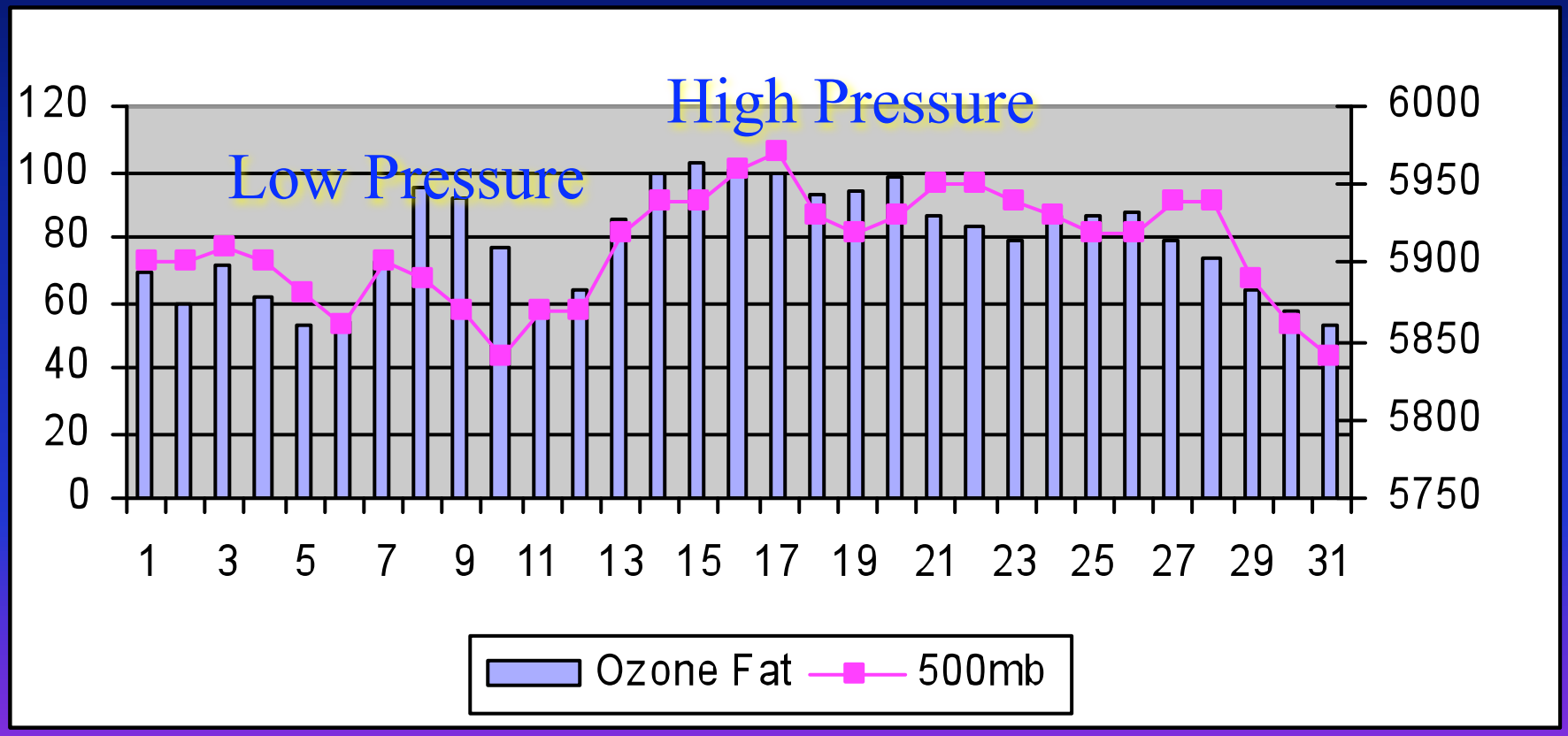
500 mb Heights vs PM 2.5 in Fresno

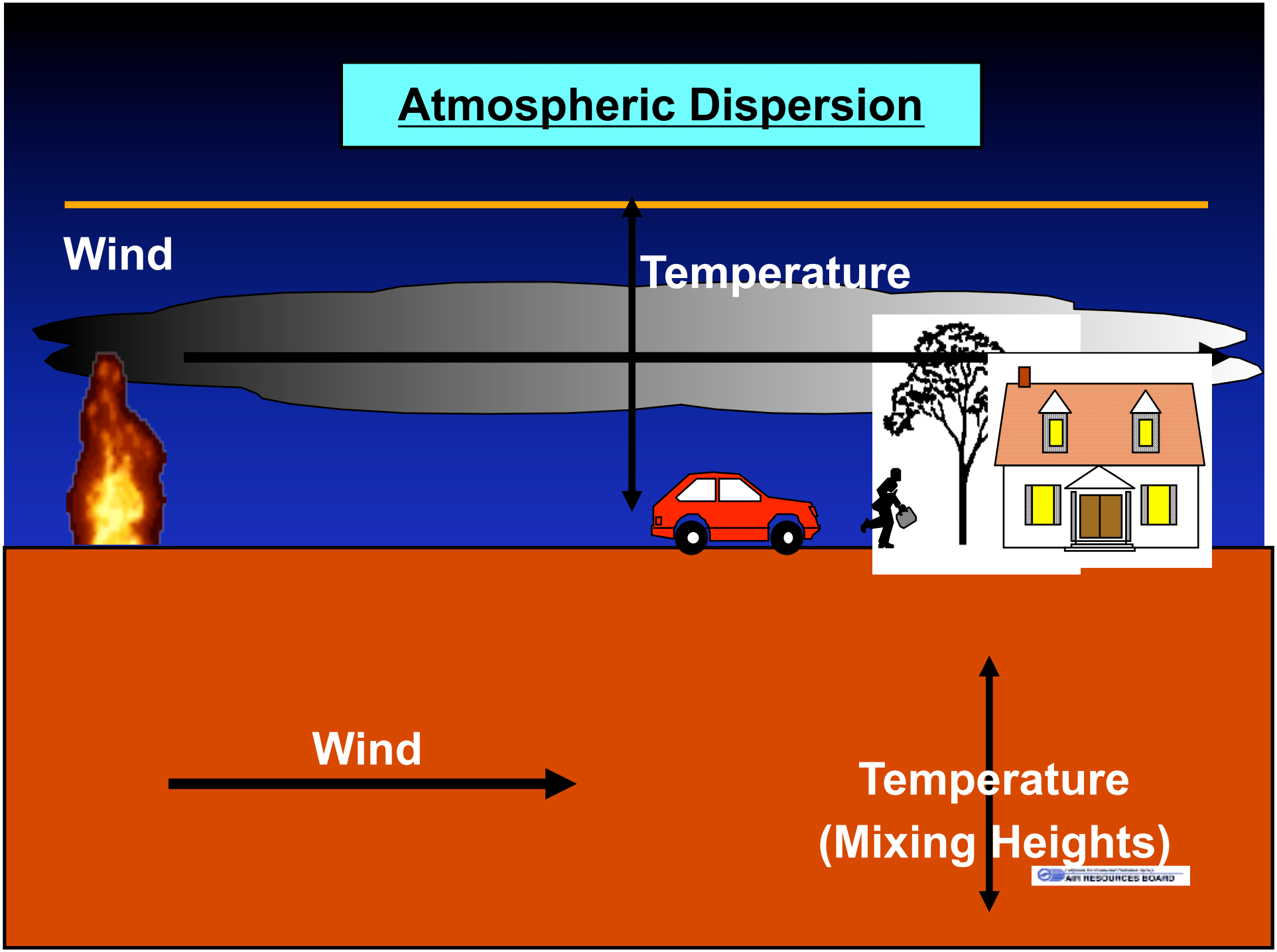


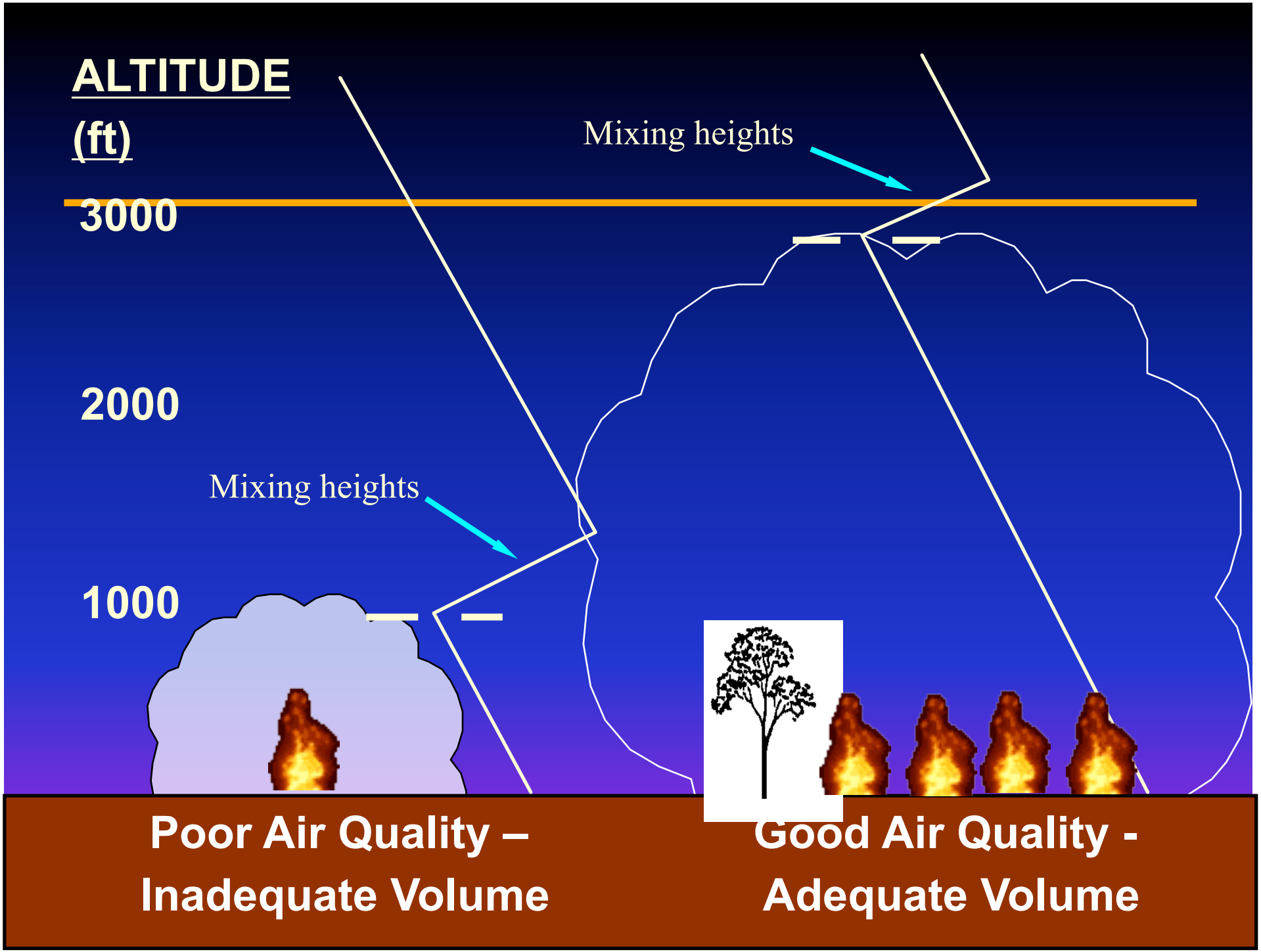
500 mb Heights vs Ozone in Yosemite



500 mb Heights vs Ozone in Fresno



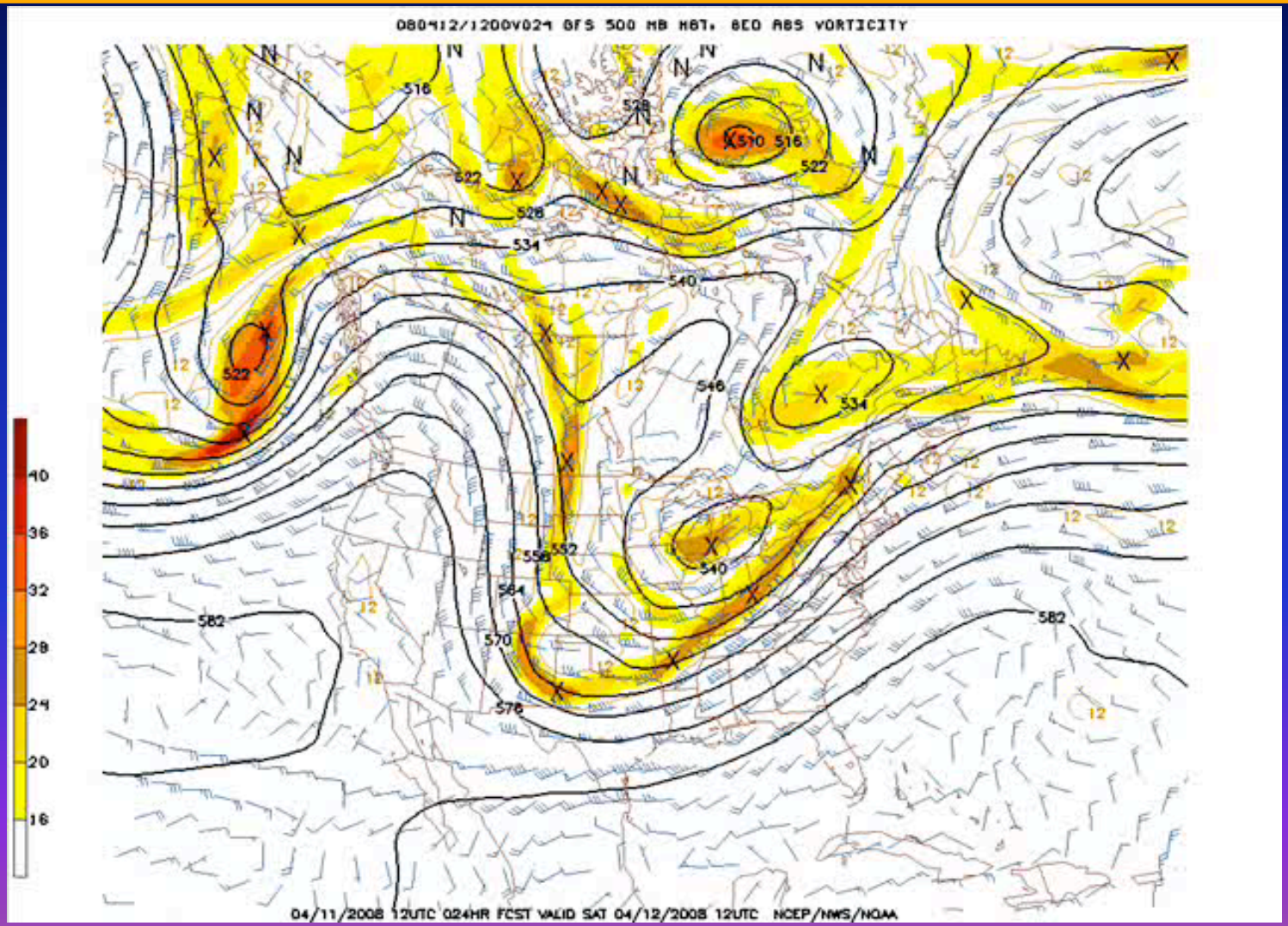

Atmospheric Dispersion
Wind
Temperature
Wind
Temperature
(Mixing Heights)
AIR RESOURCES BOARD


ALTITUDE
(ft)
3000
2000
1000
Mixing heights
Mixing heights
Poor Air Quality –
Inadequate Volume
Good Air Quality -
Adequate Volume

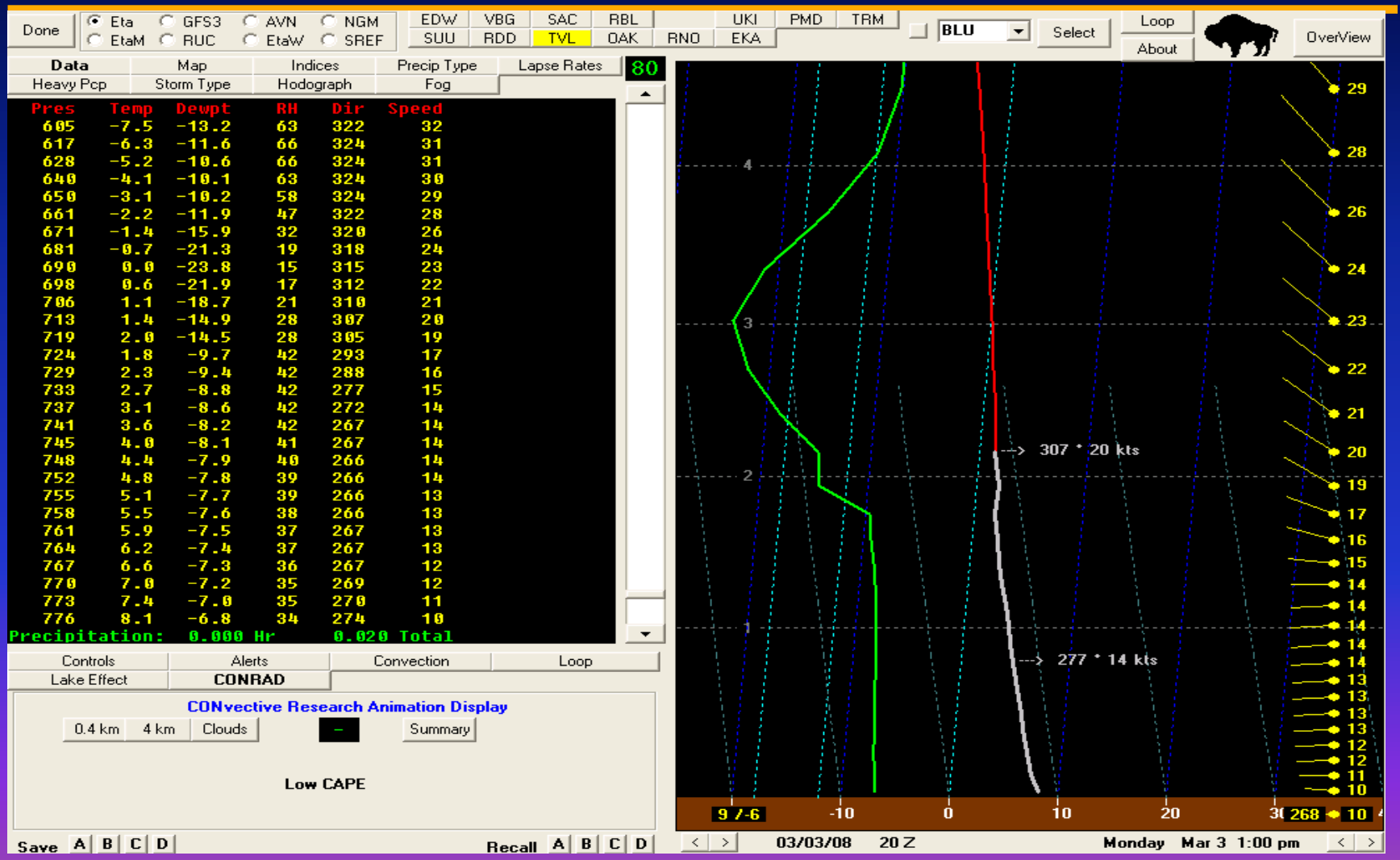
Smoke Management and CANSAC

- Met data not focused on California.
- Most information not produced specifically for smoke management.
- Most meteorological information not readable to average person.

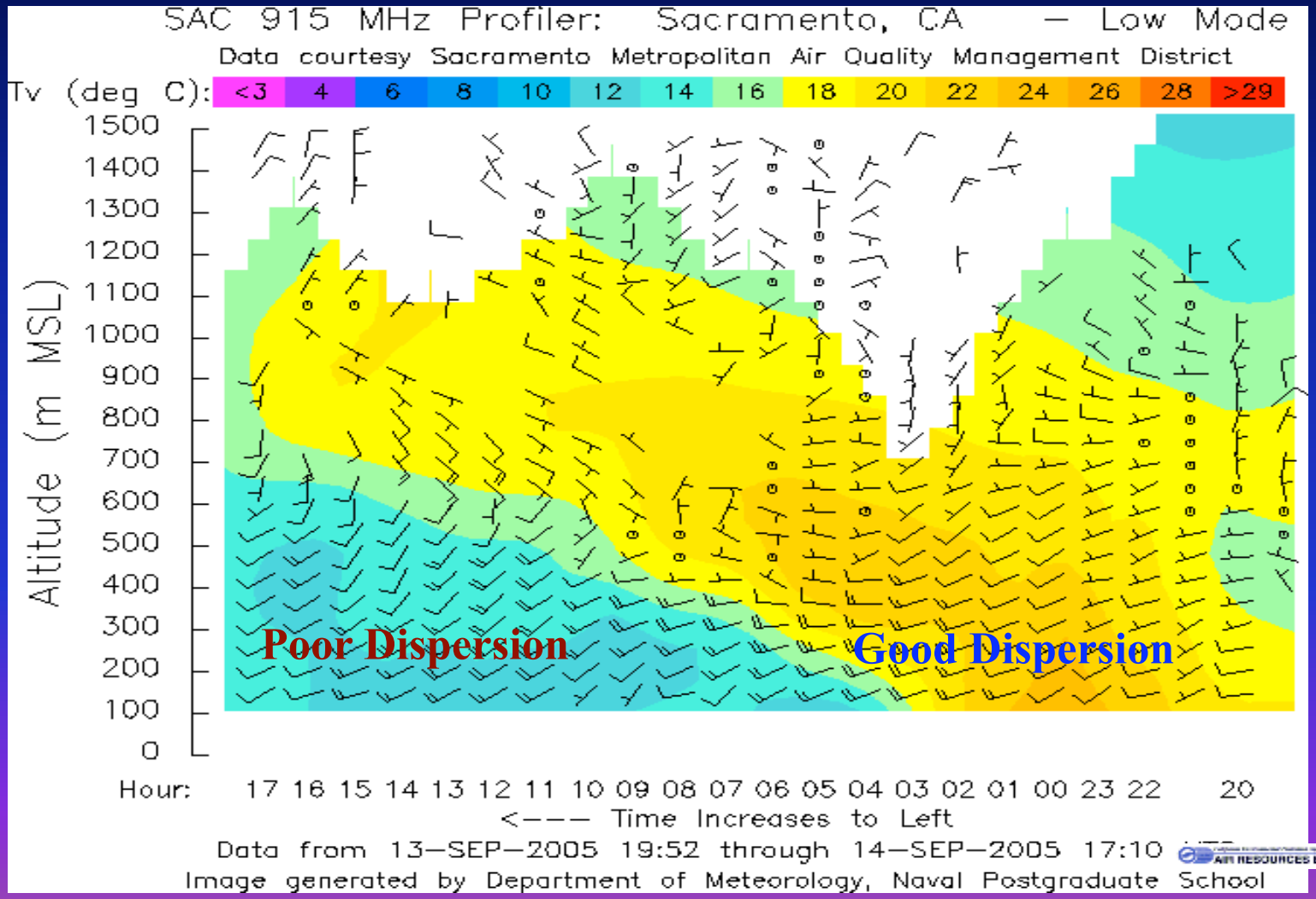
500 mb Forecast

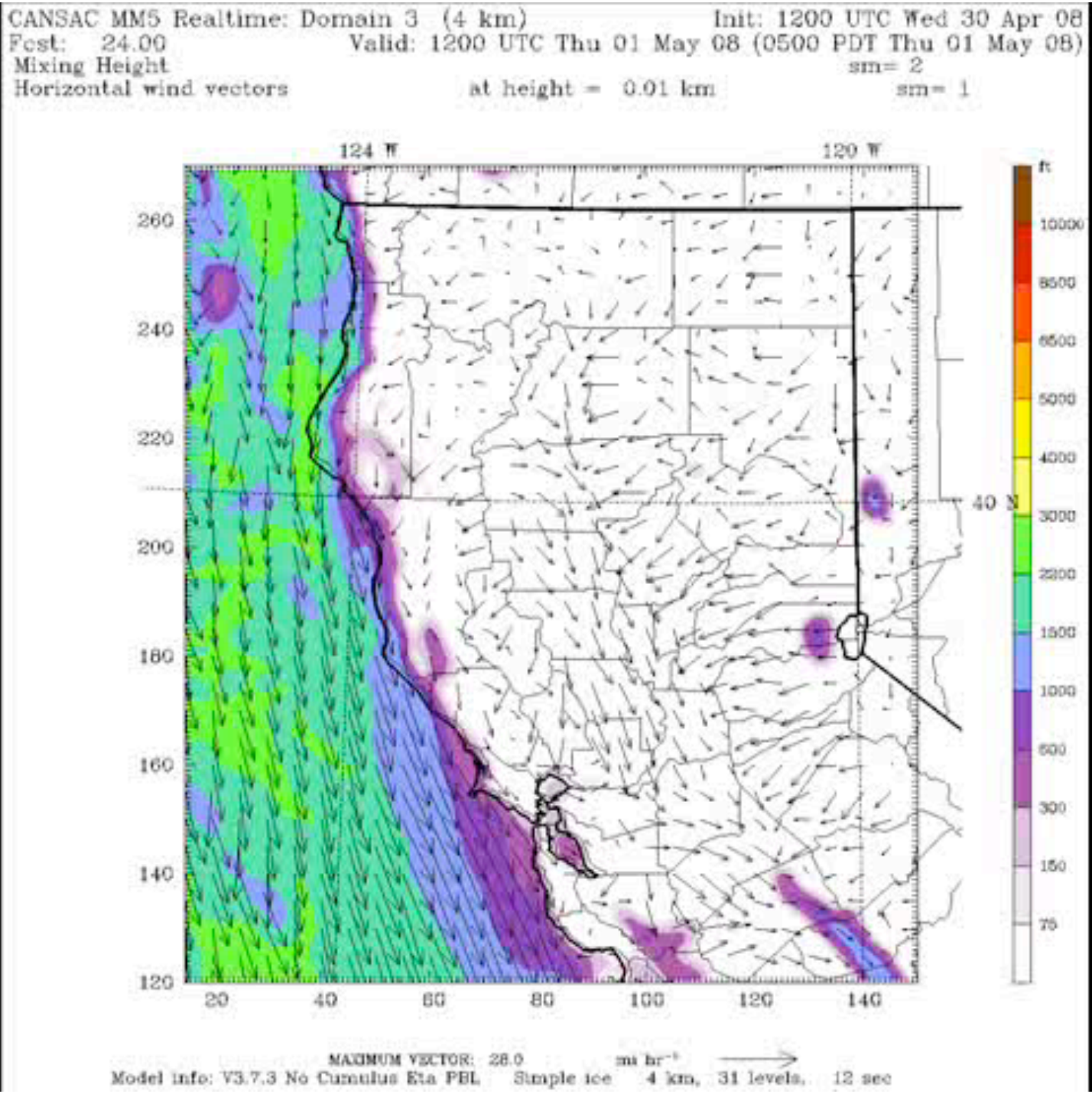


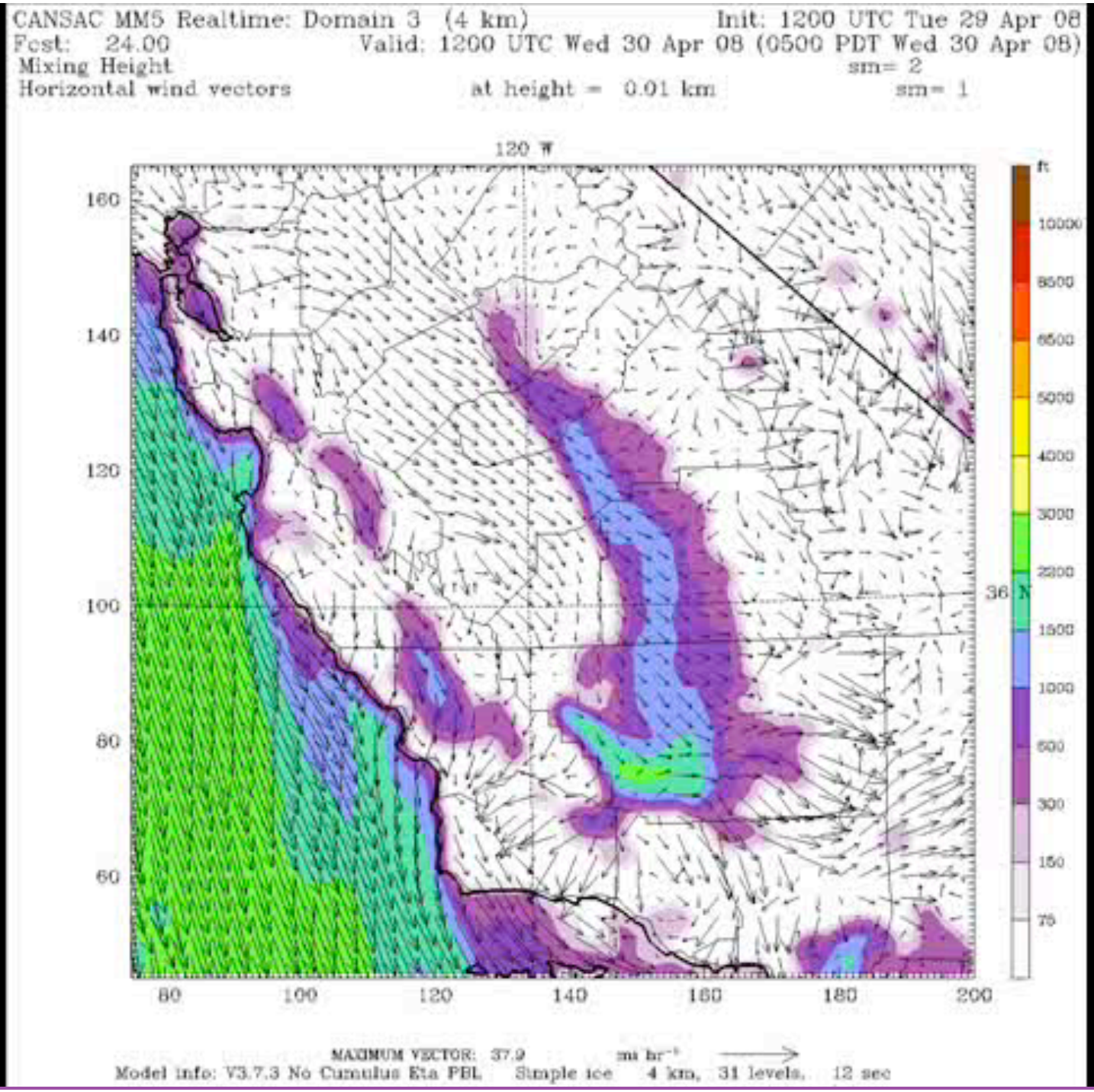
Bufkit


Done
Eta
EtaM
GFS3
RUC
AVN
EtaW
NGM
SREF
EDW
VBG
SAC
RBL
SUU
RDD
TVL
OAK
RNO
UKI
EKA
PMD
TRM
BLU
Select
Loop
About
OverView
Data
Map
Indices
Precip Type
Lapse Rates
Heavy Pcp
Storm Type
Hodograph
Fog
80
Pres Temp Dewpt RH Dir Speed
605 -7.5 -13.2 63 322 32
617 -6.3 -11.6 66 324 31
628 -5.2 -10.6 66 324 31
640 -4.1 -10.1 63 324 30
650 -3.1 -10.2 58 324 29
661 -2.2 -11.9 47 322 28
671 -1.4 -15.9 32 320 26
681 -0.7 -21.3 19 318 24
690 0.0 -23.8 15 315 23
698 0.6 -21.9 17 312 22
706 1.1 -18.7 21 310 21
713 1.4 -14.9 28 307 20
719 2.0 -14.5 28 305 19
724 1.8 -9.7 42 293 17
729 2.3 -9.4 42 288 16
733 2.7 -8.8 42 277 15
737 3.1 -8.6 42 272 14
741 3.6 -8.2 42 267 14
745 4.0 -8.1 41 267 14
748 4.4 -7.9 40 266 14
752 4.8 -7.8 39 266 14
755 5.1 -7.7 39 266 13
758 5.5 -7.6 38 266 13
761 5.9 -7.5 37 267 13
764 6.2 -7.4 37 267 13
767 6.6 -7.3 36 267 12
770 7.0 -7.2 35 269 12
773 7.4 -7.0 35 270 11
776 8.1 -6.8 34 274 10
Precipitation: 0.000 Hr 0.020 Total
Controls
Alerts
Convection
Loop
Lake Effect
CONRAD
CONvective Research Animation Display
0.4 km
4 km
Clouds
Summary
Low CAPE
Save A B C D
Recall A B C D
--> 307 * 20 kts
--> 277 * 14 kts
9 7 -6
-10
0
10
20
30 268 10
03/03/08 20 Z
Monday Mar 3 1:00 pm

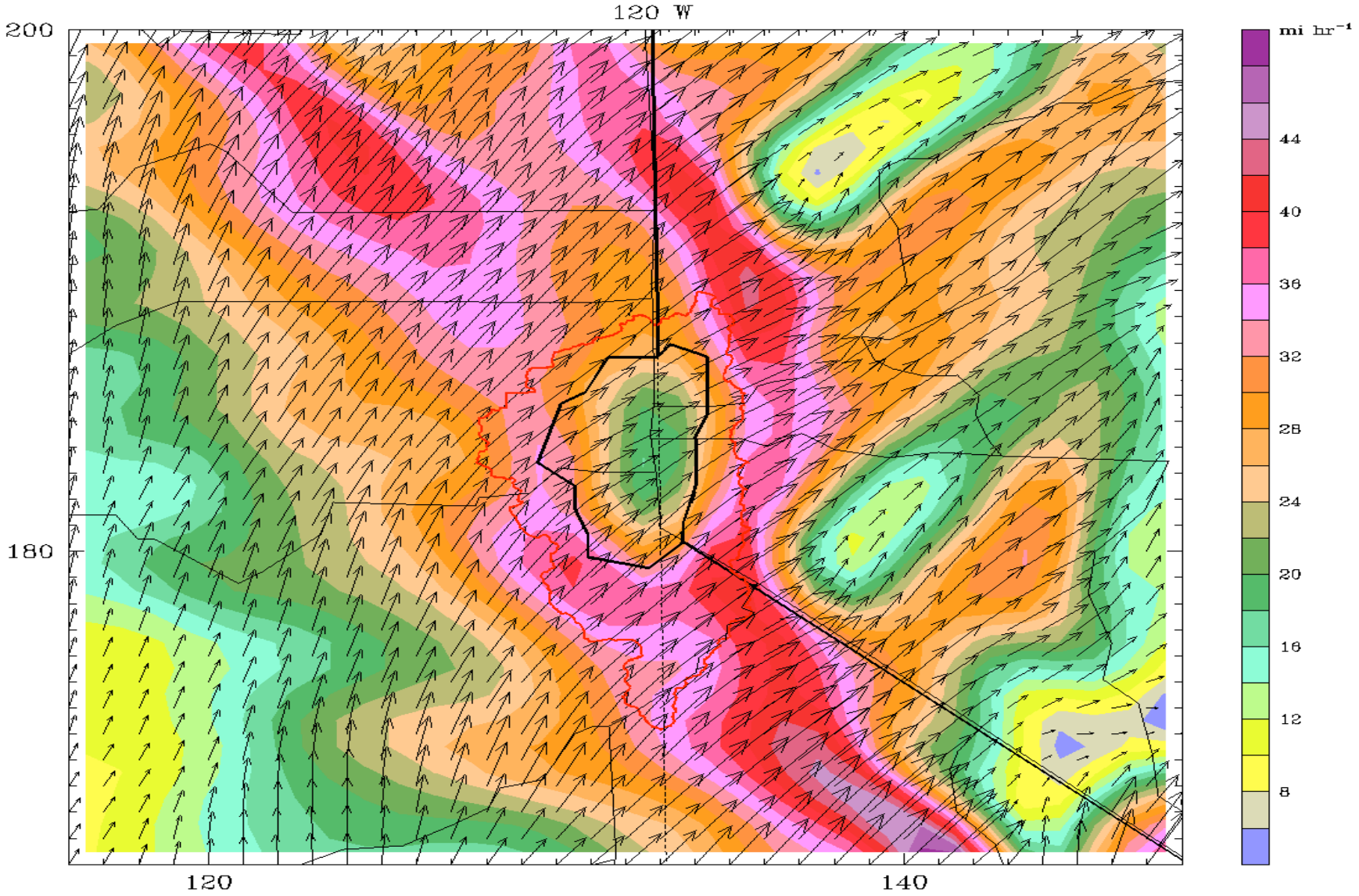
Profilers


SAC 915 MHz Profiler: Sacramento, CA — Low Mode
Data courtesy Sacramento Metropolitan Air Quality Management District
Tv (deg C): <3 4 6 8 10 12 14 16 18 20 22 24 26 28 >29
Altitude (m MSL)
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Poor Dispersion
Good Dispersion
Hour: 17 16 15 14 13 12 11 10 09 08 07 06 05 04 03 02 01 00 23 22 20
<--- Time Increases to Left
Data from 13-SEP-2005 19:52 through 14-SEP-2005 17:10
Image generated by Department of Meteorology, Naval Postgraduate School


CANSAC MM5 Realtime: Domain 3 (4 km)
Init: 1200 UTC Wed 30 Apr 08
Fcst: 24.00
Valid: 1200 UTC Thu 01 May 08 (0500 PDT Thu 01 May 08)
Mixing Height
sm= 2
Horizontal wind vectors
at height = 0.01 km
sm= 1
124 W
120 W
40 N
260
240
220
200
180
160
140
120
20
40
60
80
100
120
140
ft
10000
8500
6500
5000
4000
3000
2200
1500
1000
600
300
150
75
MAXIMUM VECTOR: 28.0 mi hr-1
Model info: V3.7.3 No Cumulus Eta PBL Simple ice 4 km, 31 levels, 12 sec

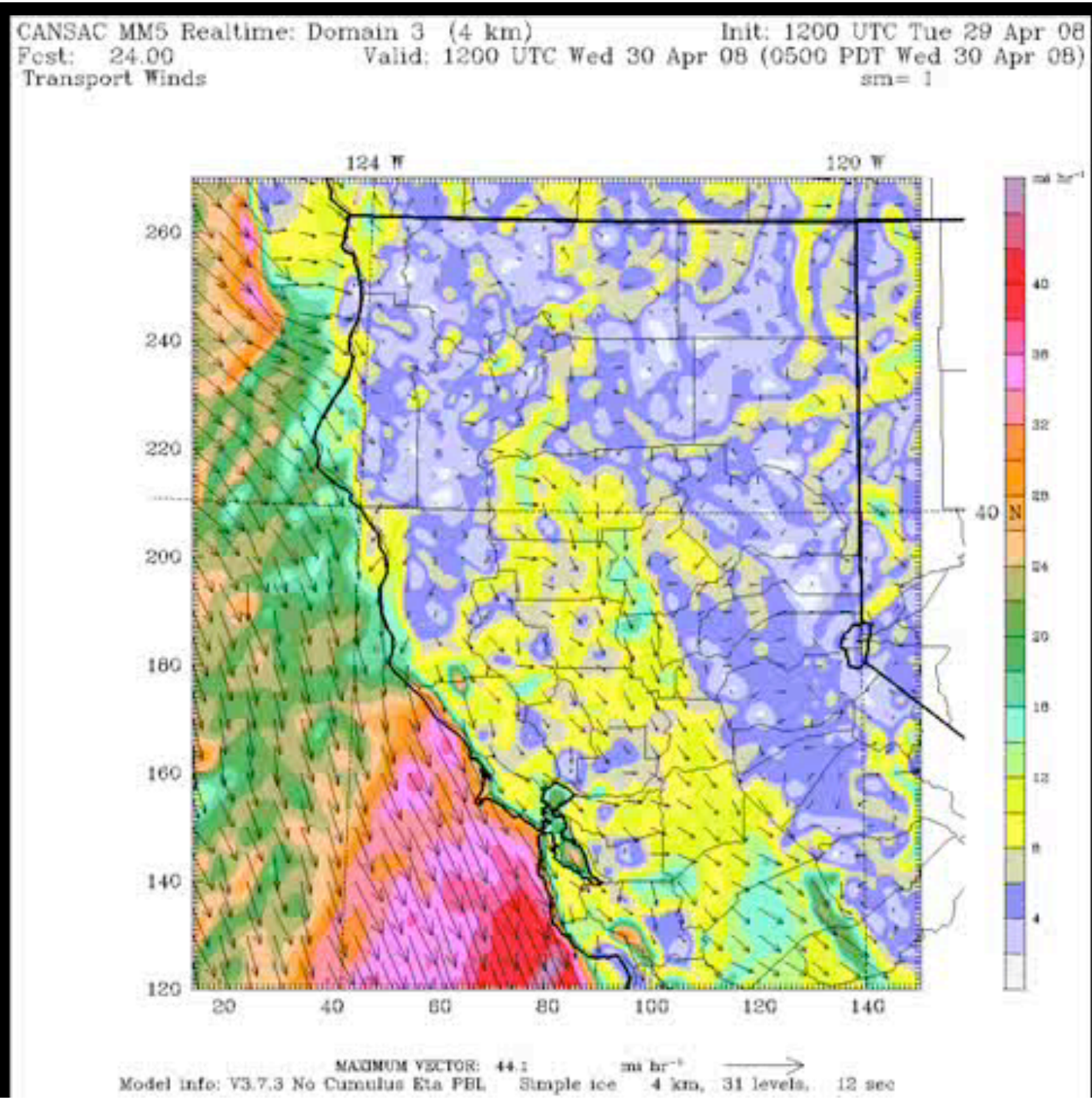

CANSAC MM5 Realtime: Domain 3 (4 km)
Init: 1200 UTC Tue 29 Apr 08
Fcst: 24.00
Valid: 1200 UTC Wed 30 Apr 08 (0500 PDT Wed 30 Apr 08)
Mixing Height
sm= 2
Horizontal wind vectors
at height = 0.01 km
sm= 1
120 W
160
140
120
100
80
60
36 N
80
100
120
140
160
180
200
ft
10000
8500
6500
5000
4000
3000
2200
1500
1000
600
300
150
75
MAXIMUM VECTOR: 37.9 mi hr-1
Model info: V3.7.3 No Cumulus Eta PBL Simple ice 4 km, 31 levels, 12 sec

CANSAC MM5 Realtime: Domain 3 (4 km) Init: 1200 UTC Thu 28 Feb 08
Fcst: 33.00 Valid: 2100 UTC Fri 29 Feb 08 (1300 PST Fri 29 Feb 08)
Transport Winds sm= 1

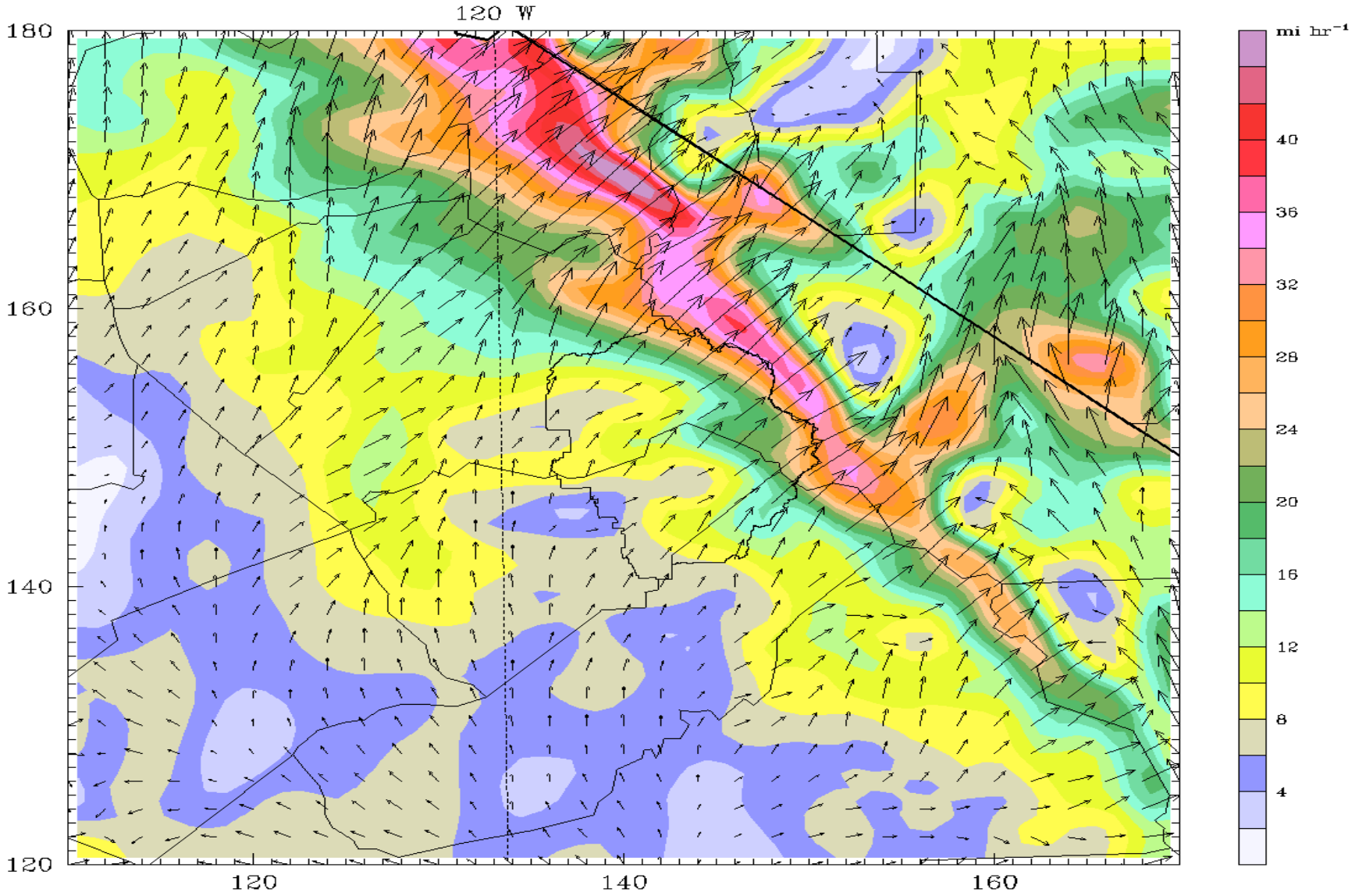


MAXIMUM VECTOR: 48.3 mi hr^{-1}

Model info: V3.7.3 No Cumulus Eta PBL Simple ice 4 km, 31 levels, 12 sec


CANSAC MM5 Realtime: Domain 3 (4 km)
Init: 1200 UTC Tue 29 Apr 08
Fcst: 24.00
Valid: 1200 UTC Wed 30 Apr 08 (0500 PDT Wed 30 Apr 08)
Transport Winds
sm= 1
124 W
120 W
40 N
260
240
220
200
180
160
140
120
20
40
60
80
100
120
140
40
36
32
28
24
20
16
12
8
4
MAXIMUM VECTOR: 44.1 mi hr-1
Model info: V3.7.3 No Cumulus Eta PBL Simple ice 4 km, 31 levels, 12 sec

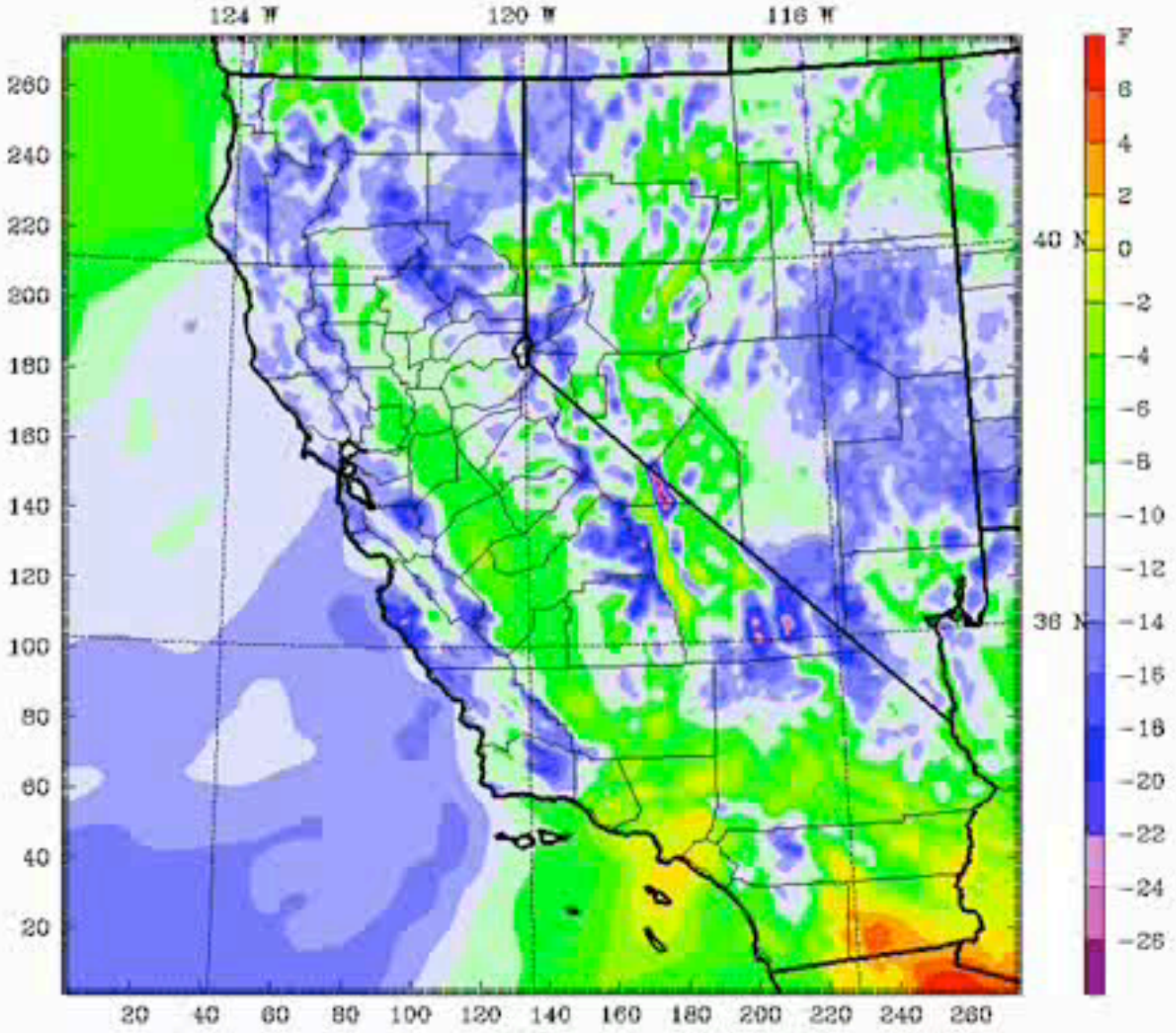
CANSAC MM5 Realtime: Domain 3 (4 km) Init: 1200 UTC Thu 28 Feb 08
Fcst: 33.00 Valid: 2100 UTC Fri 29 Feb 08 (1300 PST Fri 29 Feb 08)
Transport Winds sm= 1



MAXIMUM VECTOR: 45.1 mi hr^{-1}

Model info: V3.7.3 No Cumulus Eta PBL Simple ice 4 km, 31 levels, 12 sec

CANSAC MM5 Realtime: Domain 3 (4 km) Init: 1200 UTC Sun 24 Feb 08
Fcst: 0.00 Valid: 1200 UTC Sun 24 Feb 08 (0400 PST Sun 24 Feb 08)
Temperature Diff (3Kft-Sur. Lev.) sm= 1



Model info: V3.7.3 No Cumulus Eta PBL Simple Ice 4 km, 31 levels. 12 sec

Test

Mountain Counties Air Basin

1. 12Z 500 mb height… =___dm ____< 577 dm

2. 00Z 500 mb height… =___dm ____< 577 dm

Test

North Central Coast Air Basin
Northwest Section

Maximum Mixing Height $\geq$ 1500 ft

Wind Speed (mixing layer) $\geq$ 5 mph

BlueSky

2008022812 MM5 run as of Thu Feb 28 14:35:12 PST 2008 MM5-status: Thu Feb 28 07:03:32 PST 2008 mm5 run started

CANBURN

CANSAC Bluesky Prescribed Fire Input Form (Under Development)

Please enter the incident you would include as part of Bluesky's smoke impact forecasts:

* Please select whether this burn is for planned or actual.

1. Burn data absolutely necessary for BlueSky

Please select whether this burn is: Planned ○ Accomplished ○

	Month	Day	Year	Hour	Minute
Ignition Date and Time:	1	1	2006	00	00

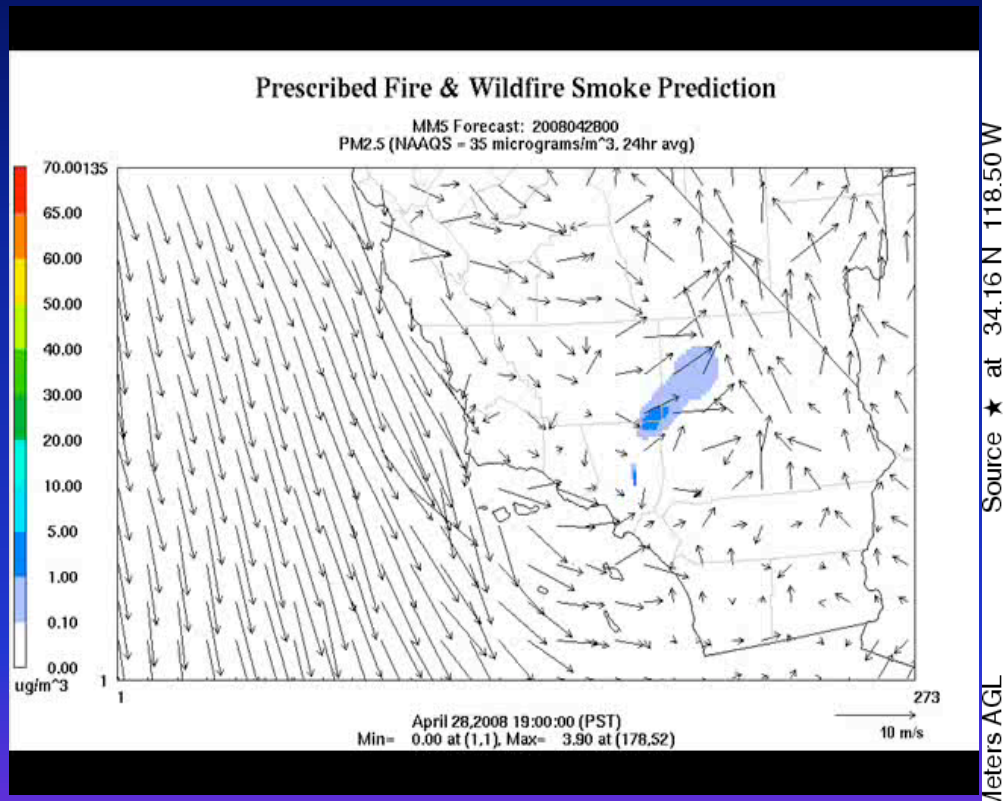
Incident ID:

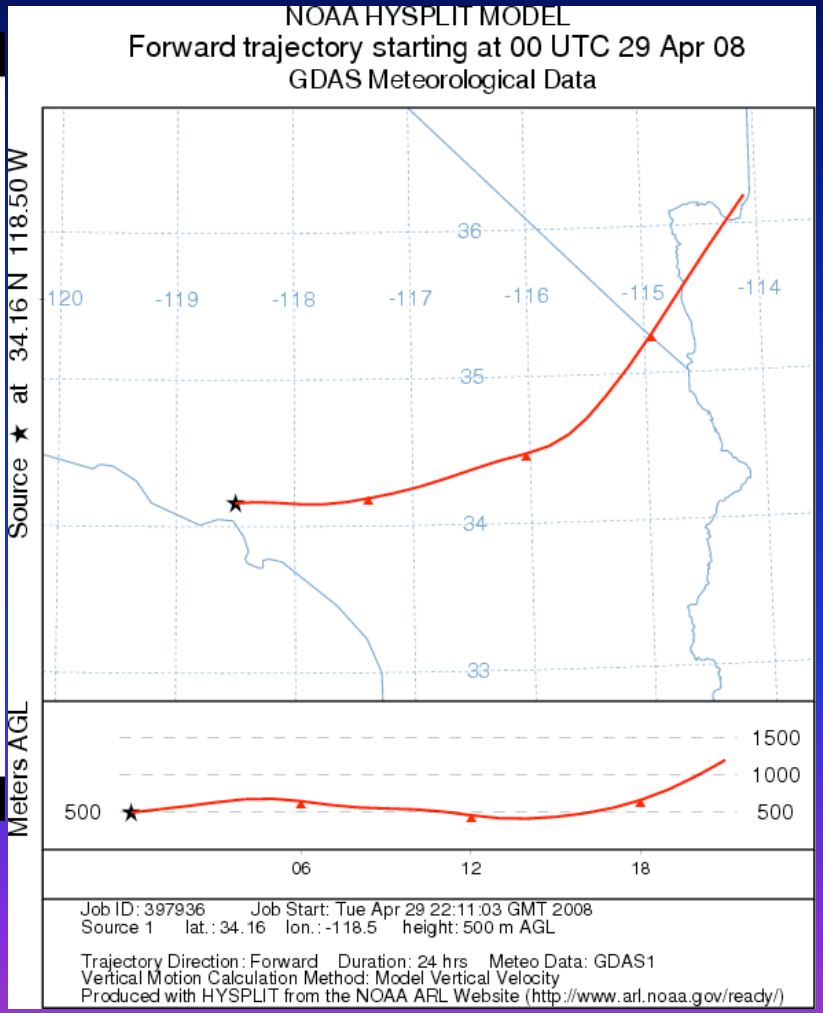
Latitude: (decimal degrees north) [Range: 32.15 - 42.30]

Longitude: (decimal degrees west) [Range: 126.56 - 112.89]

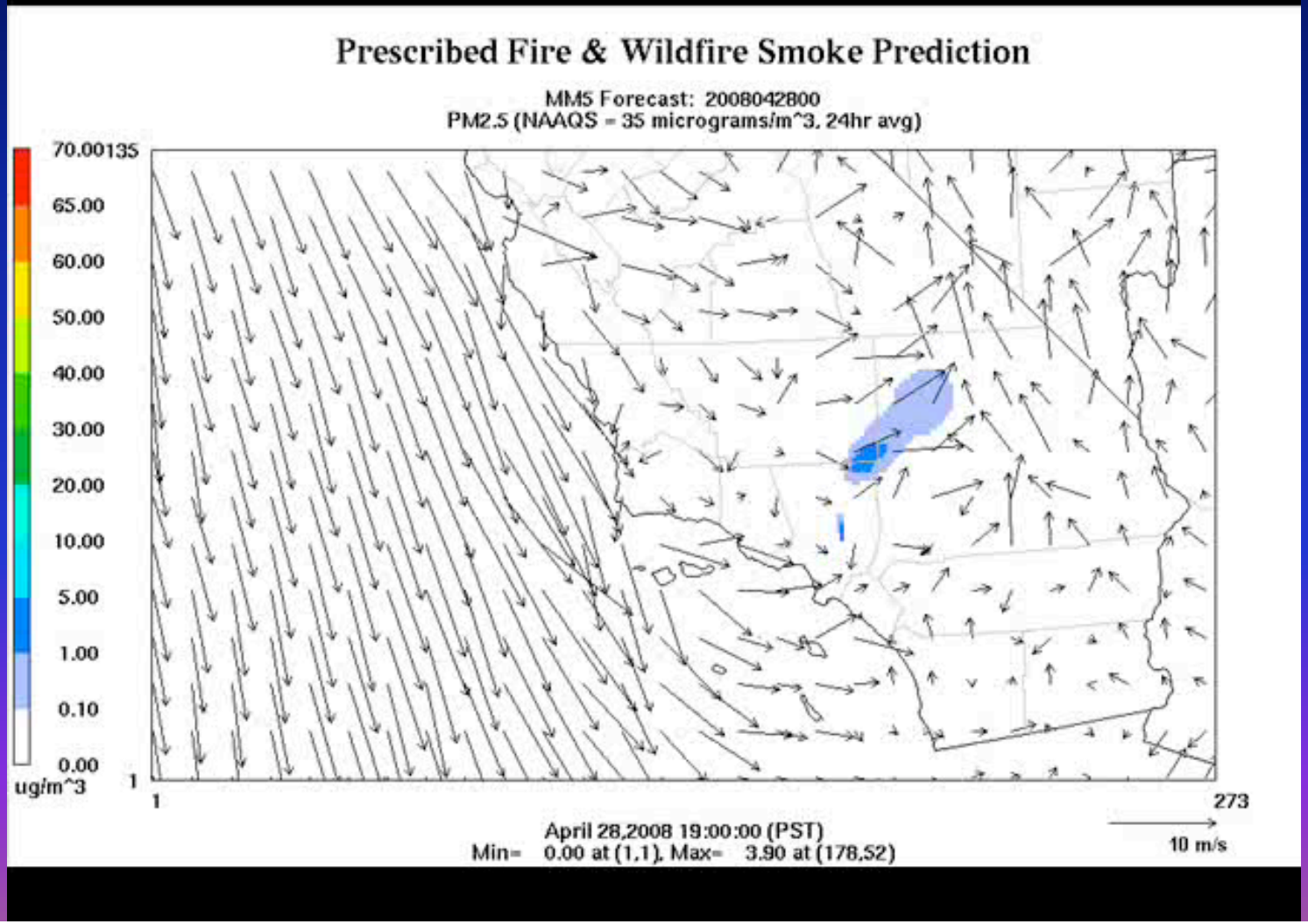
OR

BlueSky


Prescribed Fire & Wildfire Smoke Prediction
MM5 Forecast: 2008042800
PM2.5 (NAAQS = 35 micrograms/m^3, 24hr avg)
70.00135
65.00
60.00
50.00
40.00
30.00
20.00
10.00
5.00
1.00
0.10
0.00
ug/m^3
1
1
273
10 m/s
April 28,2008 19:00:00 (PST)
Min= 0.00 at (1,1), Max= 3.90 at (178,52)


NOAA HYSPLIT MODEL
Forward trajectory starting at 00 UTC 29 Apr 08
GDAS Meteorological Data
Source ★ at 34.16 N 118.50 W
-120
-119
-118
-117
-116
-115
-114
36
35
34
33
Meters AGL
1500
1000
500
500
06
12
18
Job ID: 397936 Job Start: Tue Apr 29 22:11:03 GMT 2008
Source 1 lat.: 34.16 lon.: -118.5 height: 500 m AGL
Trajectory Direction: Forward Duration: 24 hrs Meteo Data: GDAS1
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

Challenges Ahead



California Environmental Protection Agency

Air Resources Board

Dar Mims

Contract Manager

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(916) 322-7454

ARB Meteorology Web Page

www.arb.ca.gov/met/met.htm