

DISCOVER-AQ OUTLOOK Jan. 21, 2013

Today was another day very similar to the past few days. It started out with some early AM fog in the central part of the SJV. Hanford fog began at 2:18 AM and remained with <0.25 mi visibility until 9 AM. Hanford jumped to 1.25 mi. just before the P-3B arrived and the plane was able to do a missed approach there on the first circuit. Visalia went to 0.5 mi visibility briefly at 7:35 AM, but quickly recovered to 1.5 mi. at 8 AM. Haze was prevalent throughout the valley with visibilities of 3 mi. at a number of locations. PM2.5 was the highest at the southern end of the valley. However, most other locations except Huron and Tranquility were in the Code Orange range. We expect another morning fairly similar tomorrow, although the fog could be a bit more widespread and longer-lasting. Cirrus could be moving into the study area by afternoon tomorrow, but is expected to be less than 50% coverage. Wednesday will likely have considerable high cloudiness, and will not likely be a good day to fly. We may get some clearing on Thursday, but clouds will roll in on Friday associated with the cut off low off the coast of southern California. These clouds will likely persist on Saturday. A frontal system will approach from the northwest on Sunday, and pass the SJV by Monday, flushing out the valley.

Code Orange for PM2.5 is forecast for tomorrow for Fresno, Tulare, and Kern counties and Code Yellow for Kings County.

We recommend flying on Tuesday, but not on Wednesday. Thursday may be possible.

DISCOVER-AQ/PODEX Forecast Briefing

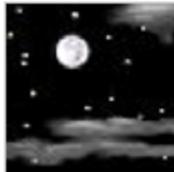
January 21, 2013

Ken Pickering, NASA/GSFC
Chris Loughner, ESSIC/GSFC

Fresno:

M.L.KING DAY	TONIGHT	TUESDAY	TUESDAY NIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY
								
Morning Frost High: 62 °F	Clear Low: 35 °F	Sunny High: 66 °F	Mostly Clear Low: 40 °F	Partly Sunny High: 66 °F	Mostly Cloudy Low: 46 °F	Mostly Sunny High: 64 °F	Partly Cloudy Low: 47 °F	Partly Sunny High: 65 °F

Hanford:

M.L.KING DAY	TONIGHT	TUESDAY	TUESDAY NIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY
								
Morning Frost High: 63 °F	Patchy Frost Low: 32 °F	Morning Frost High: 66 °F	Mostly Clear Low: 35 °F	Partly Sunny High: 66 °F	Partly Cloudy Low: 44 °F	Mostly Sunny High: 63 °F	Partly Cloudy Low: 45 °F	Partly Sunny High: 65 °F

Bakersfield:

M.L.KING DAY	TONIGHT	TUESDAY	TUESDAY NIGHT	WEDNESDAY	WEDNESDAY NIGHT	THURSDAY	THURSDAY NIGHT	FRIDAY
								
Morning Frost High: 62 °F	Clear Low: 34 °F	Sunny High: 68 °F	Mostly Clear Low: 40 °F	Mostly Sunny High: 67 °F	Partly Cloudy Low: 47 °F	Mostly Sunny High: 66 °F	Partly Cloudy Low: 47 °F	Partly Sunny High: 67 °F

Current Conditions

FRESNO CA

Haze

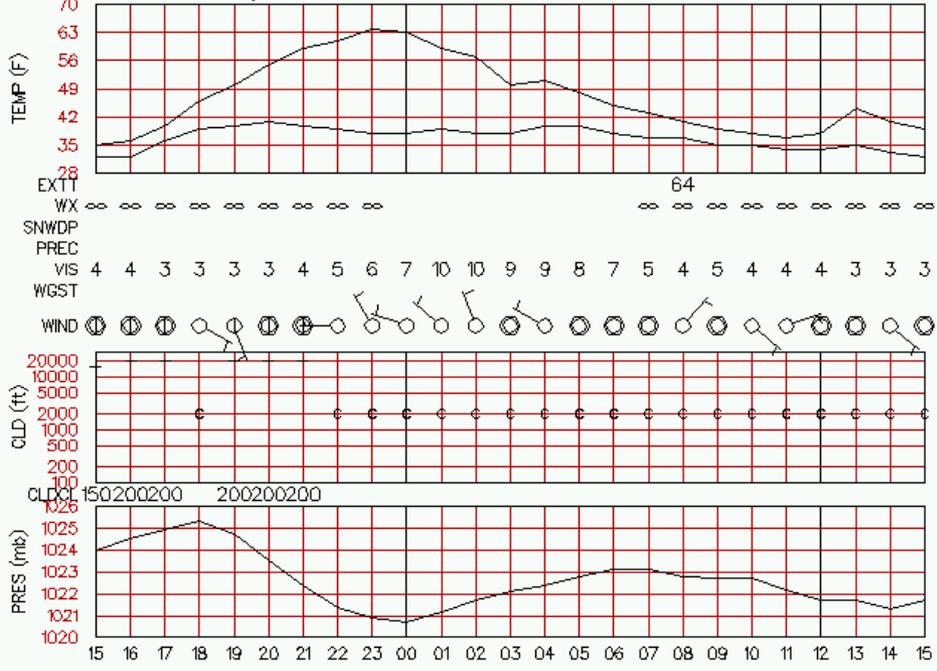
39°F
4°C

Humidity 76%
Wind Speed calm
Barometer 30.17 in (1021.7 mb)
Dewpoint 32°F (0°C)
Visibility 3.00 mi

Last Update on 21 Jan 6:53 am PST

▼ Plymouth State Weather Center ▼

Meteorgram for KFAT from 1500Z 20 JAN 13 to 1500Z 21 JAN 13



HANFORD CA

Weather: Freezing Fog

Temperature: 31°F

Dewpoint: 30°F

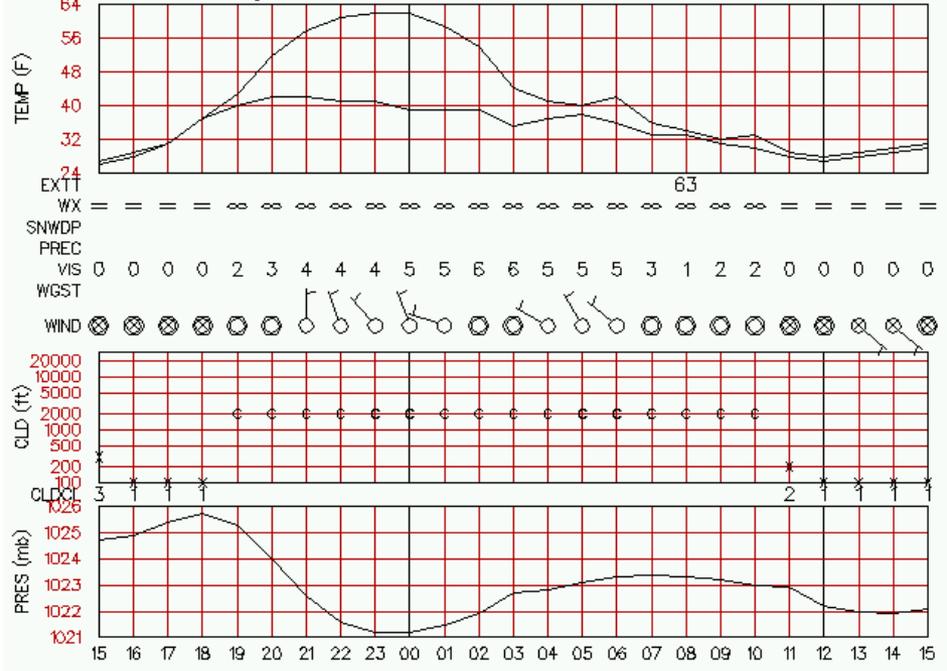
Humidity: 96%

Wind Speed: calm

Visibility: <0.25

▼ Plymouth State Weather Center ▼

Meteorgram for KHJO from 1500Z 20 JAN 13 to 1500Z 21 JAN 13



Current Conditions

BAKERSFIELD CA

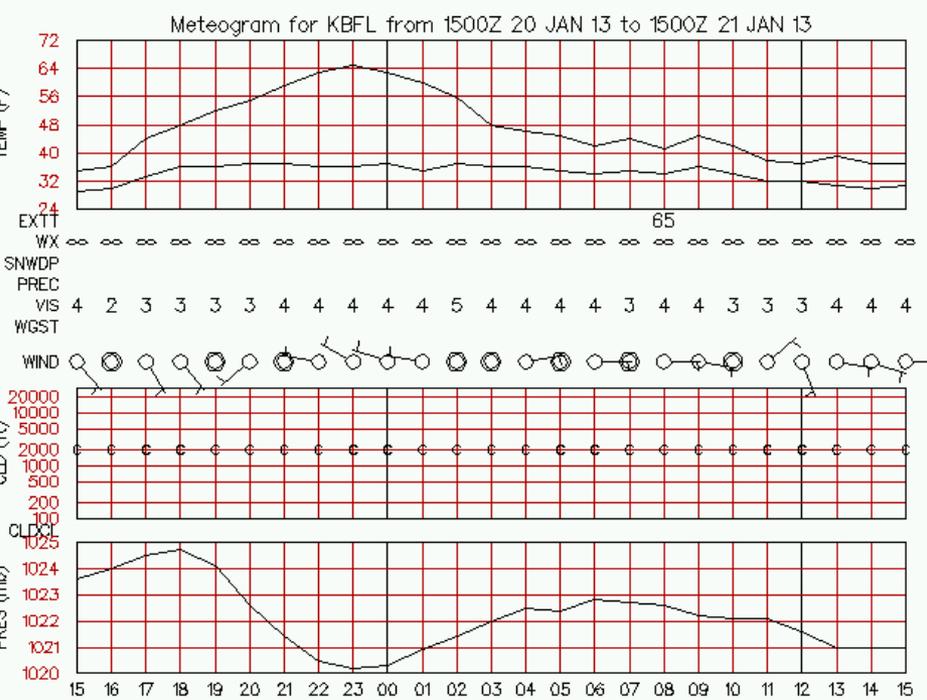
Haze

37°F
3°C

Humidity 78%
Wind Speed E 3 MPH
Barometer 30.15 in (1021.0 mb)
Dewpoint 31°F (-1°C)
Visibility 4.00 mi

Last Update on 21 Jan 6:54 am PST

Plymouth State Weather Center



Fresno



Fresno

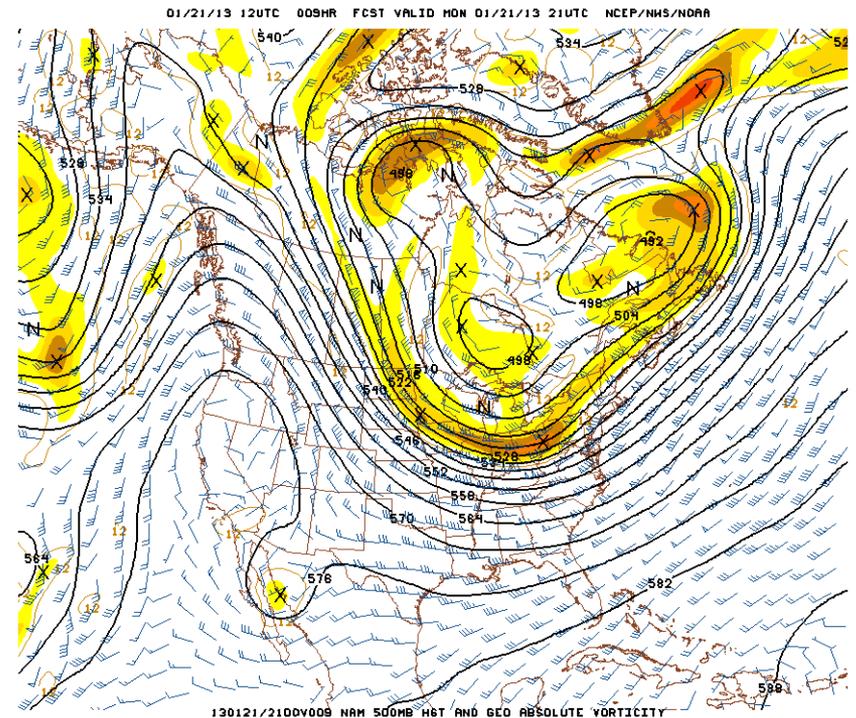
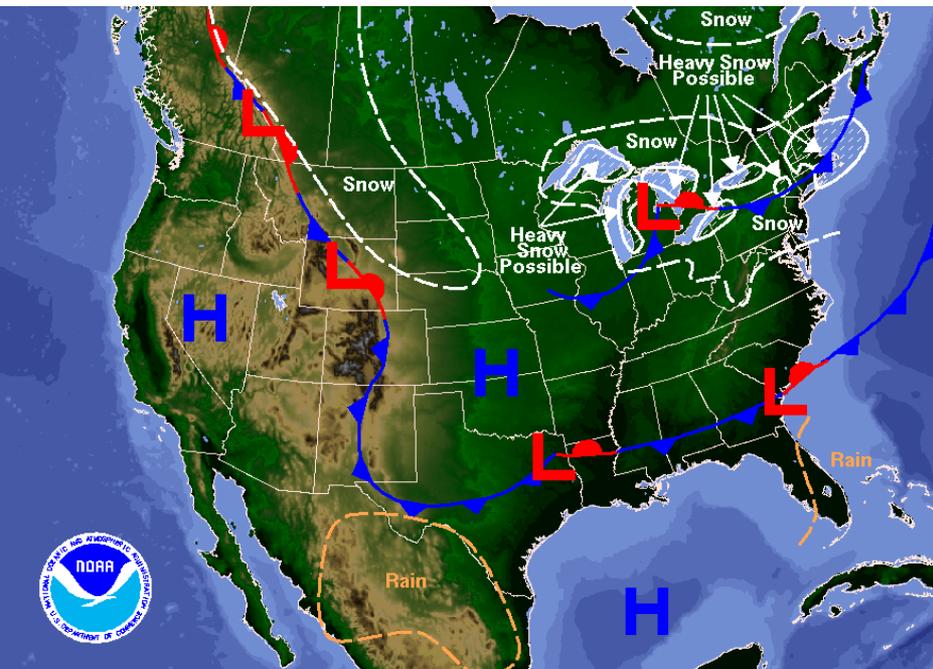


Visalia



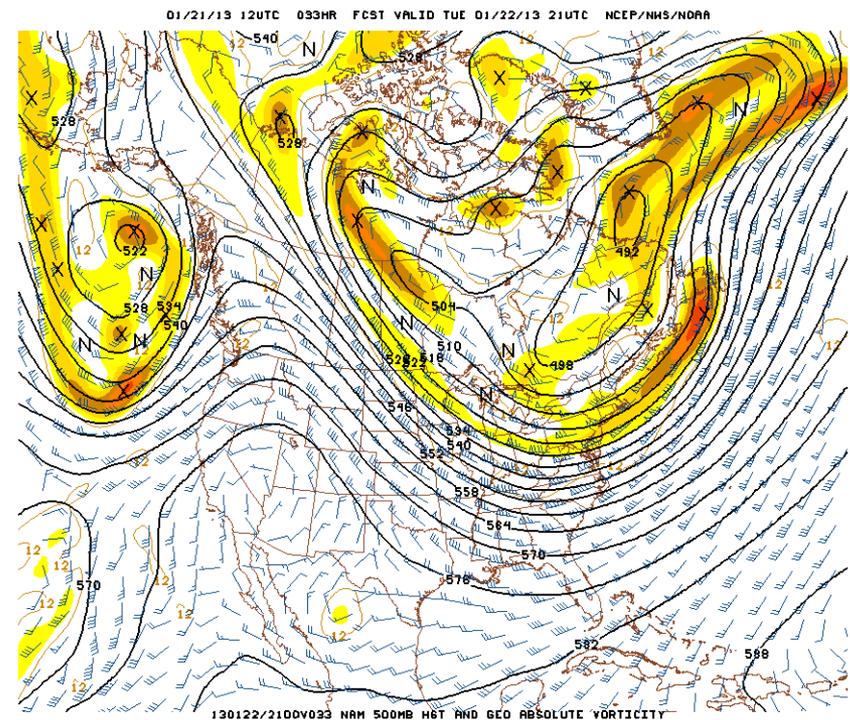
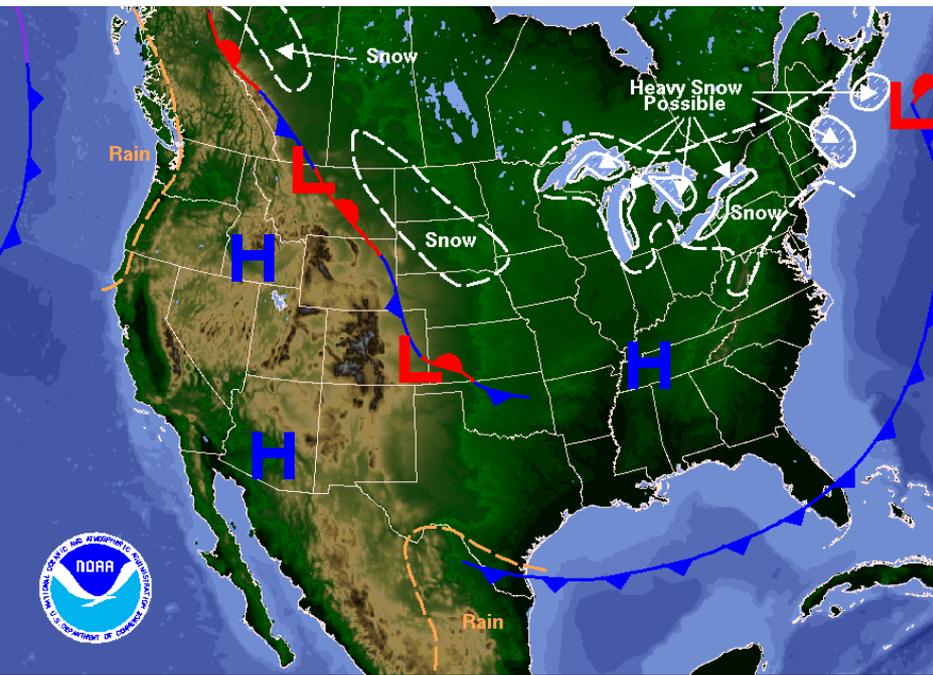
Today : Sunny. Large upper level ridge still along the Pacific coastline.

500 mb NAM at 1 PM.



Tomorrow: Mostly sunny with increasing clouds during the afternoon as upper level trough moves into the Pacific Northwest.

500 mb NAM at 1 PM.



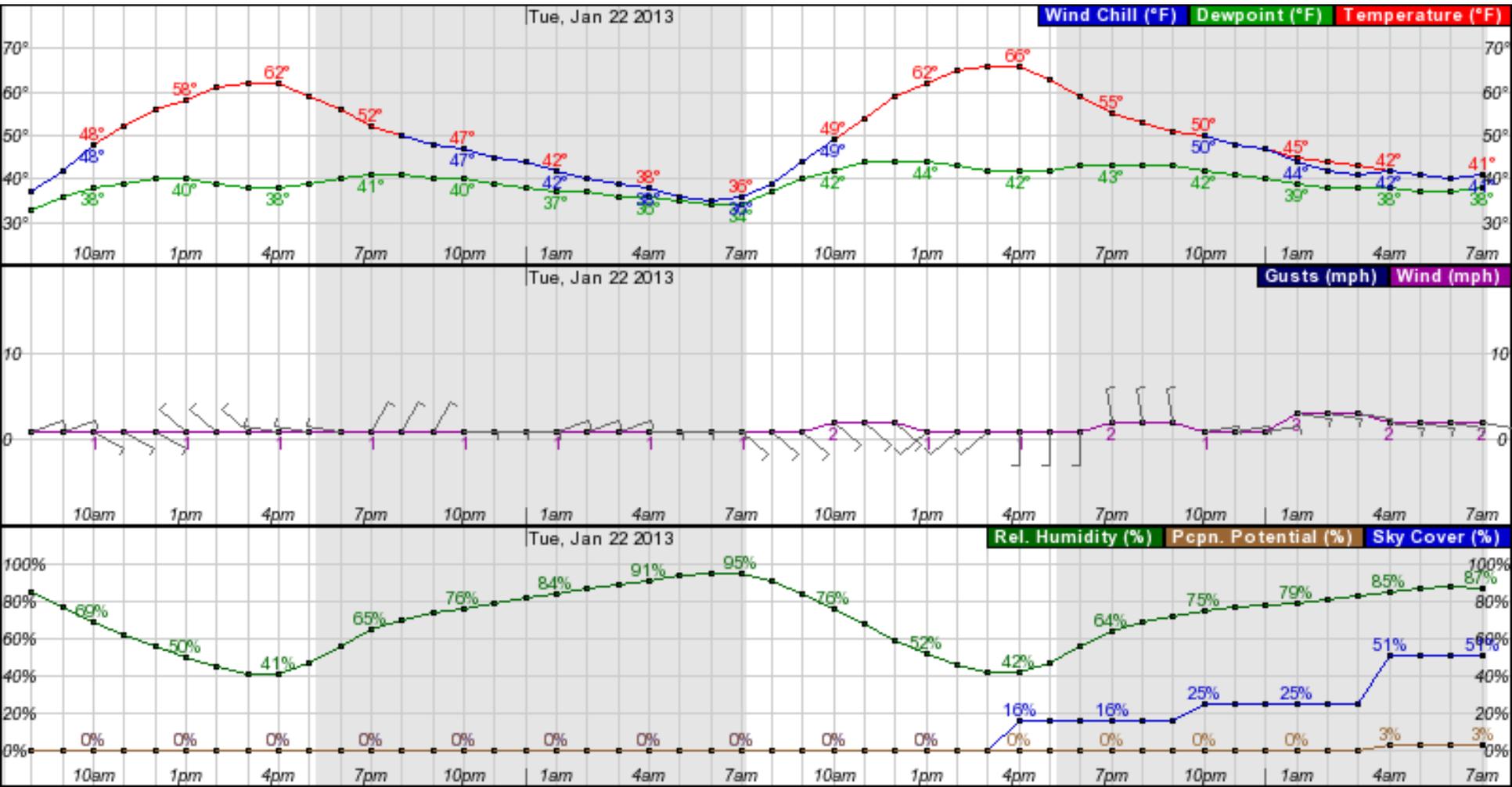
Fresno

Today: Sunny.

Tomorrow: Mostly sunny with a chance of some morning fog.

Today →

Tomorrow →



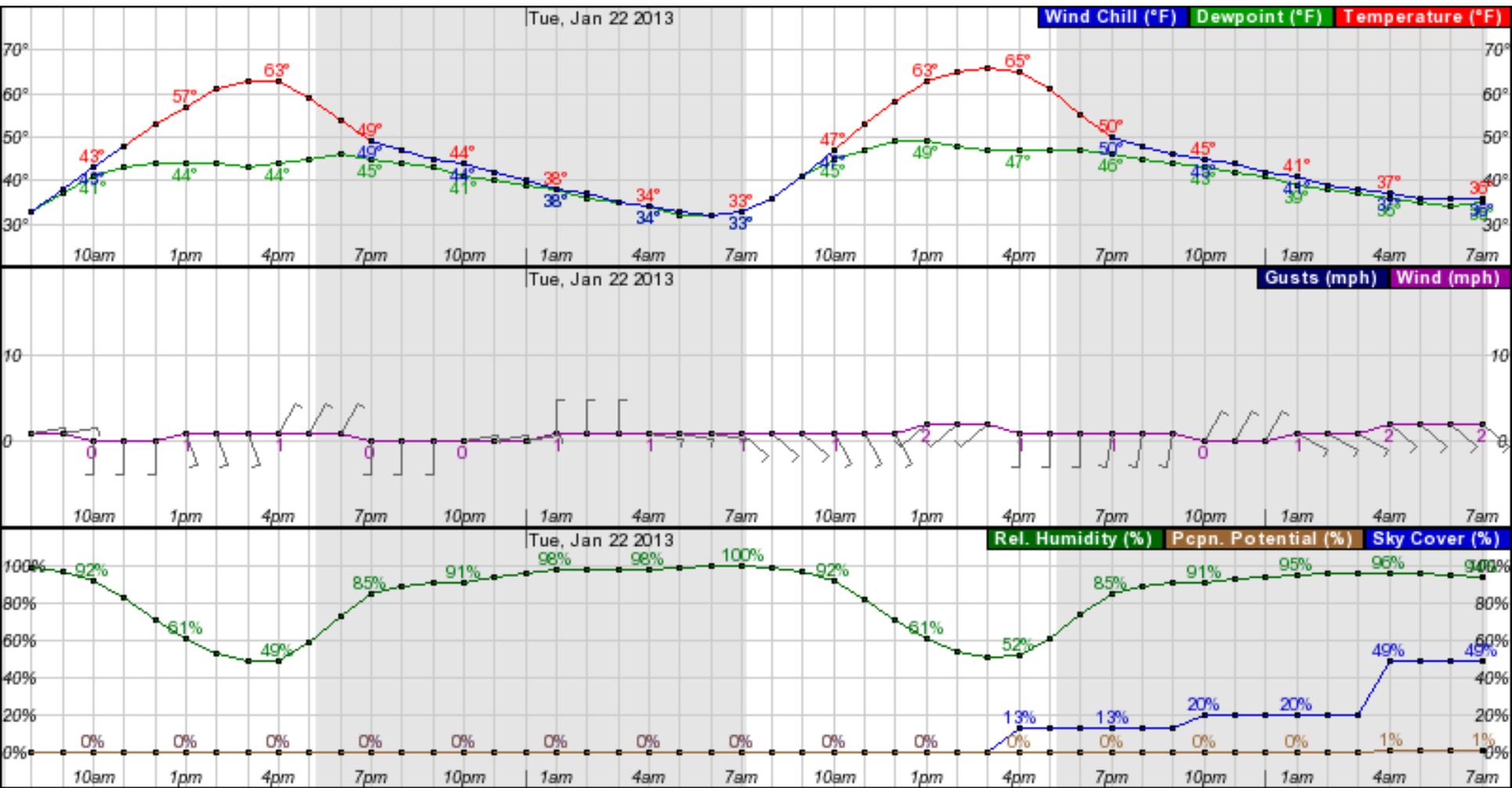
Hanford

Today: Sunny.

Tomorrow: Foggy morning – mostly sunny afternoon.

Today →

Tomorrow →



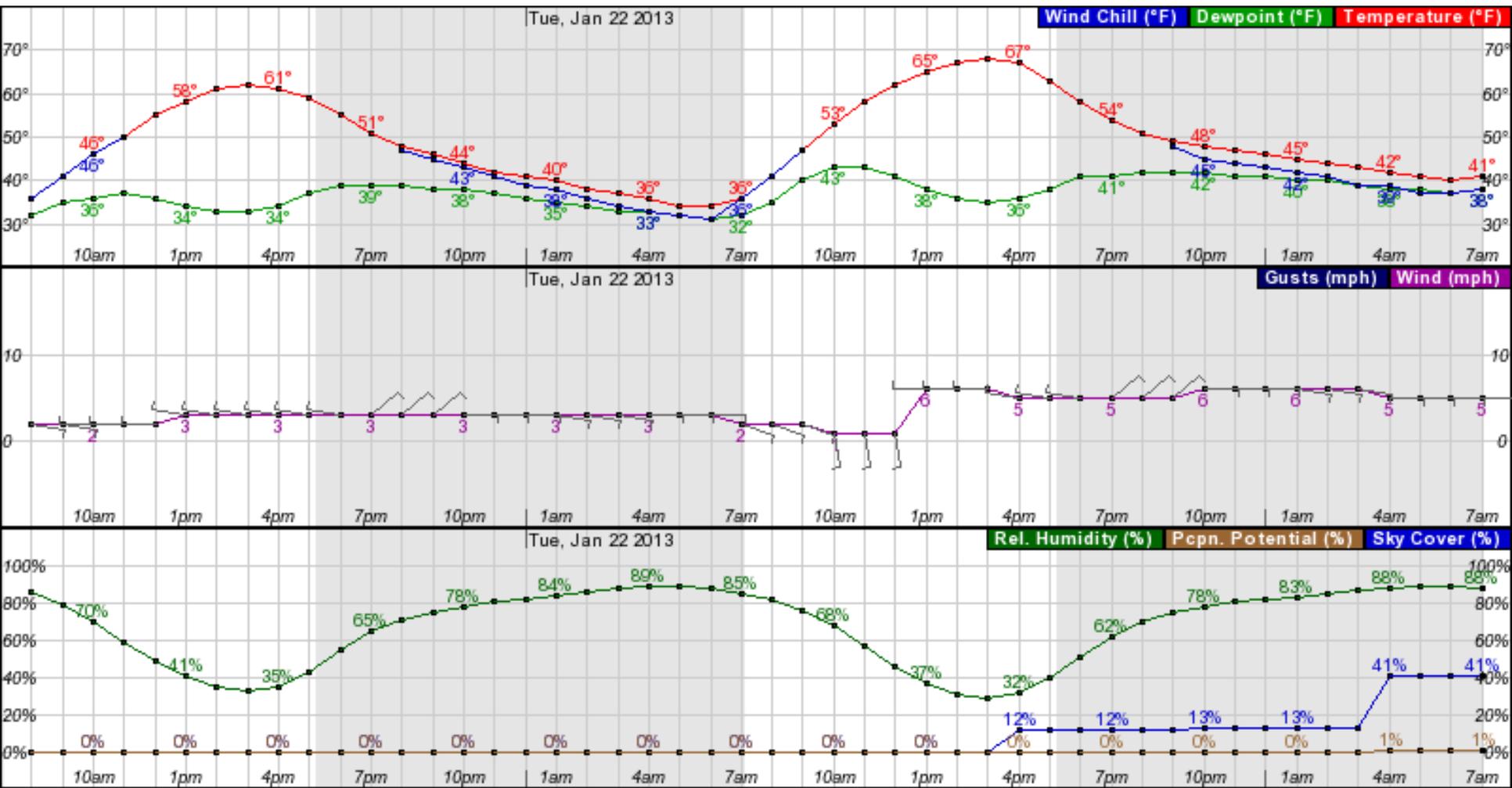
Bakersfield

Today: Sunny.

Tomorrow: Mostly sunny.

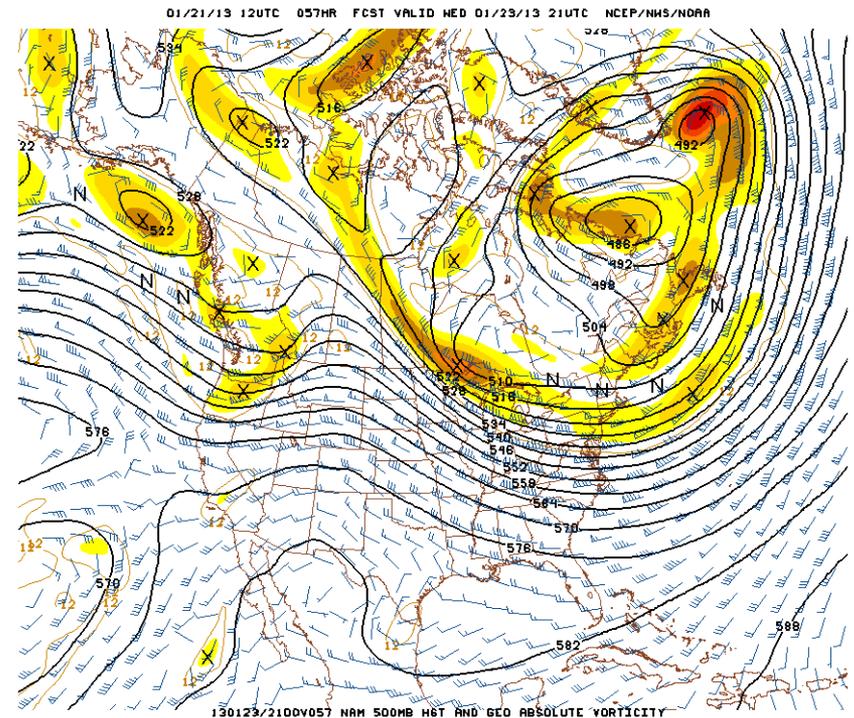
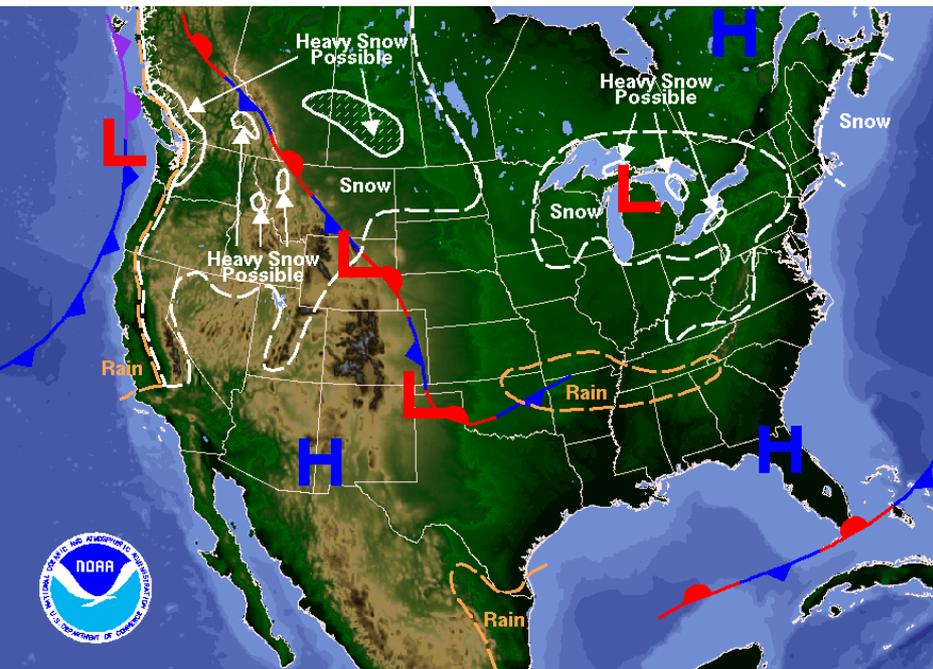
Today →

Tomorrow →



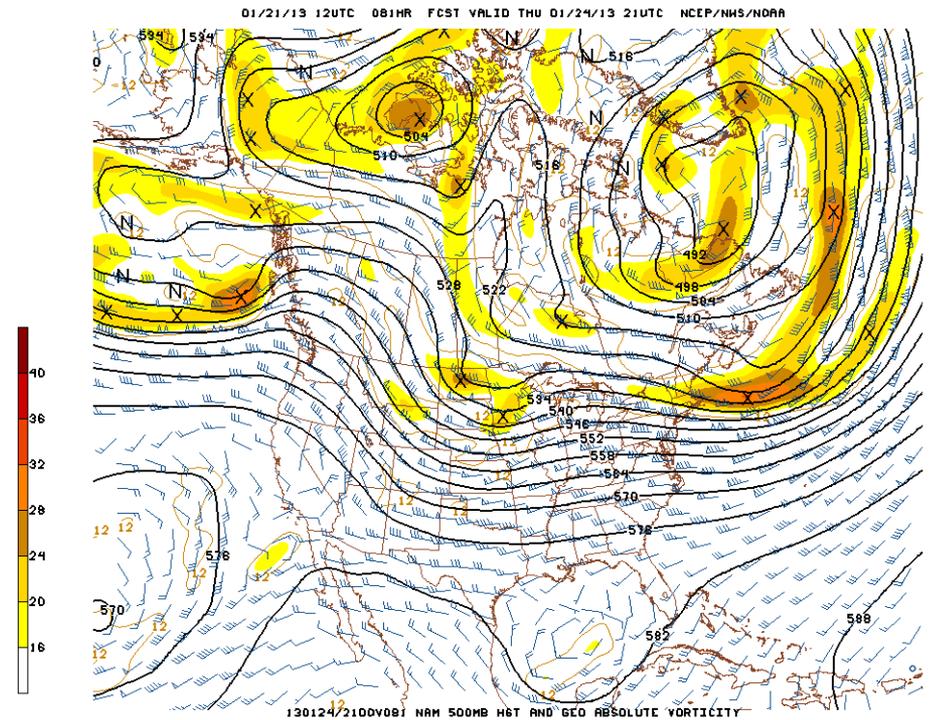
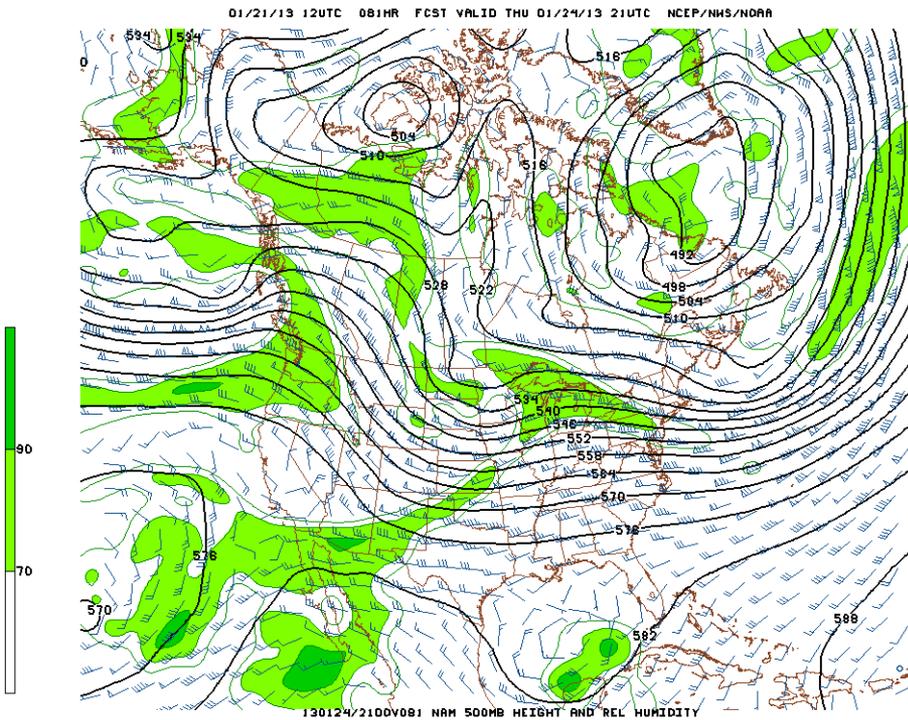
Wednesday: Mostly cloudy with upper level trough passing to our north and an upper level low to the southwest.

500 mb NAM at 1 PM.



500 mb NAM Thursday 1 PM

500 mb NAM Thursday 1 PM



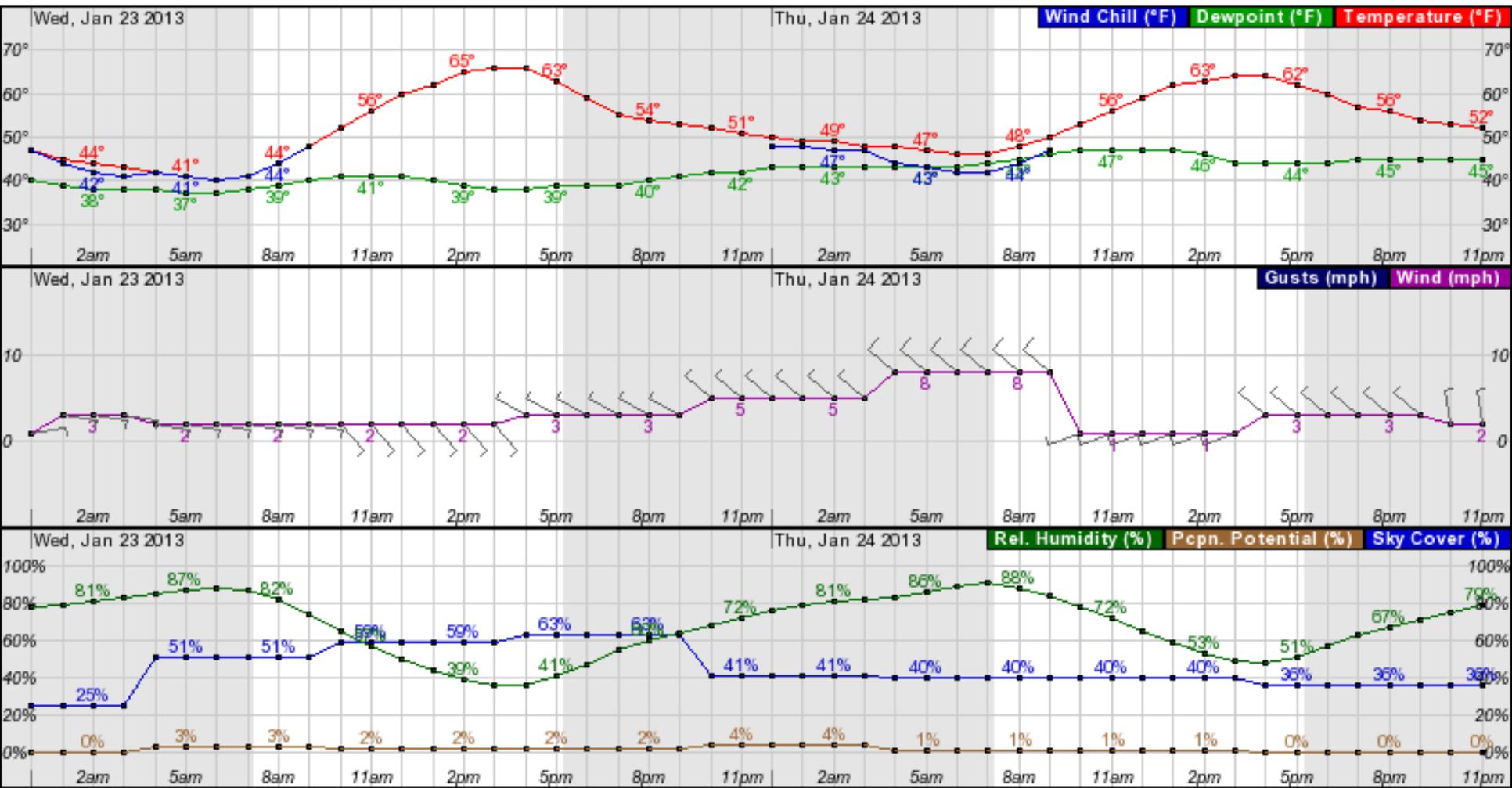
Fresno

Wednesday: Mostly cloudy.

Thursday: Partly cloudy.

Wednesday →

Thursday →



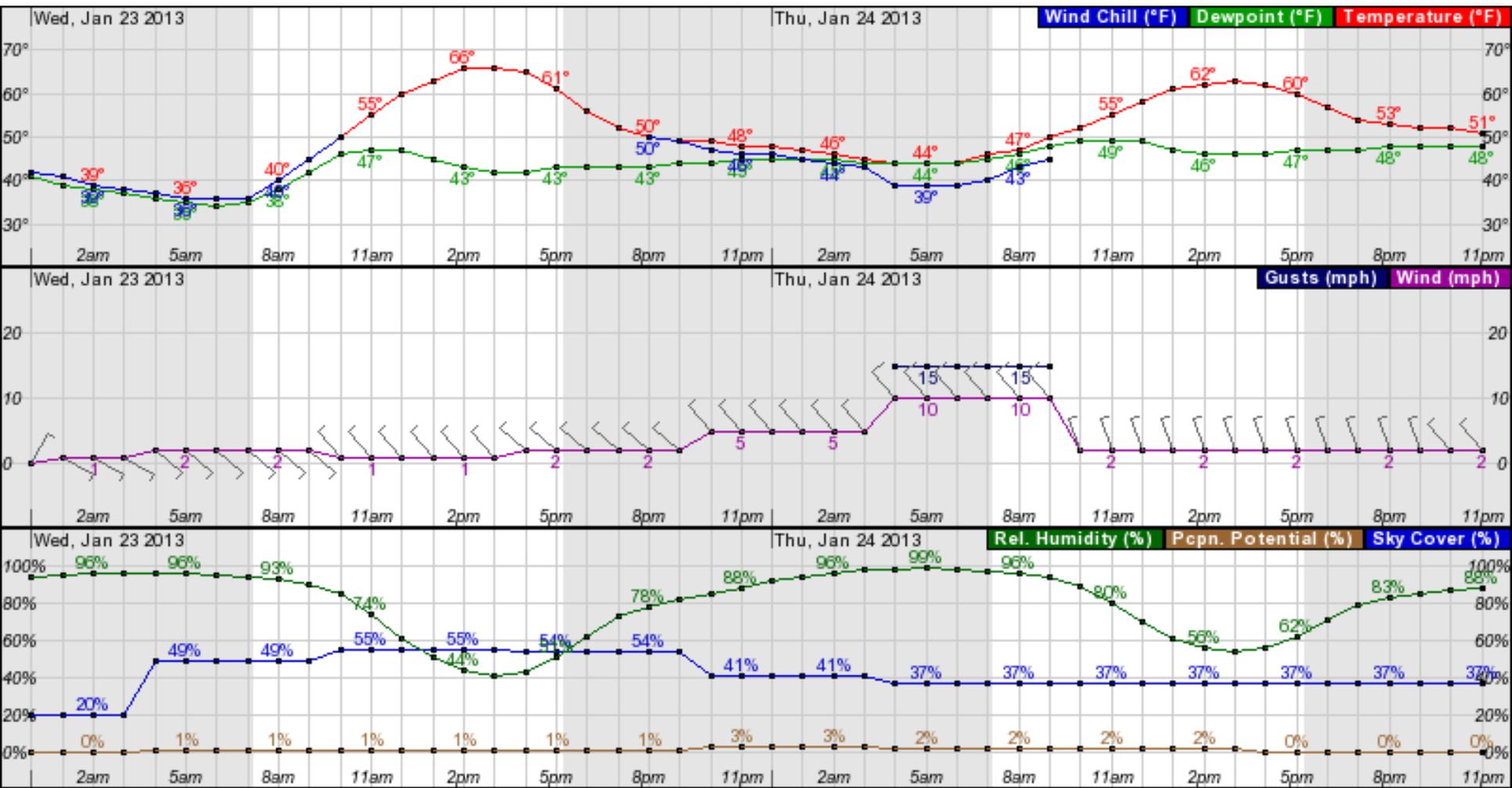
Hanford

Wednesday: Mostly cloudy.

Thursday: Partly cloudy.

Wednesday →

Thursday →



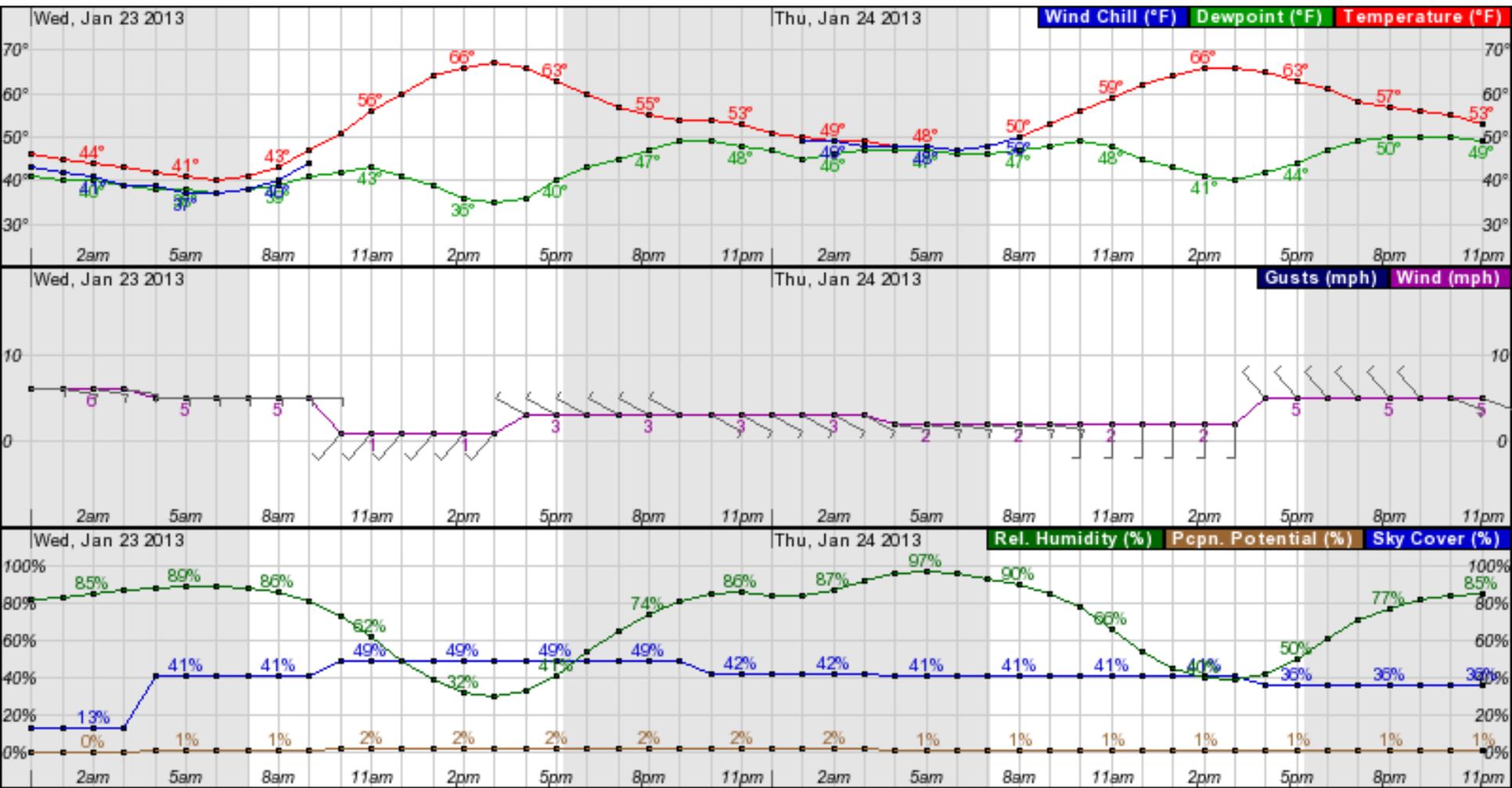
Bakersfield

Wednesday: Partly cloudy.

Thursday: Partly cloudy.

Wednesday →

Thursday →



Forecast 7 AM Relative Humidity

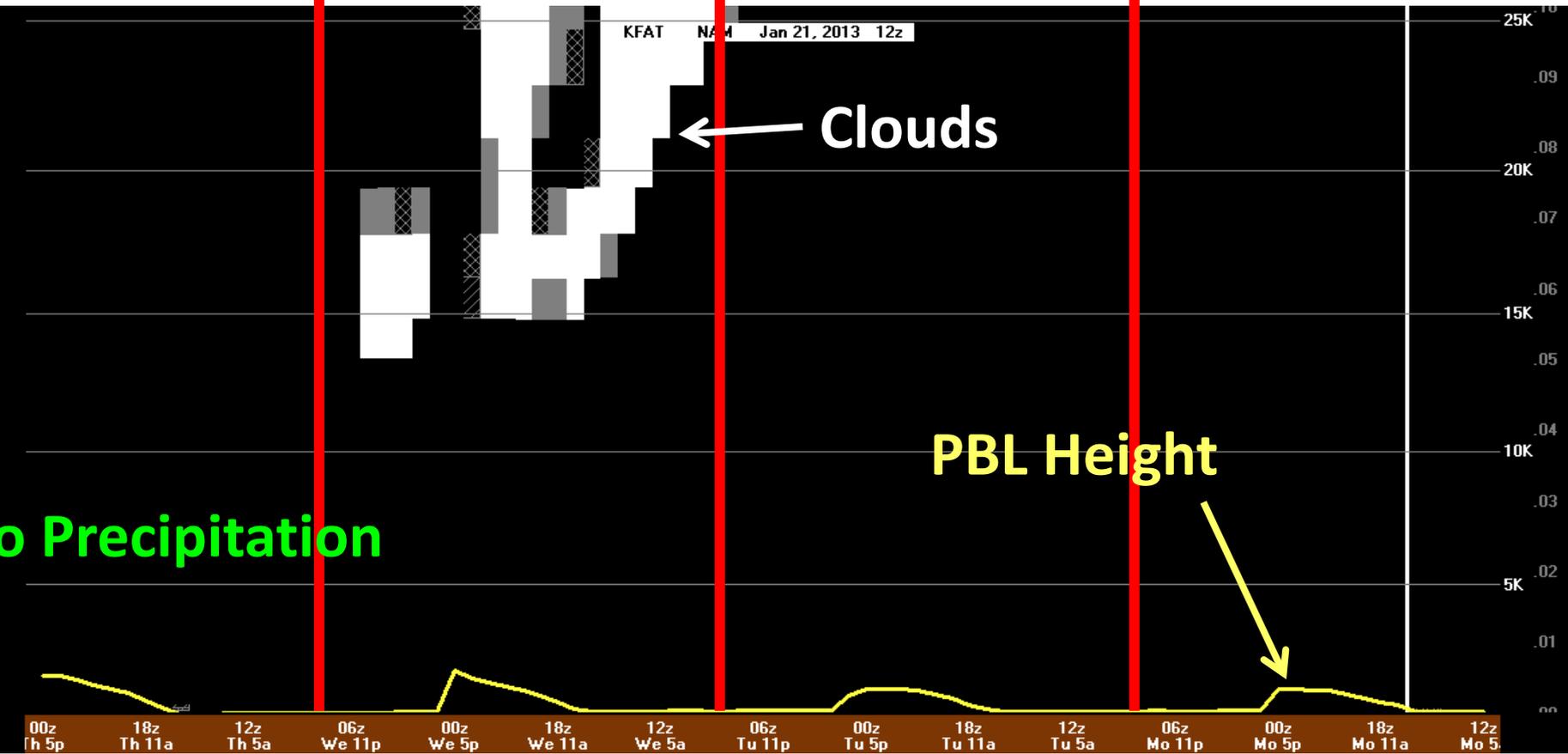
Station	Tues.	Wed.	Thurs.
Fresno	95%	82%	92%
Hanford	100%	95%	98%
Bakersfield	85%	87%	93%

Fresno; BUFKIT – NAM (12 UTC 21 January)

Thursday

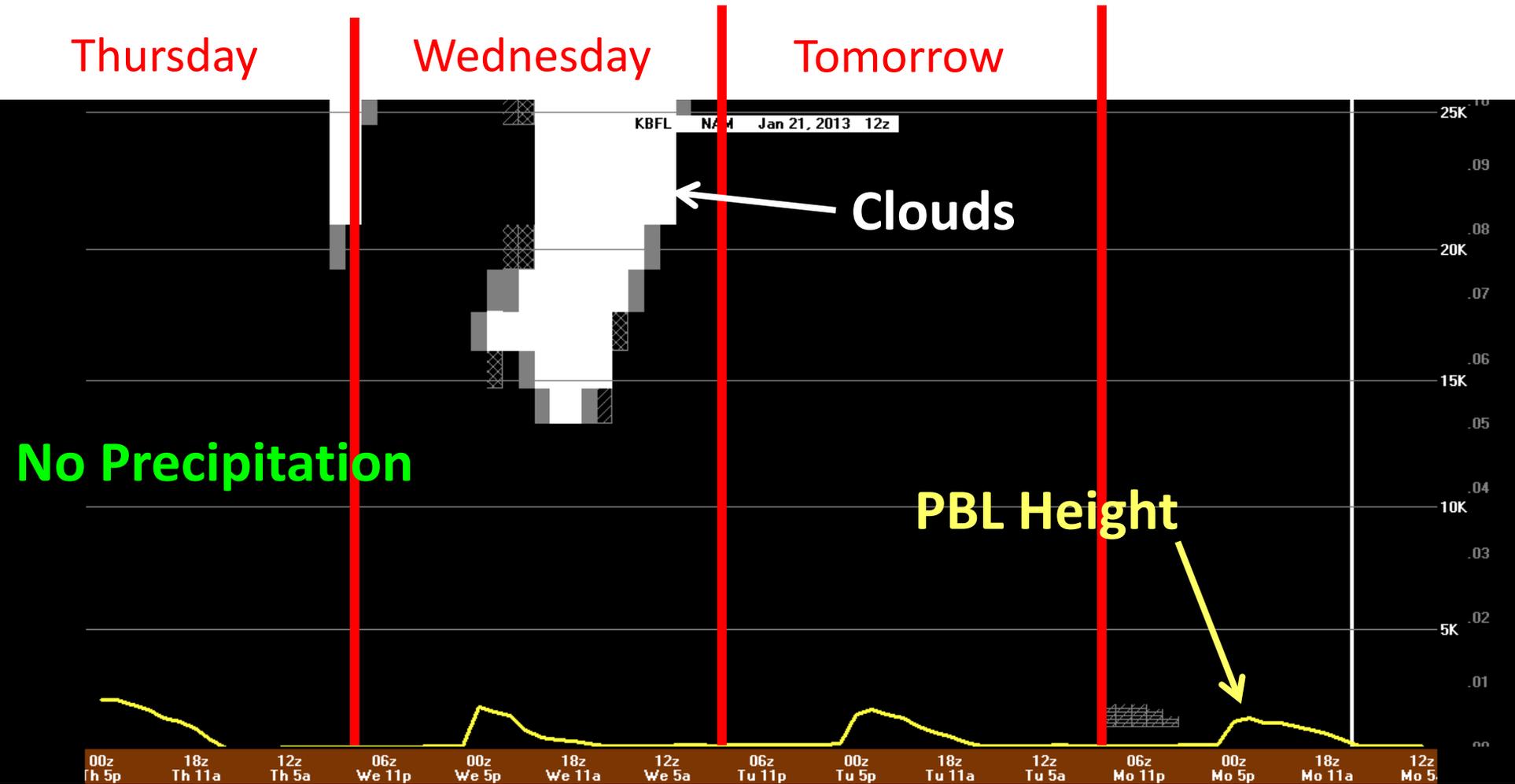
Wednesday

Tomorrow



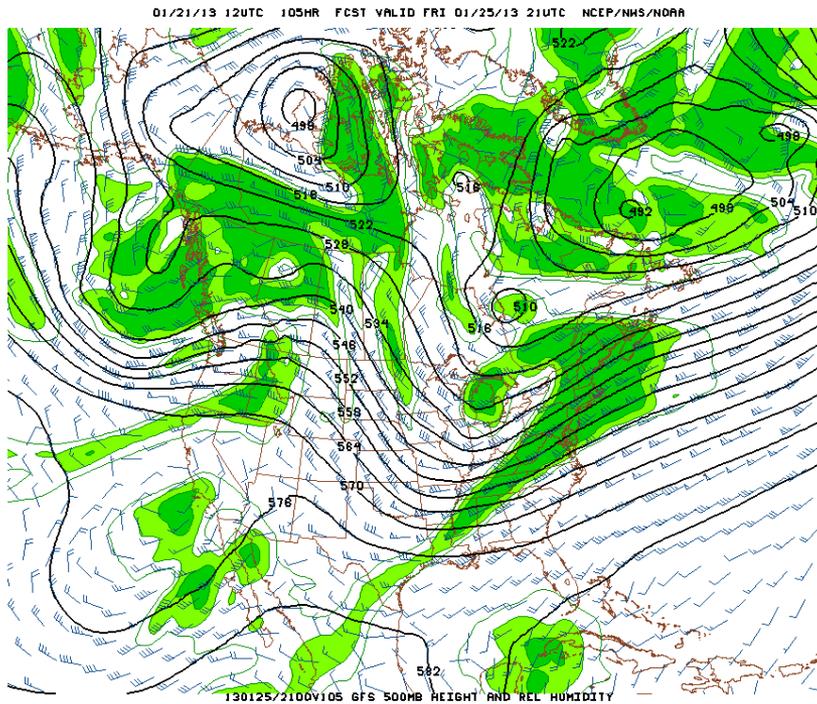
- Today and tomorrow: Sunny.
- Wednesday: cloudy.
- Thursday: Sunny.

Bakersfield; BUFKIT – NAM (12 UTC 21 January)

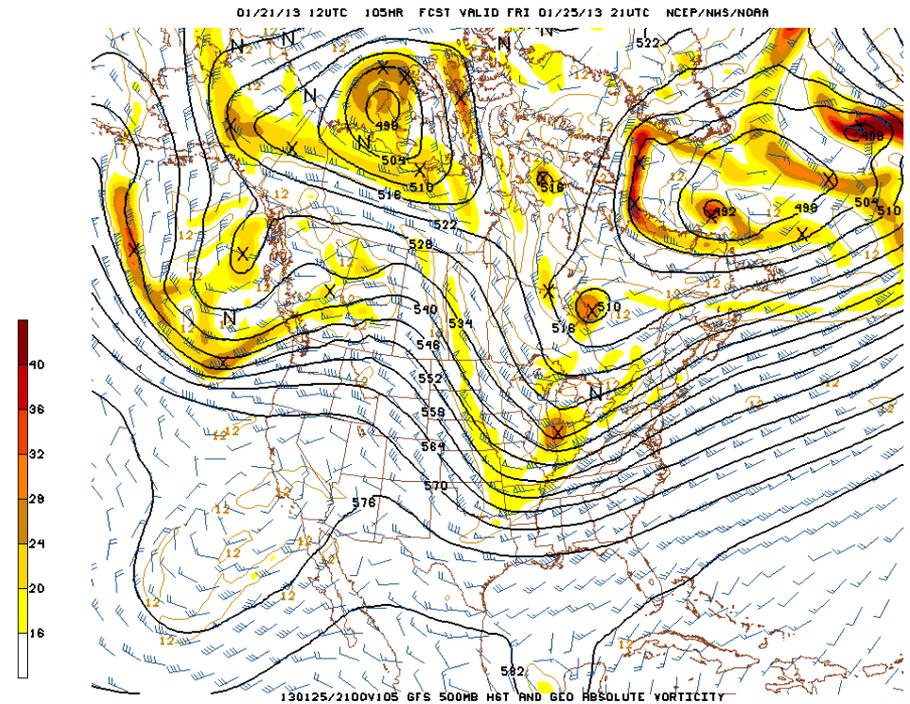


- Today and tomorrow: Sunny.
- Wednesday: Cloudy.
- Thursday: Sunny.

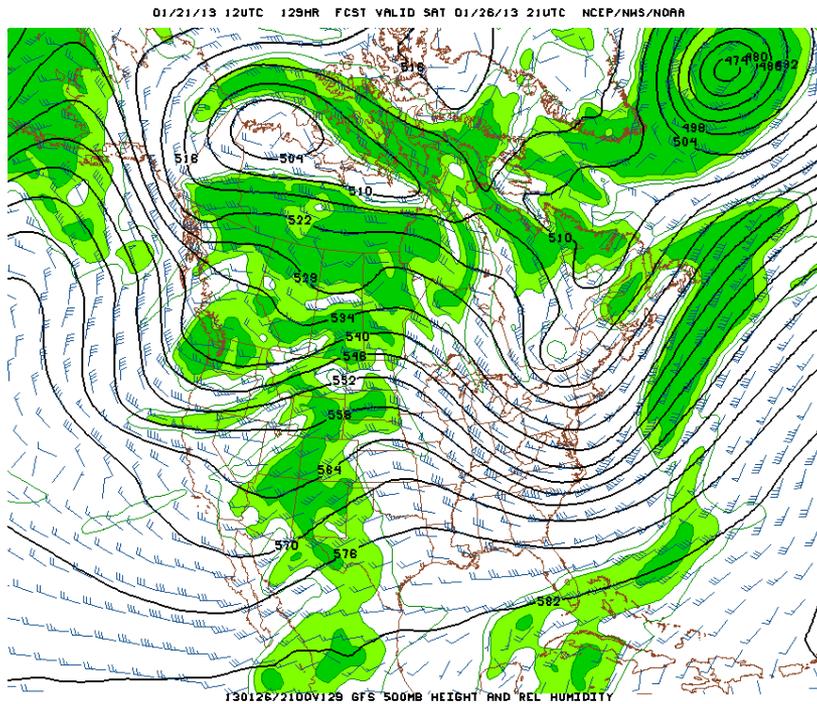
500 mb GFS Friday 1 PM



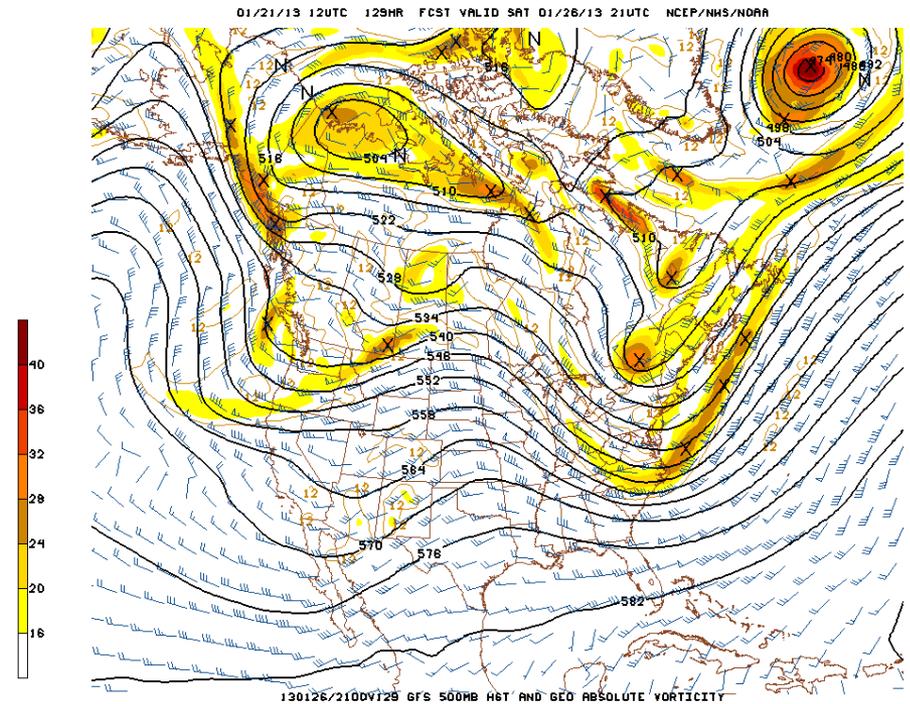
500 mb GFS Friday 1 PM



500 mb GFS Saturday 1 PM



500 mb GFS Saturday 1 PM



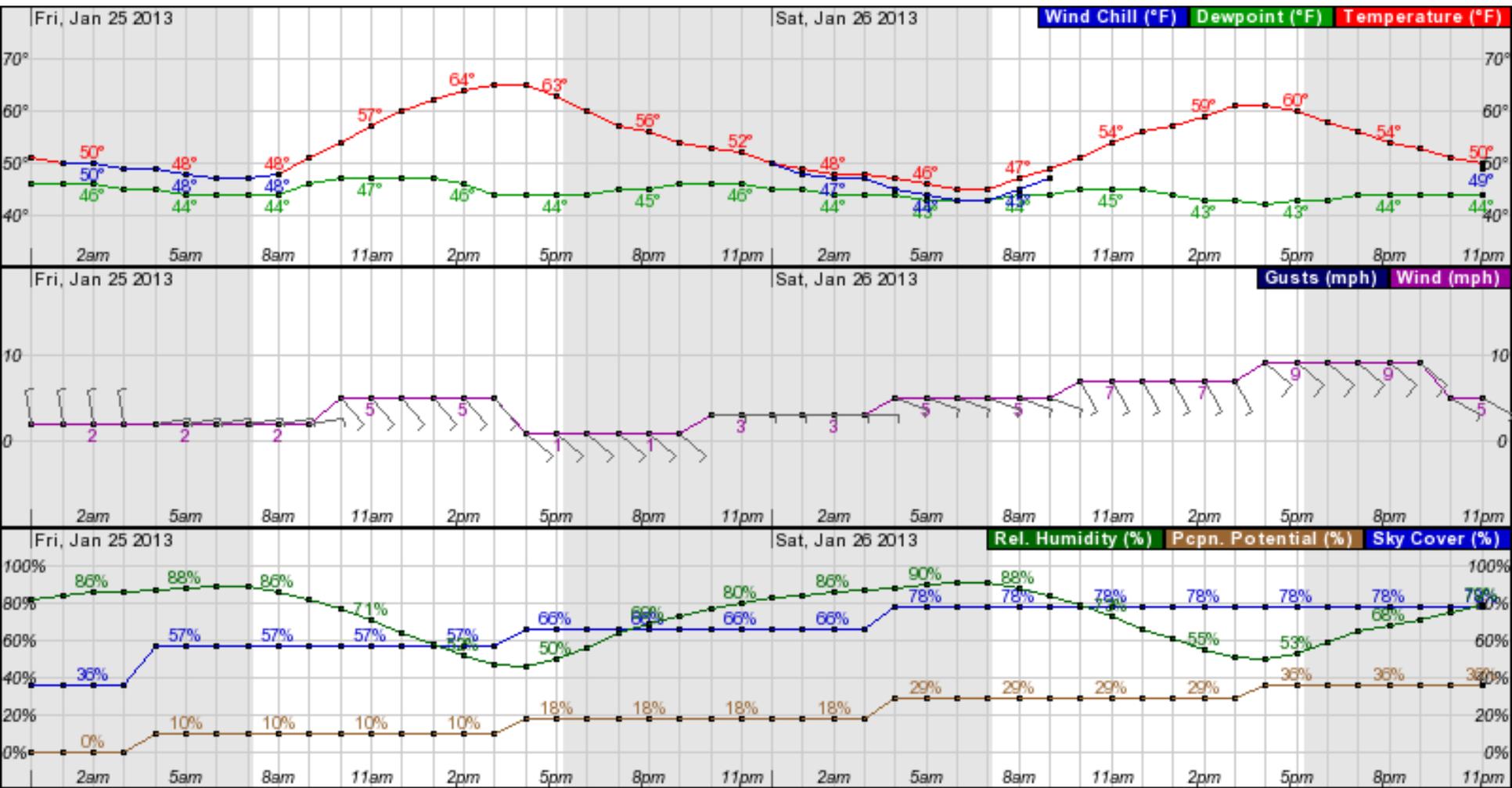
Fresno

Friday: Mostly cloudy.

Saturday: Mostly cloudy.

Friday →

Saturday →



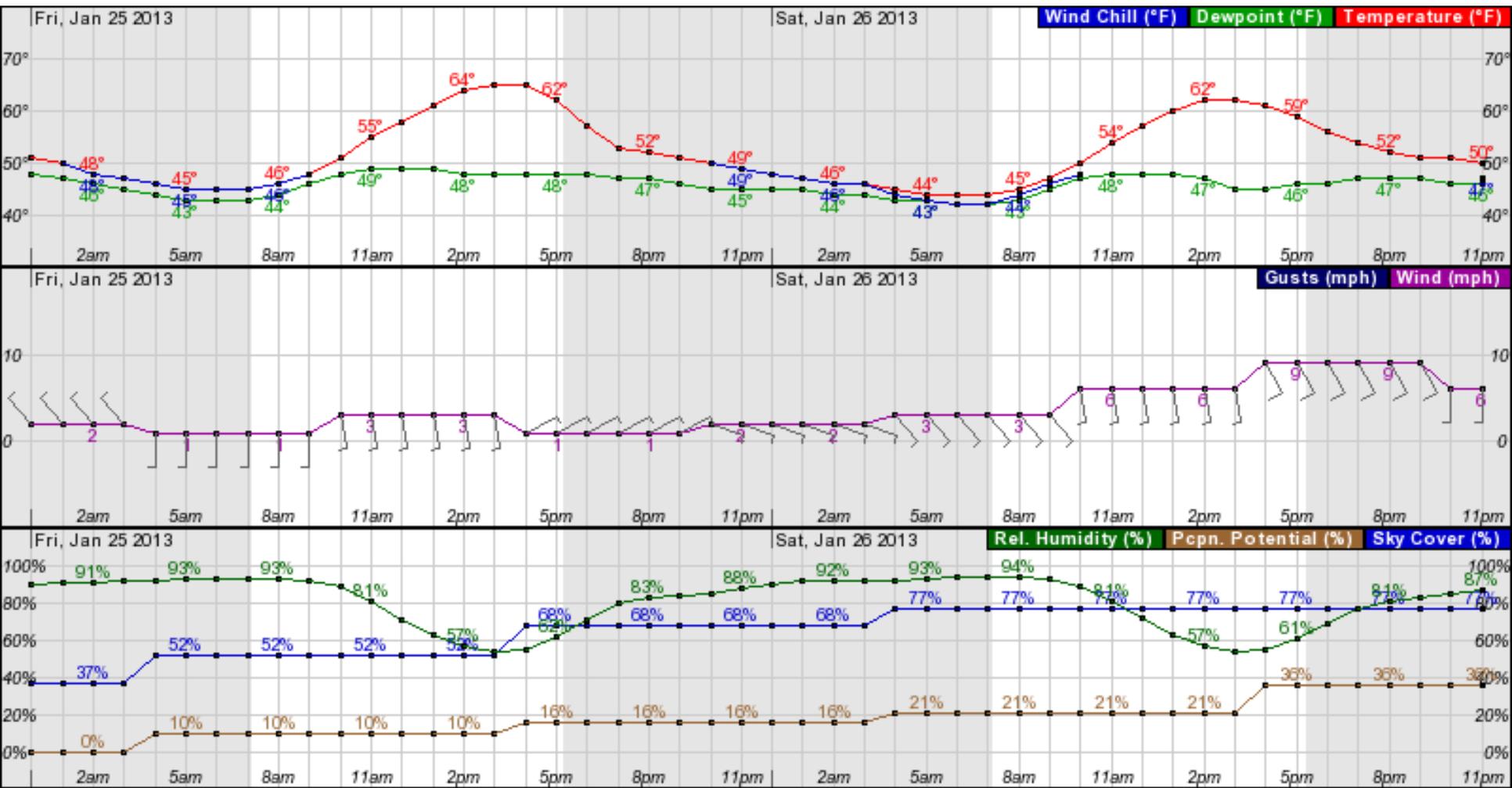
Hanford

Friday: Mostly cloudy.

Saturday: Mostly cloudy.

Friday →

Saturday →



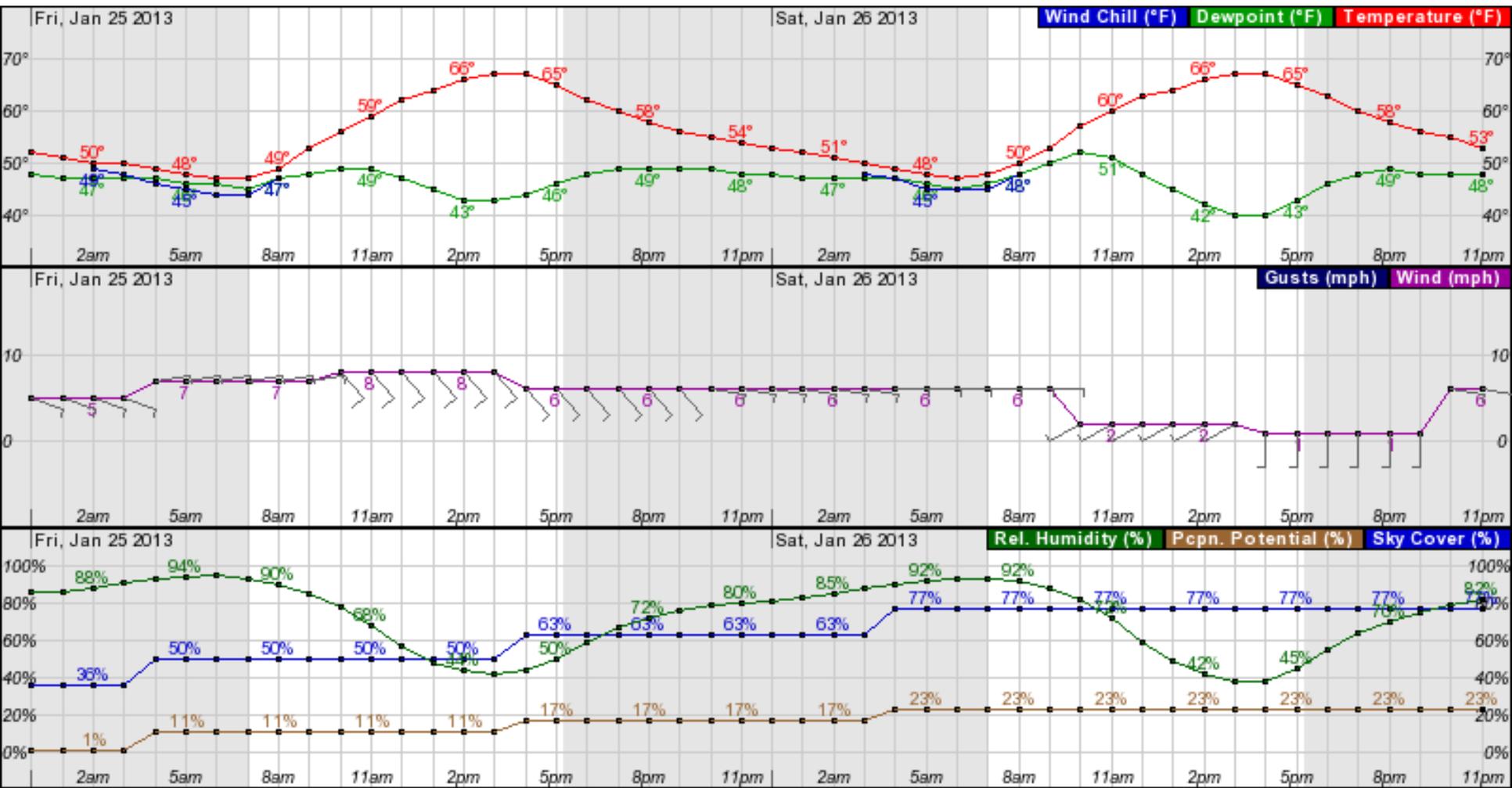
Bakersfield

Friday: Mostly cloudy.

Saturday: Mostly cloudy.

Friday →

Saturday →



Tomorrow: NAM – high clouds moving in in the afternoon;

GEOS-5 – high clouds.

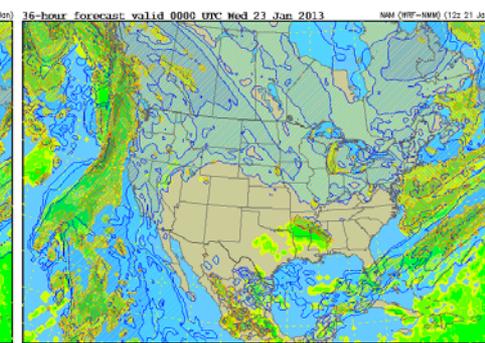
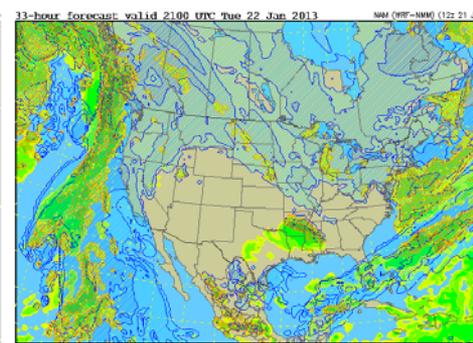
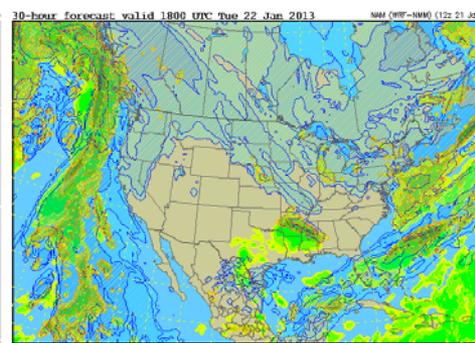
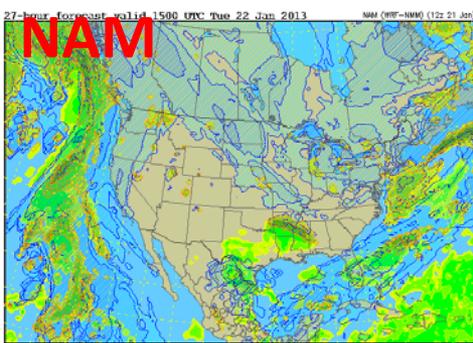
7 am

10 am

1 pm

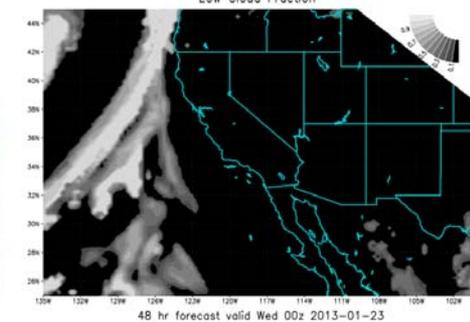
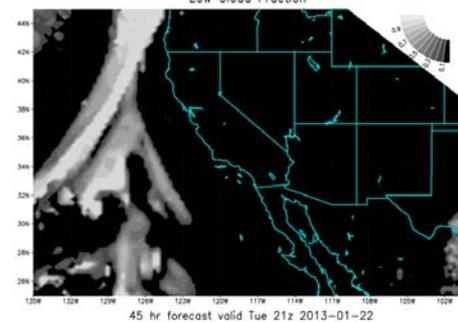
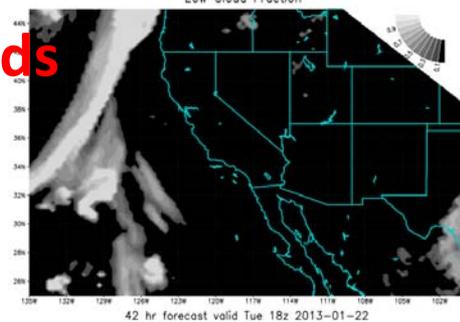
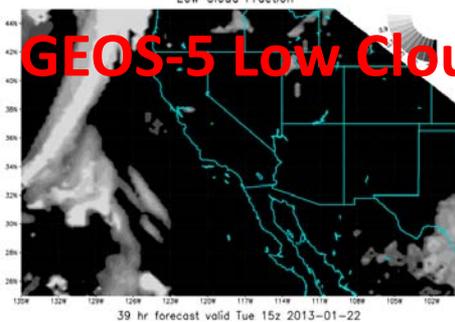
4 pm

Integrated liquid and frozen hydrometeors (all levels)

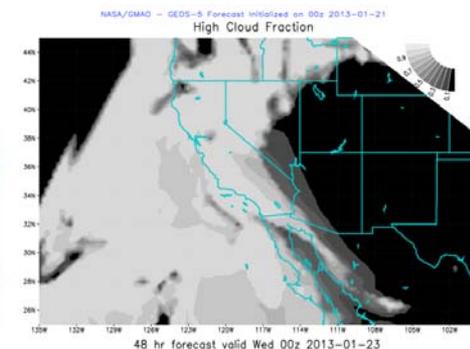
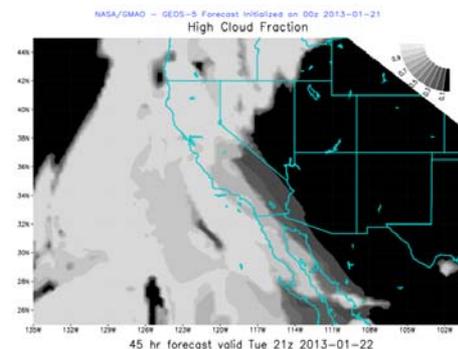
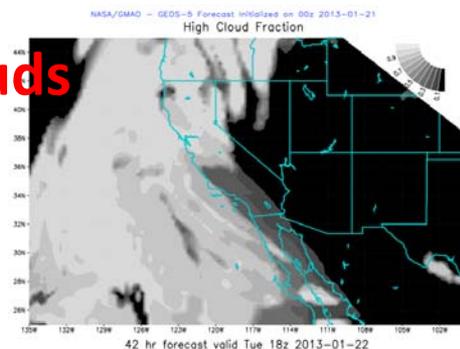
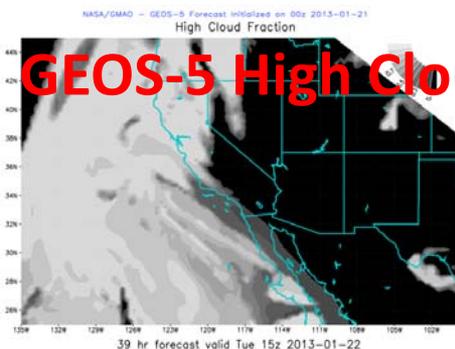


NASA/GMAO – GEOS-5 Forecast Initialized on 00z 2013-01-21

GEOS-5 Low Clouds



GEOS-5 High Clouds



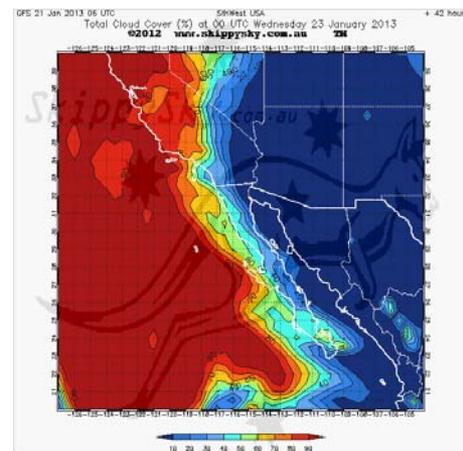
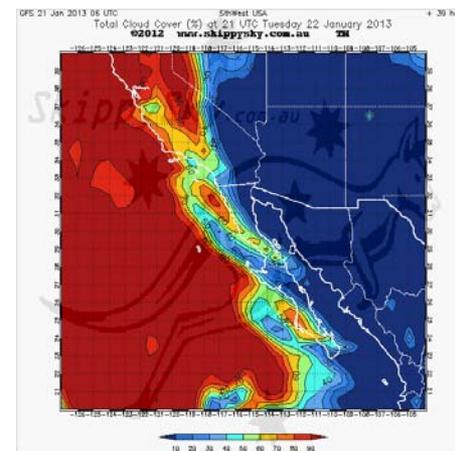
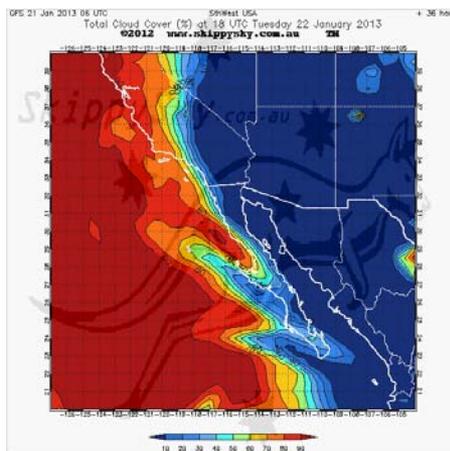
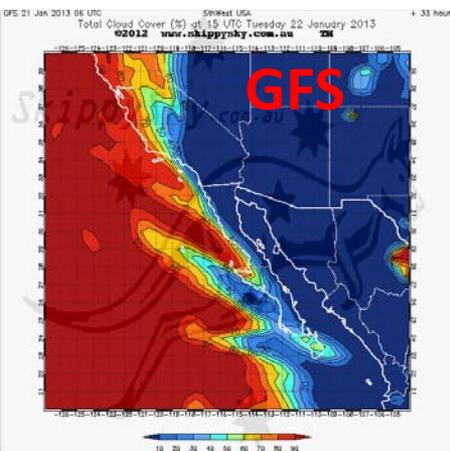
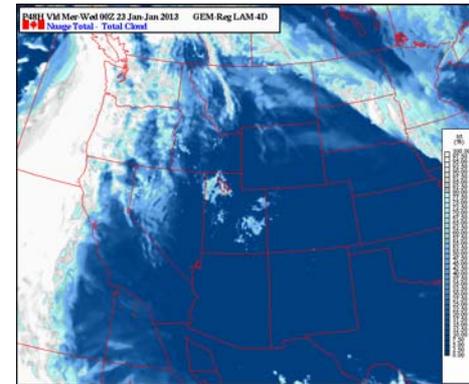
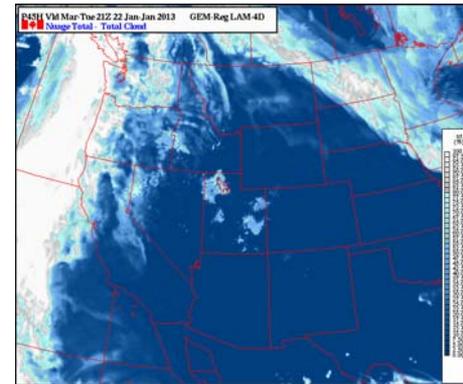
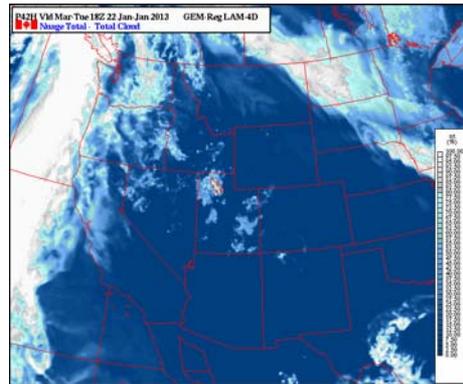
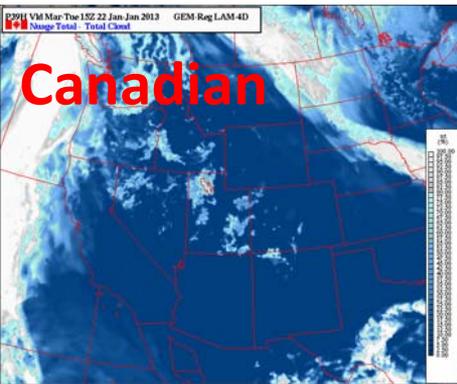
Tomorrow: Canadian – mostly sunny; GFS – high clouds.

7 am

10 am

1 pm

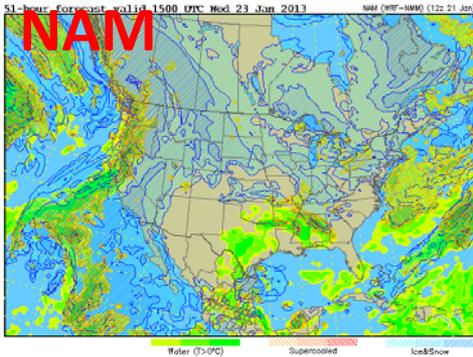
4 pm



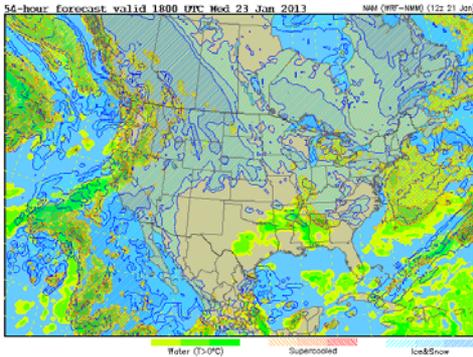
Wednesday: NAM – cloudy; GEOS-5 – cloudy.

7 am 10 am 1 pm 4 pm

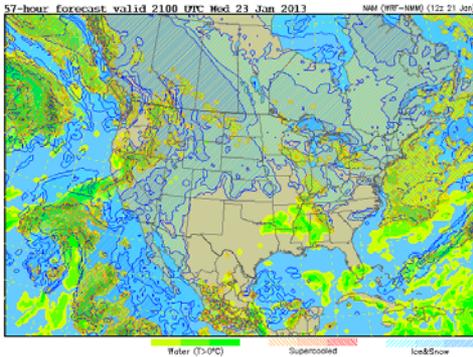
Integrated liquid and frozen hydrometeors (all levels)



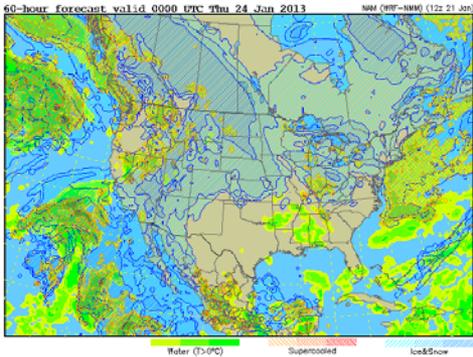
Integrated liquid and frozen hydrometeors (all levels)



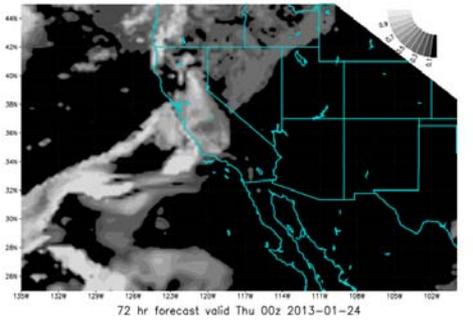
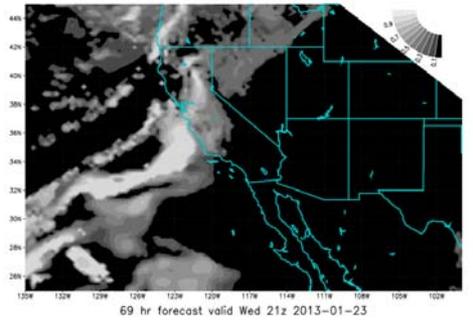
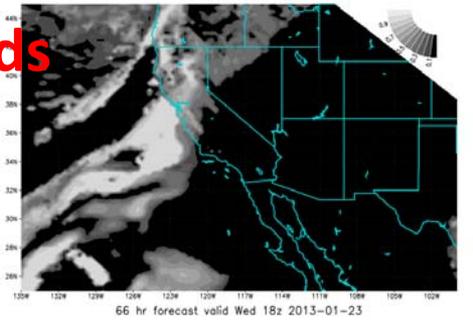
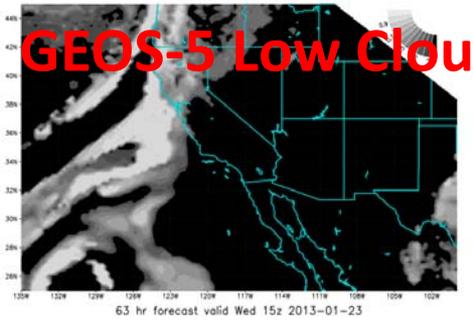
Integrated liquid and frozen hydrometeors (all levels)



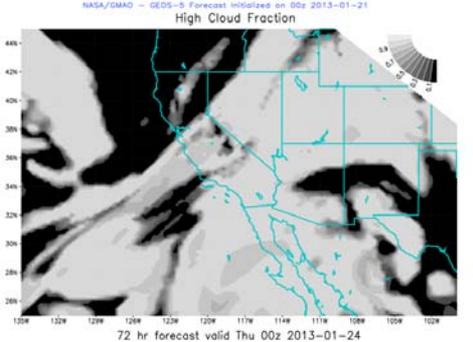
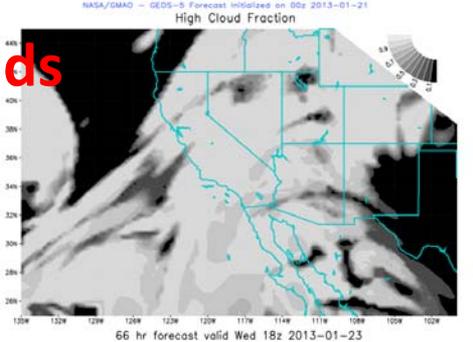
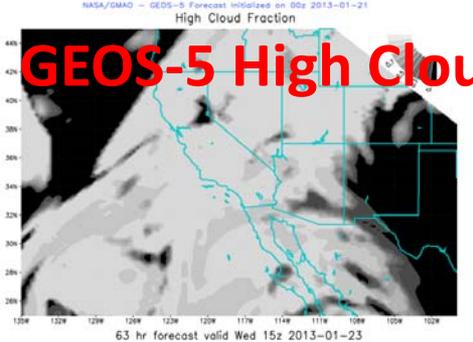
Integrated liquid and frozen hydrometeors (all levels)



GEOS-5 Low Clouds



GEOS-5 High Clouds



Thursday: NAM – cloudy; GEOS-5 – cloudy.

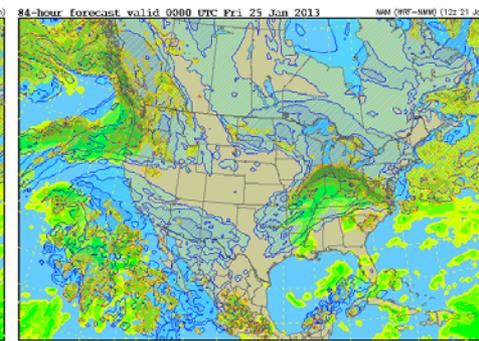
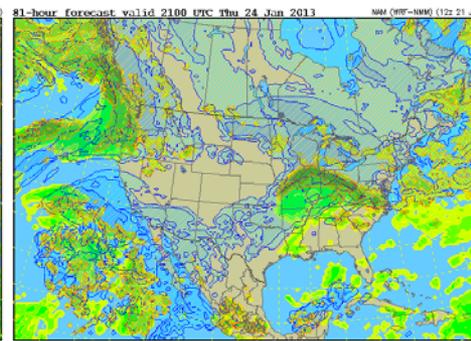
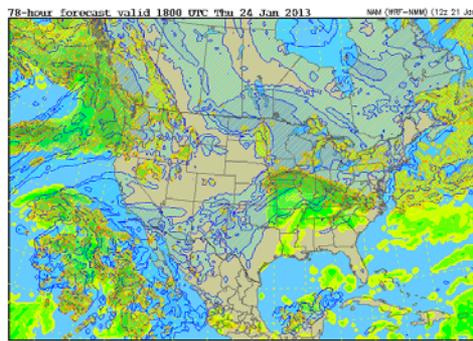
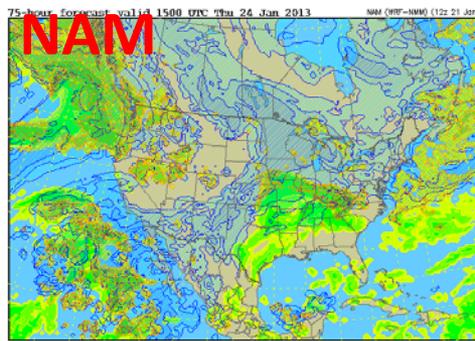
7 am

10 am

1 pm

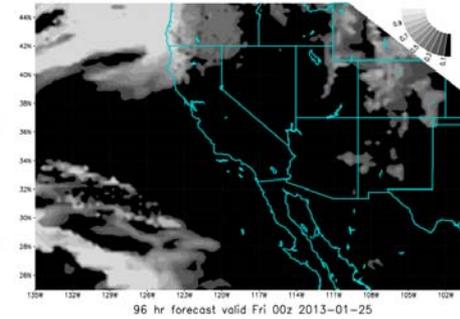
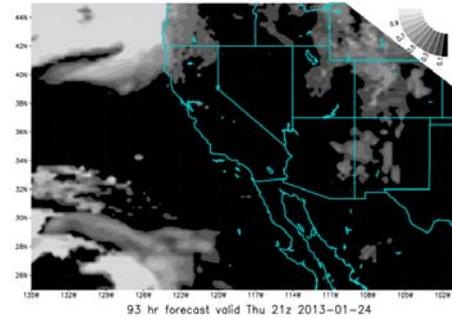
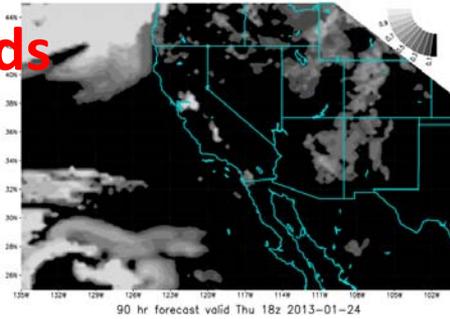
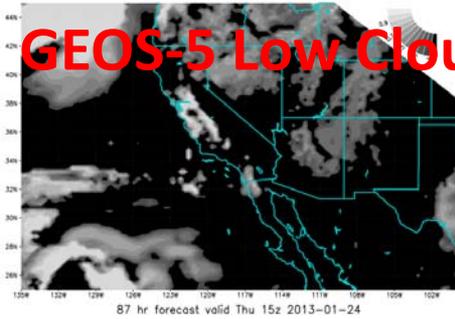
4 pm

Integrated liquid and frozen hydrometeors (all levels)

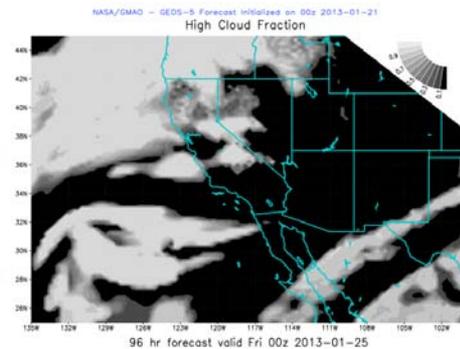
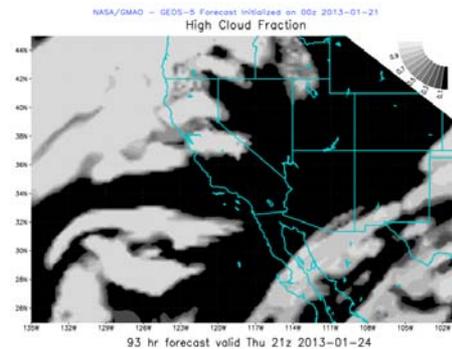
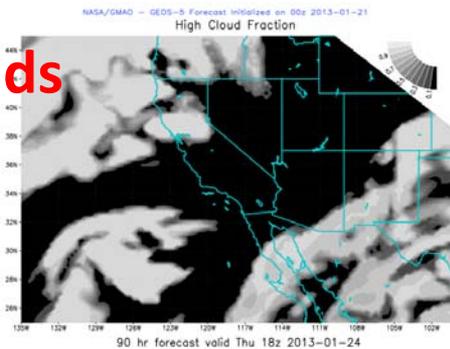
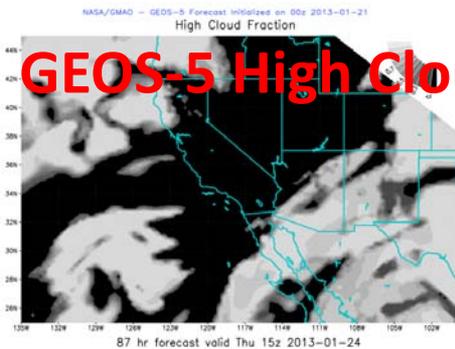


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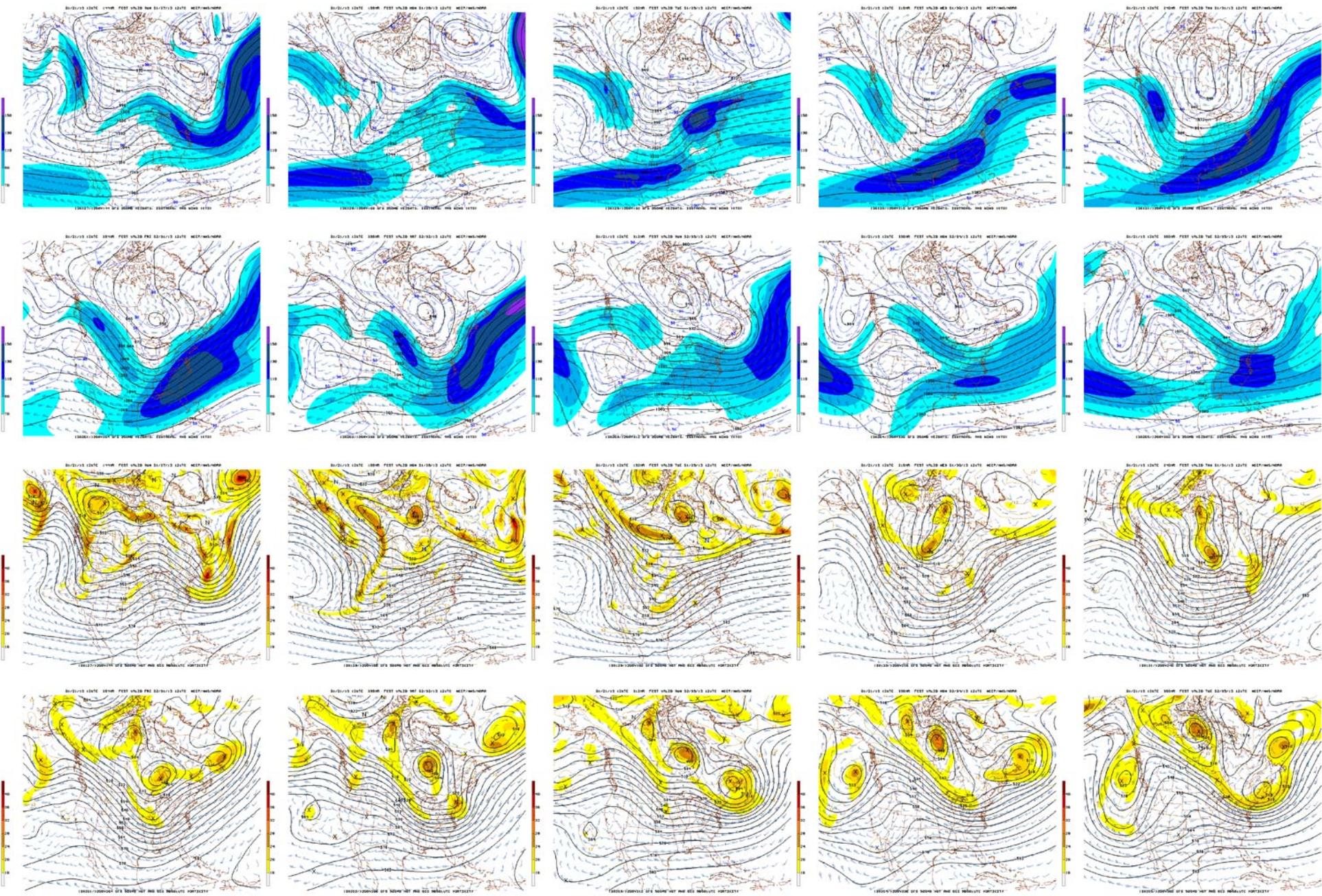
GEOS-5 Low Clouds



GEOS-5 High Clouds



Sun 27 Jan – Tue 5 Feb: 250 mb (top 2 rows) and 500 mb (bottom 2 rows) charts



[AREA FORECAST DISCUSSION](#)

[NATIONAL WEATHER SERVICE](#) SAN JOAQUIN VALLEY - HANFORD CA

421 AM [PST](#) MON JAN 21 2013

.SYNOPSIS...

HIGH PRESSURE WILL CONTINUE OVER CENTRAL CALIFORNIA INTO EARLY WEDNESDAY. MAINLY CLEAR SKIES AND ABOVE NORMAL TEMPERATURES DURING THE DAYTIME HOURS. AREAS OF LATE NIGHT AND MORNING [FOG](#) IN THE SAN JOAQUIN VALLEY.

&&

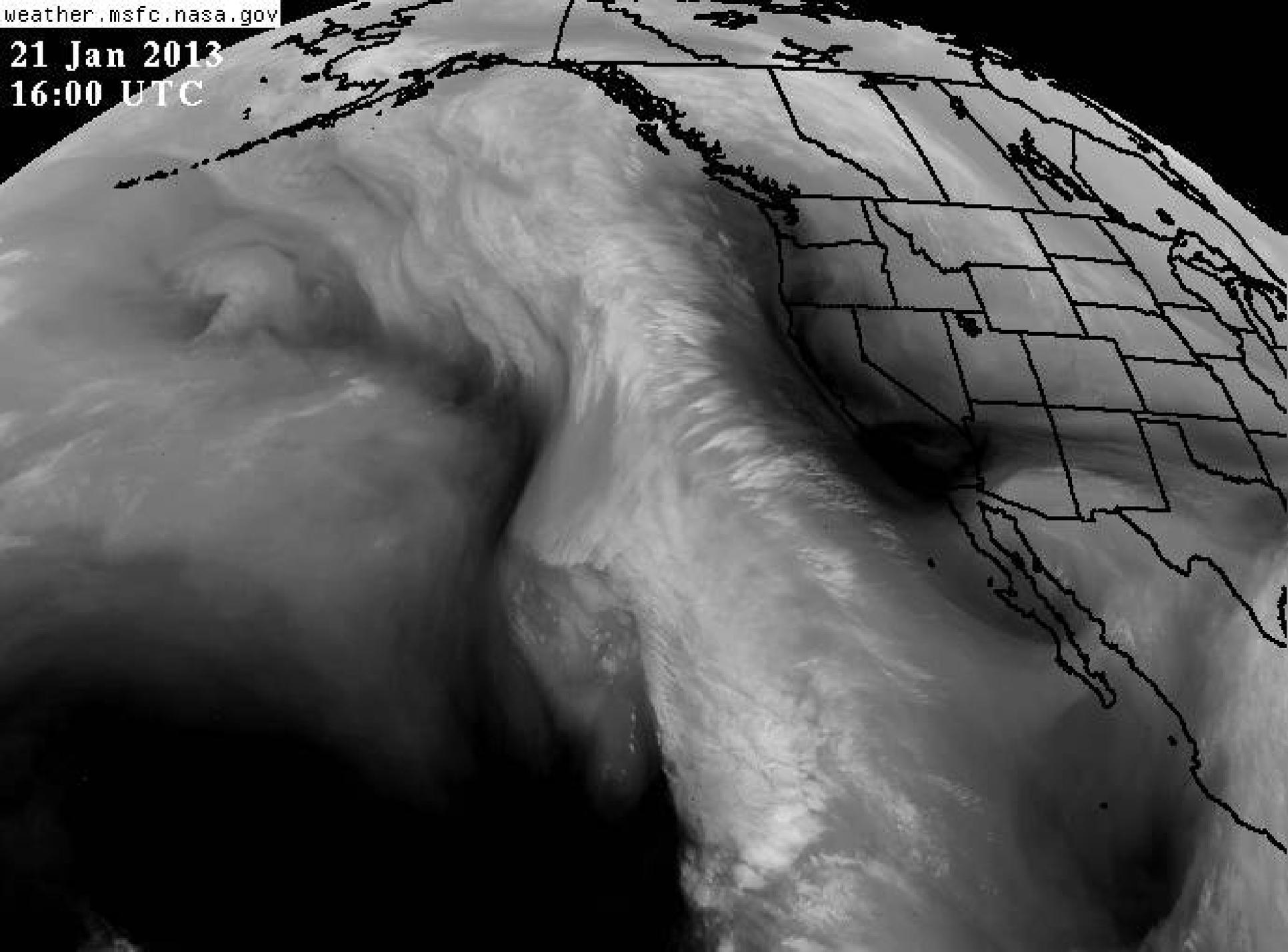
.DISCUSSION...

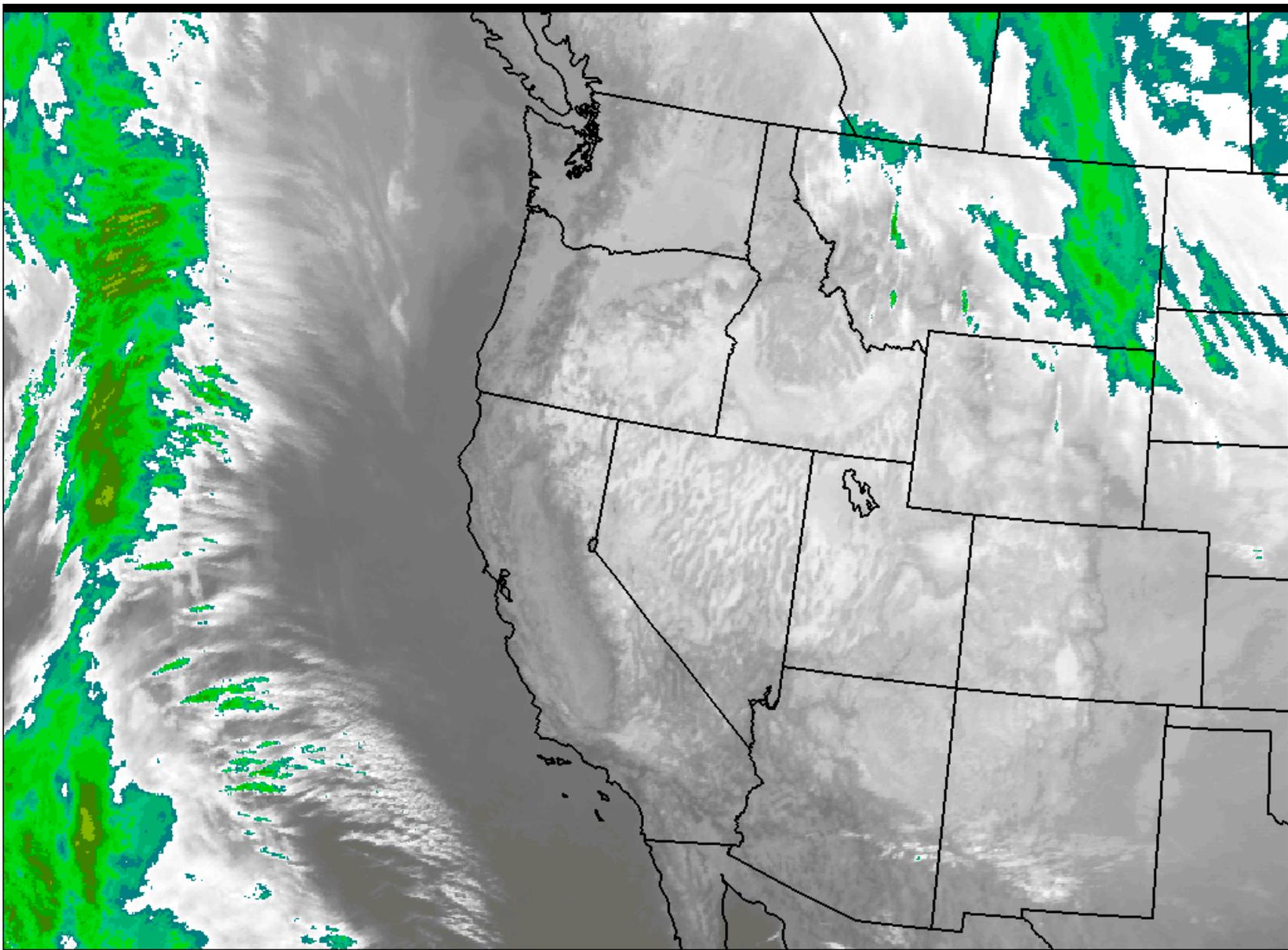
HIGH PRESS AT THE [SFC](#) AND ALOFT WILL DOMINATE CENTRAL CA THRU EARLY WED. THIS WILL BRING MAINLY CLEAR SKIES...LIGHT WINDS AND ABOVE NORMAL DAYTIME [TEMPS](#). NIGHTTIME MINS IN THE SJV CONT TO GRADUALLY IMPROVE...THO SOME OUTLIERS SEEM TO BE STUCK IN THE UPPER 20S. INCREASING CLOUDS TUES NITE SHOULD PUT AN END TO THE VALLEY [FROST](#). DENSE [FOG](#) WILL BE PROBLEMATIC THE NEXT 2 NITES...BUT SHOULD BE CONFINED MAINLY TO THE CENTER OF THE VALLEY.

A LONGWAVE UPPER [TROF](#) ROUGHLY ALONG 135W...WILL APPROACH THE WEST COAST WED. MODELS CONT TO SPLIT THE [SYS](#) WED. [GFS](#) TRIES TO BRING SOME PRECIP TO CENTRAL CA WED NITE AS THE SPLIT PASSES BY TO THE NORTH AND THE [CUTOFF LOW](#) FORMS WELL TO THE SW OF CA. THE EURO CONTS ON THE DRY SIDE...AS ENERGY WITH THE [NRN](#) PORTION OF THE SPLIT DIMINISHES AS IT MOVES THRU THE [MEAN RIDGE](#) POSITION. BELIEVE IN THE DRY SIDE AS SPLITS GENERALLY DONT BRING PRECIP THIS FAR SOUTH. HOWEVER JUST ENOUGH UNCERTAINTY WED [AFTN](#) AND EVE FOR A SLIGHT CHANCE OF SPKLS OR LIGHT SHWRS FROM MERCED CNTY INTO YOSEMITE.

MODELS BEGINNING TO DIVERGE ON TIMING AND STRENGTH AS THE CLOSED [CUTOFF](#) LIFT NE AS AN OPEN WAVE...BRINGING SOME PRECIP TO CENTRAL CA...POSSIBLY AS EARLY AS FRI. ON [SAT](#)...A NEW [SYS](#) DROPS SE OUT OF THE GLFAK. THE EURO DROPS THE MAIN LOW SWRD ALONG THE WEST COAST WITH A FARLY STRONG CLOSED UPPER LOW SUN NEAR THE NORCAL COAST. IT ALSO SHOWS A SUBTROP CONNECTION DEVELOPING AHEAD OF THE UPPER LOW. [GFS](#) KEEP A MORE PROGRESSIVE PATTERN WITH AN OPEN WAVE [MOVG](#) QUICKLY THRU CENTRAL CA. PREFER THE SIMILAR GEM AND EURO SOLUTIONS WITH A DEEP WET PATTERN SETTING UP...AND LASTING THRU AT LEAST MON...AS THIS IS MORE OF A TYPICAL TRAJECTORY THAN A FAST [MOVG](#) S/WV [TROF](#).

21 Jan 2013
16:00 UTC

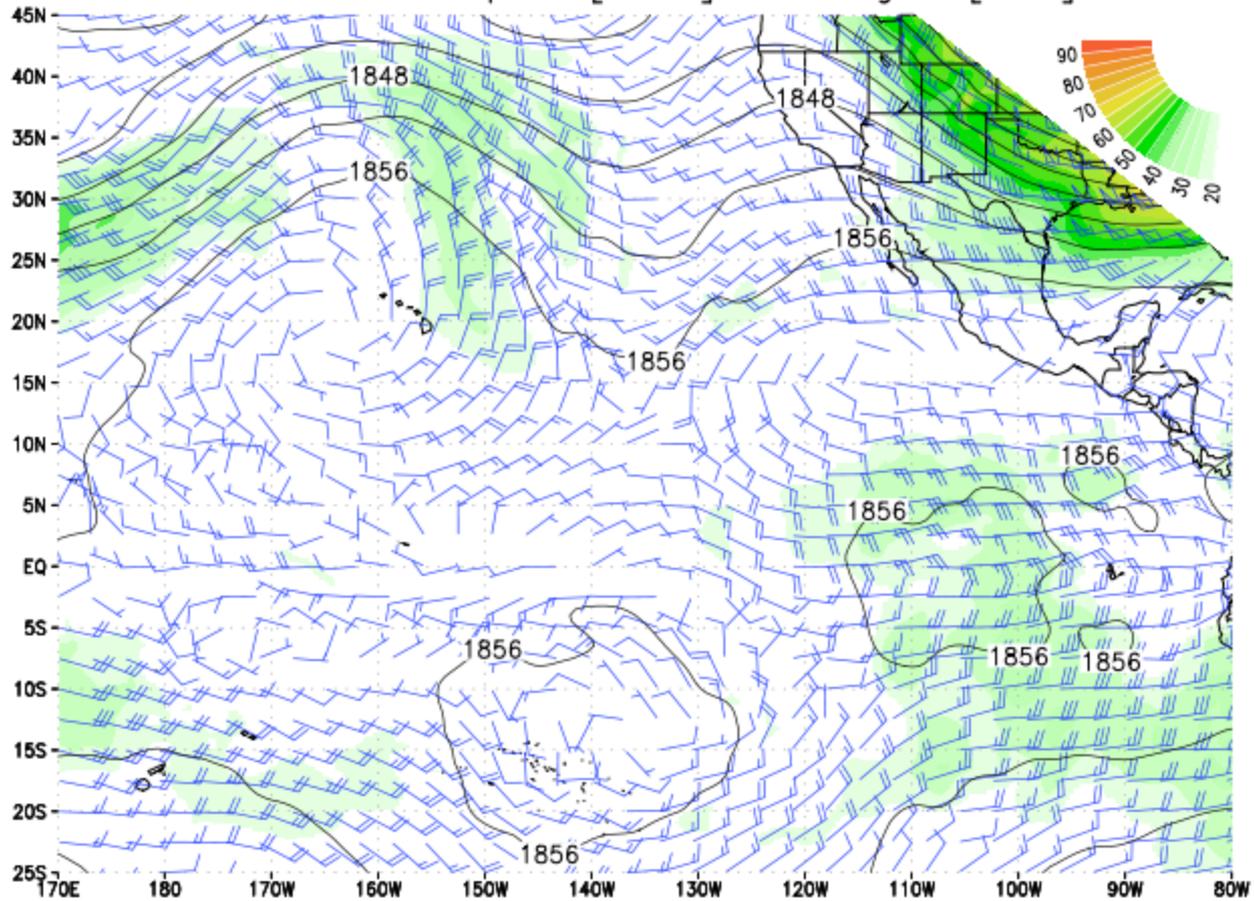




130121/1500 GOES15 IR4

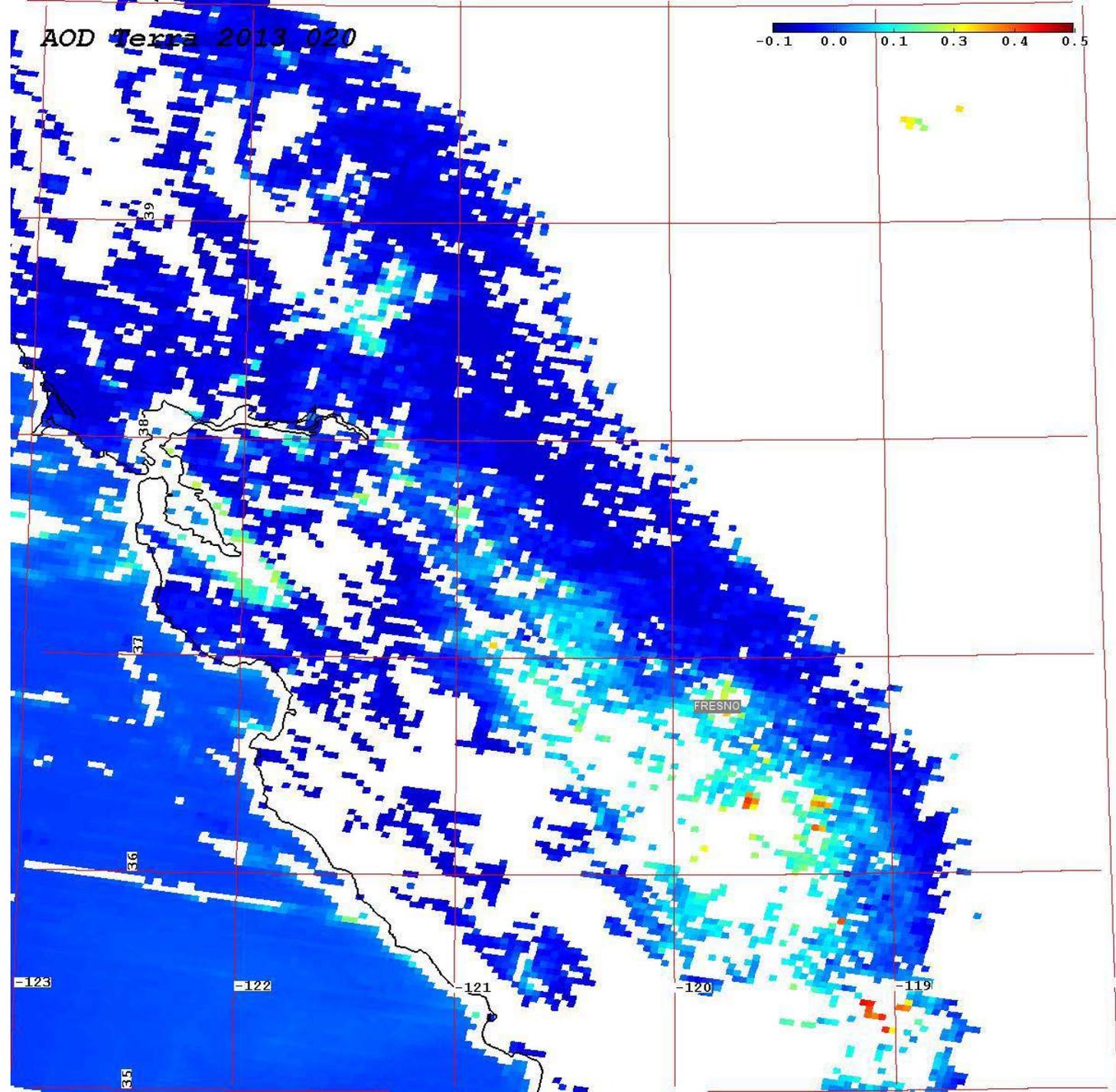
NASA/GMAO - GEOS-5 Forecast Initialized on 00z 2013-01-21

70 hPa Wind Speed [knots] and Heights [dam]

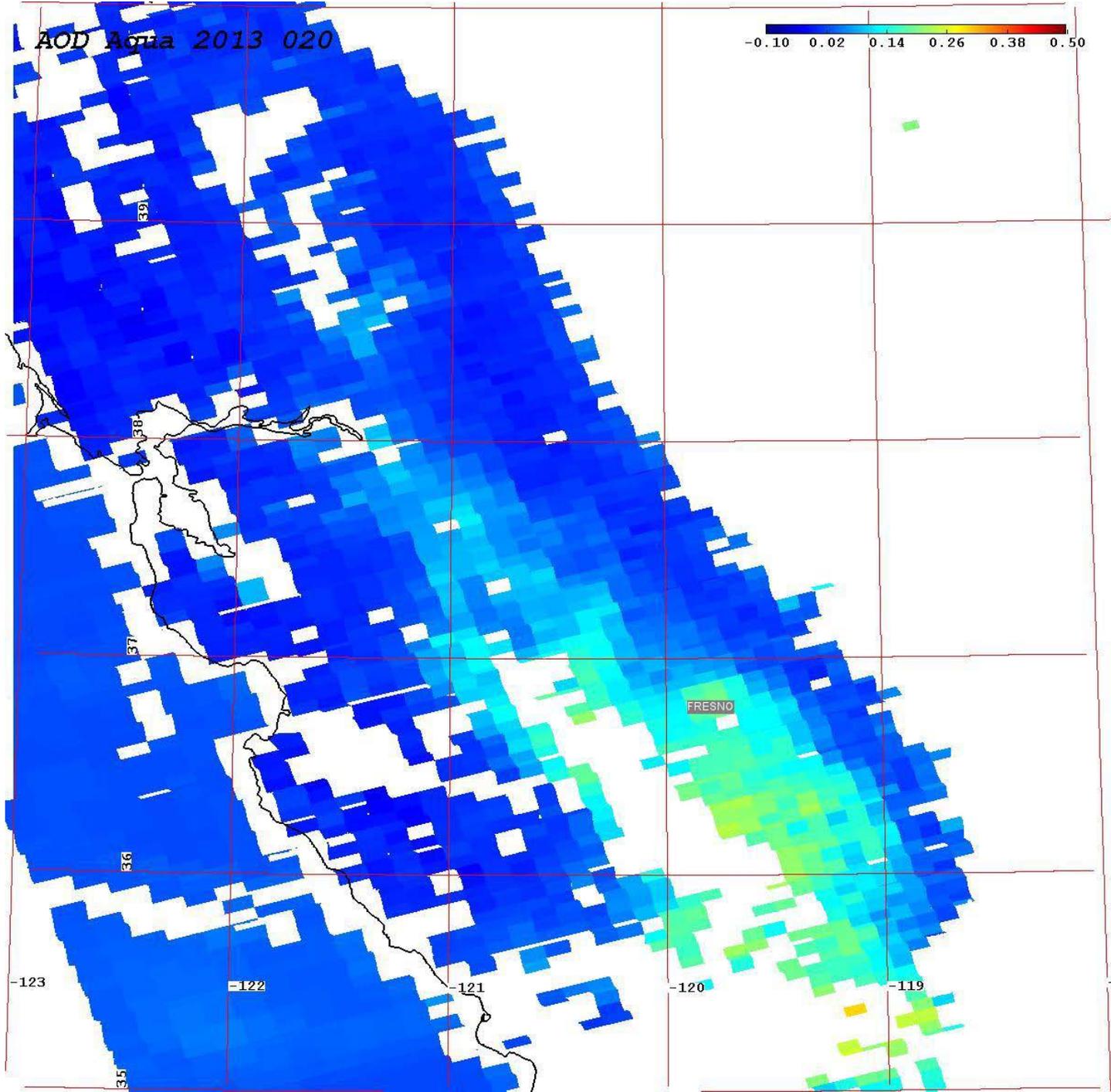
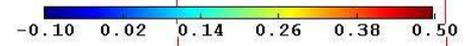


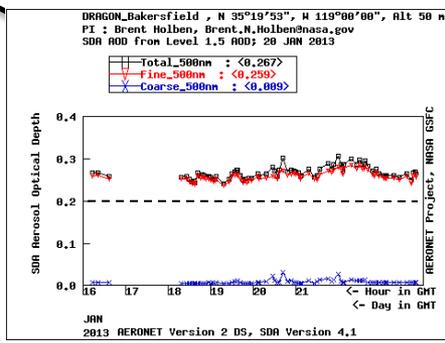
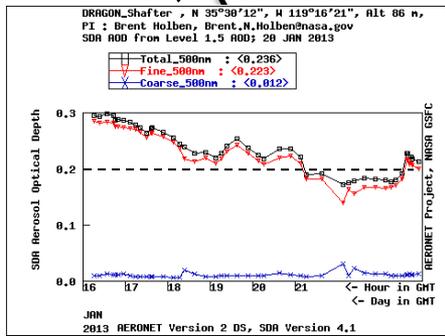
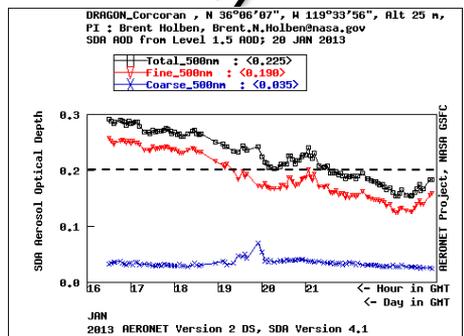
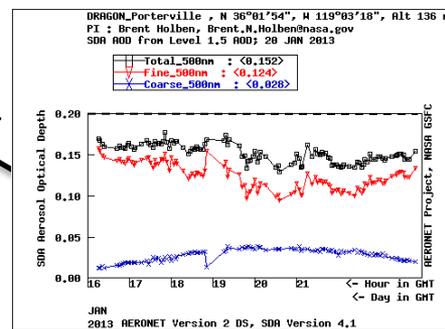
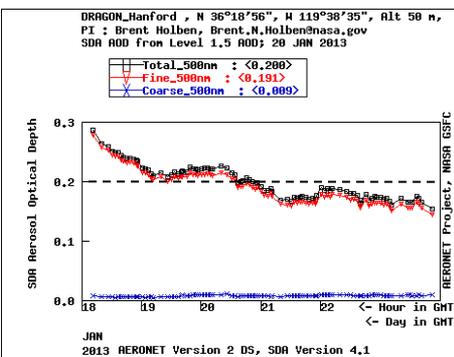
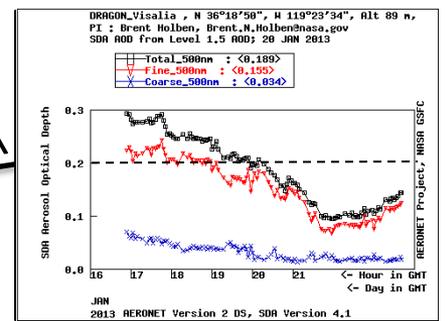
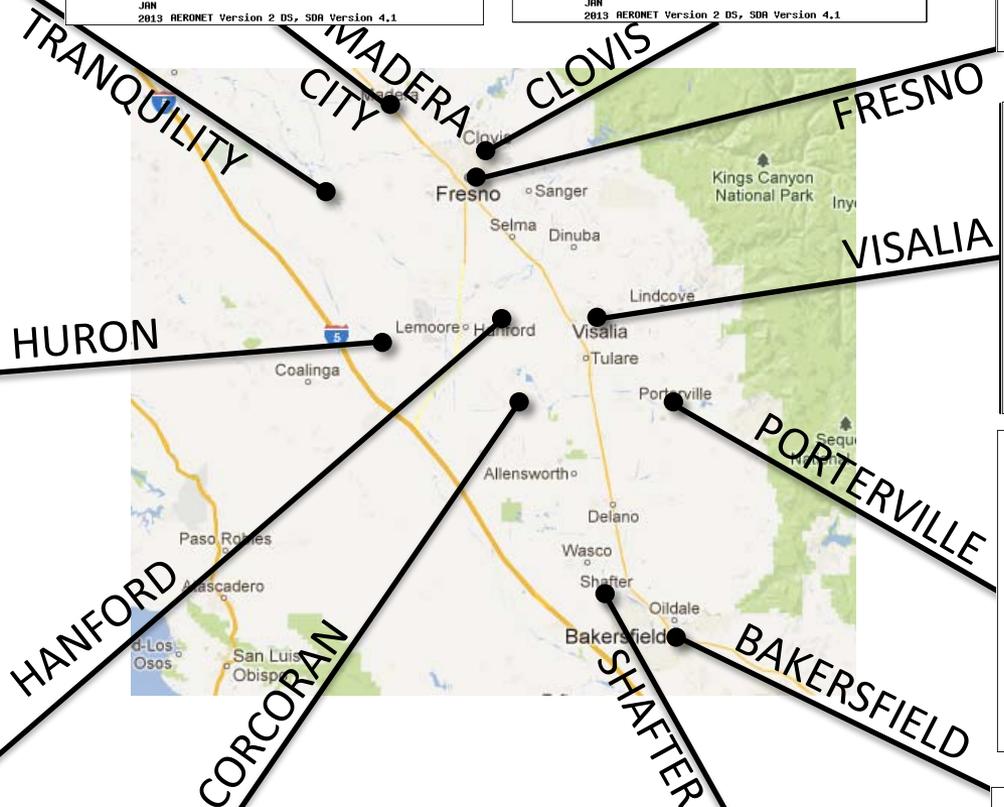
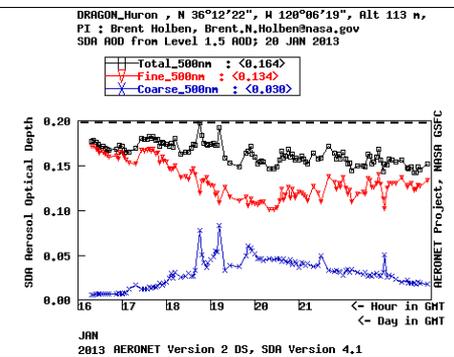
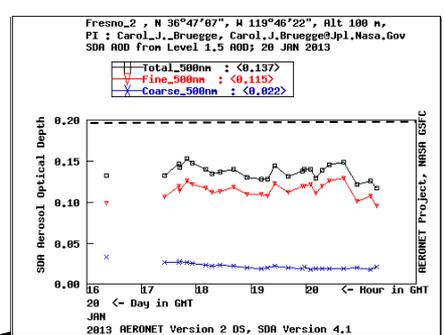
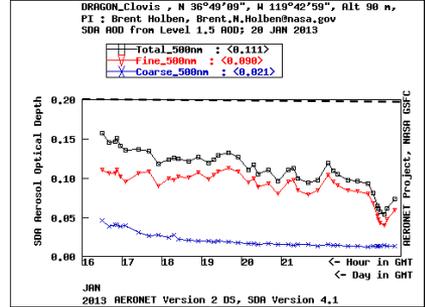
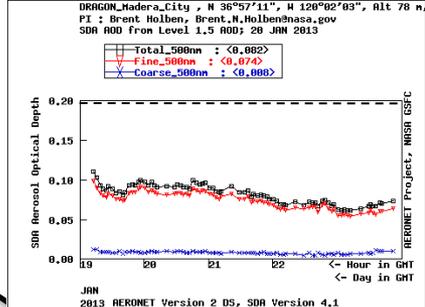
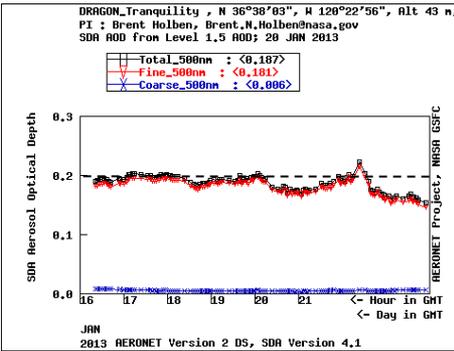
42 hr forecast valid Tue 18z 2013-01-22

AOD Terra 2013 020



AOD Area 2013 020



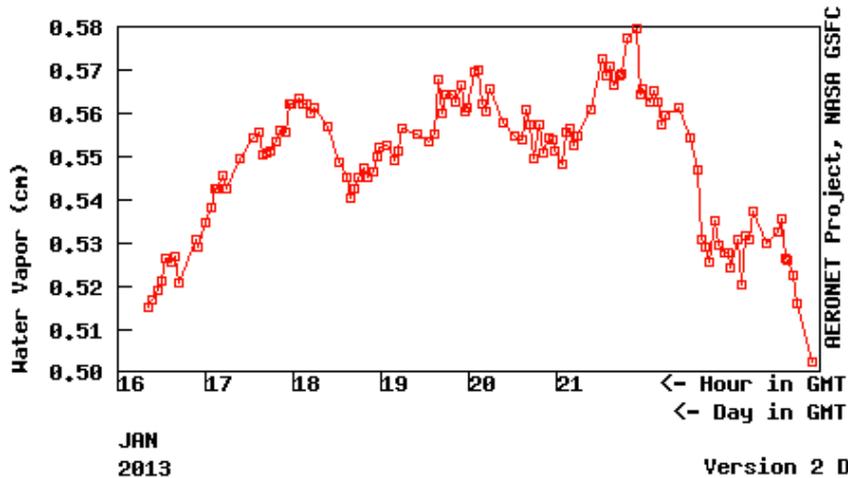


JAN 20 2013

Water Vapor data from JAN 20 of 2013

DRAGON_Tranquility , N 36°38'02", W 120°22'55", Alt 43 m,
PI : Brent Holben, Brent.N.Holben@nasa.gov
Level 1.5 AOT; Data from 20 JAN 2013

Water(cn) : <0.549>

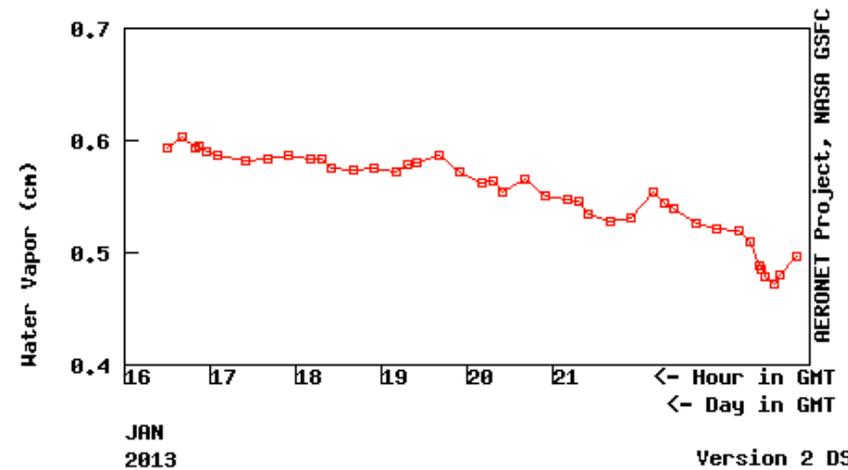


Water Vapor data from JAN 20 of 2013

Water Vapor data from JAN 20 of 2013

DRAGON_Clovis , N 36°49'08", W 119°42'57", Alt 90 m,
PI : Brent Holben, Brent.N.Holben@nasa.gov
Level 1.5 AOT; Data from 20 JAN 2013

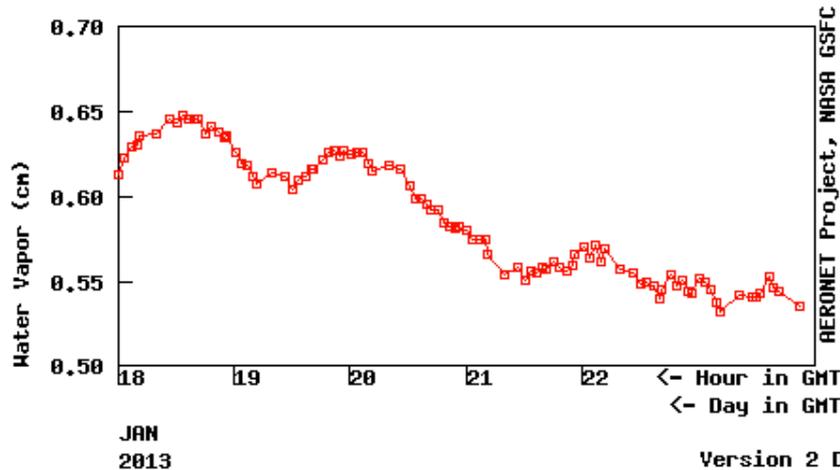
Water(cn) : <0.553>



Water Vapor data from JAN 20 of 2013

DRAGON_Hanford , N 36°18'57", W 119°38'34", Alt 50 m,
PI : Brent Holben, Brent.N.Holben@nasa.gov
Level 1.0 AOT; Data from 20 JAN 2013

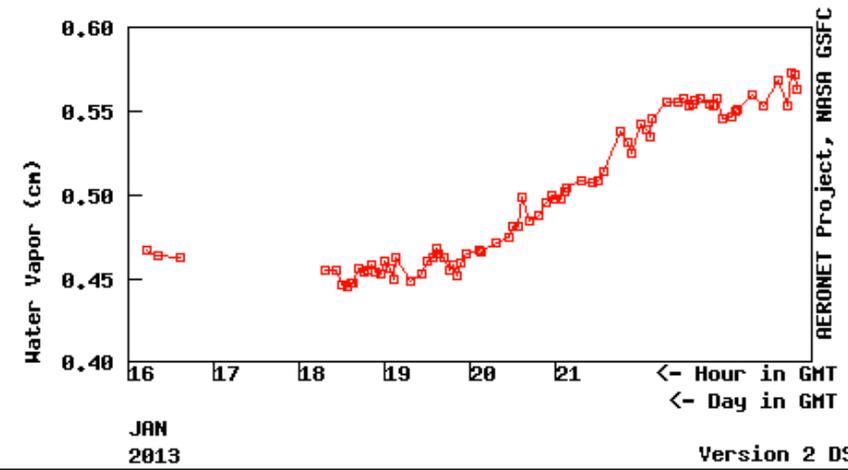
Water(cn) : <0.588>



Water Vapor data from JAN 20 of 2013

DRAGON_Bakersfield , N 35°19'55", W 119°00'00", Alt 50 m,
PI : Brent Holben, Brent.N.Holben@nasa.gov
Level 1.5 AOT; Data from 20 JAN 2013

Water(cn) : <0.500>



Water Vapor data from JAN 20 of 2013

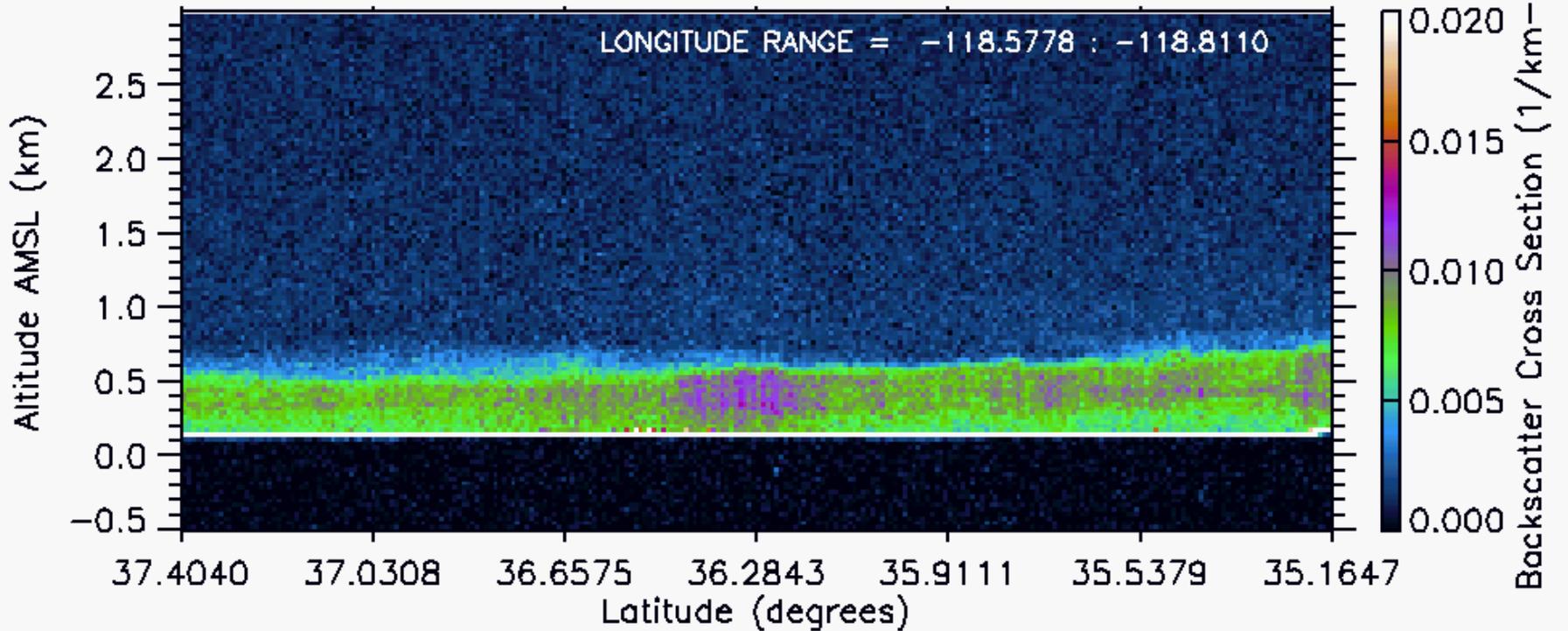
CPL Attenuated Backscatter for 012013

532nm

Time of Day (UTC)

17:35:00 17:43:20 17:51:39 18:00:00 18:08:20 18:16:39 18:24:59

LONGITUDE RANGE = -118.5778 : -118.8110

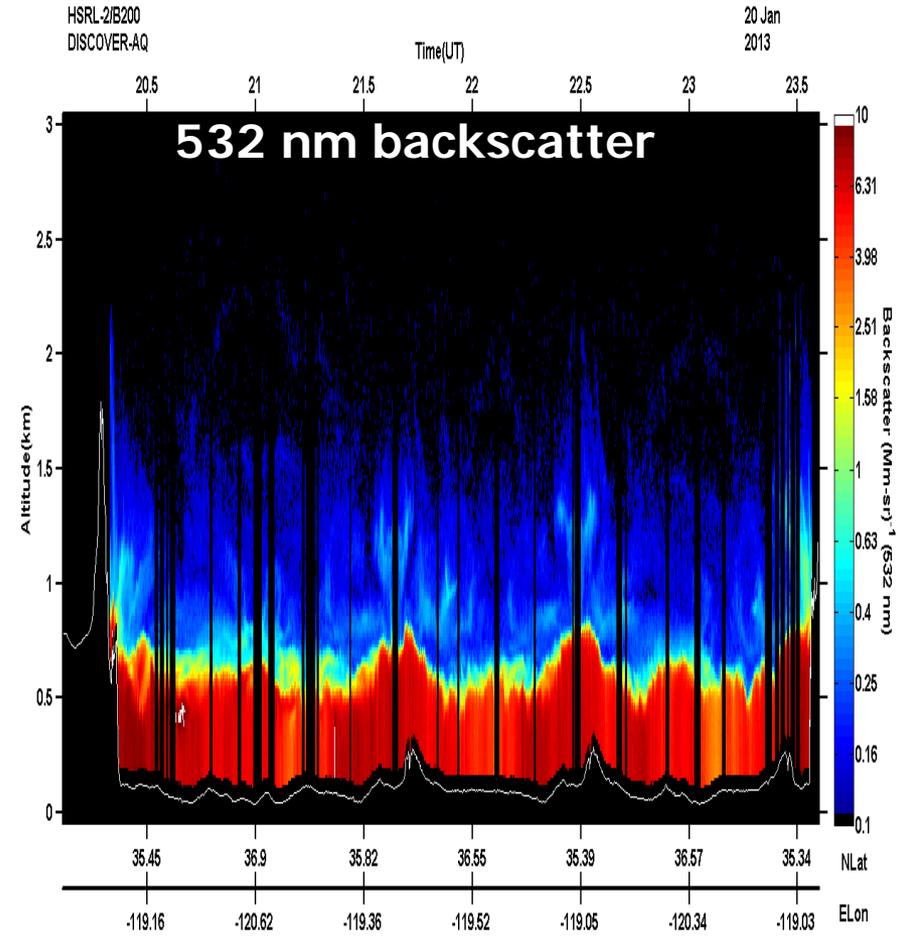
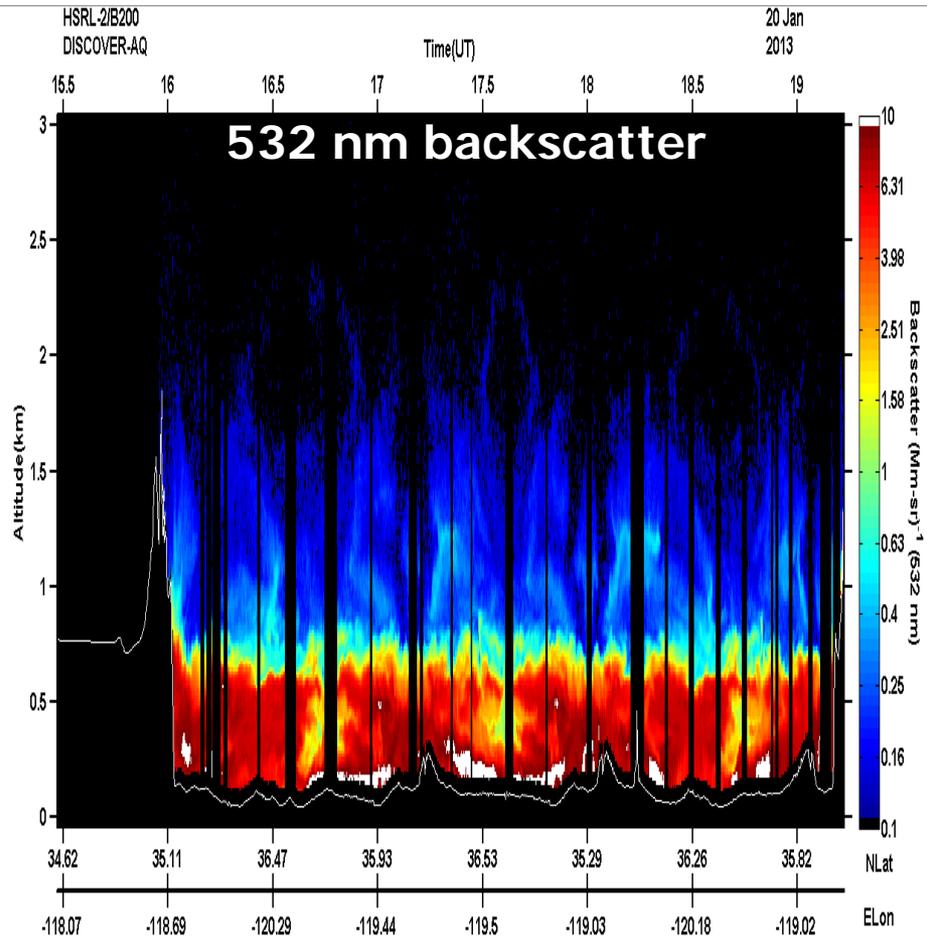


HSRL-2 measurements of temporal and vertical aerosol variability (Jan. 20, 2013)

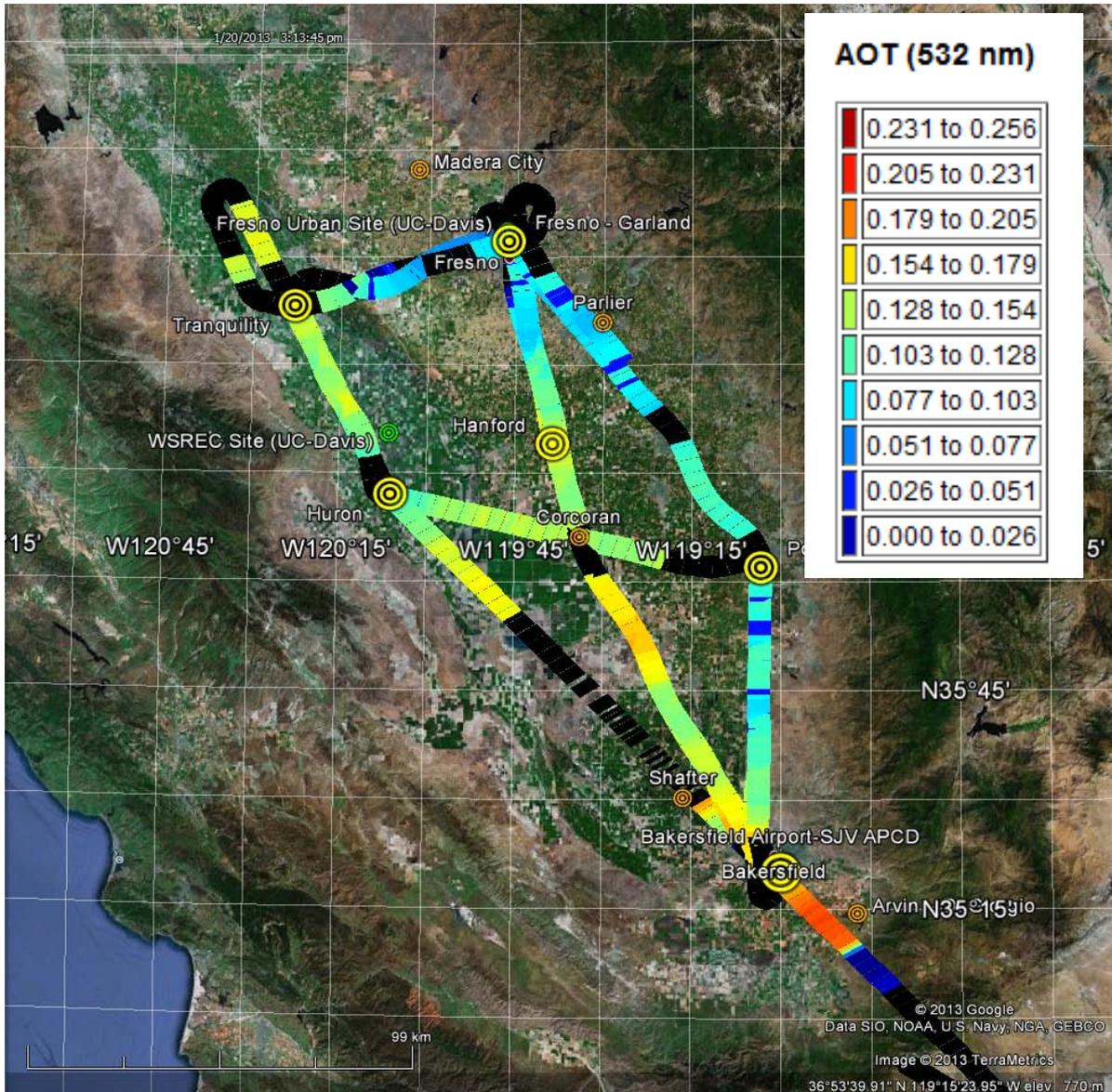


Morning

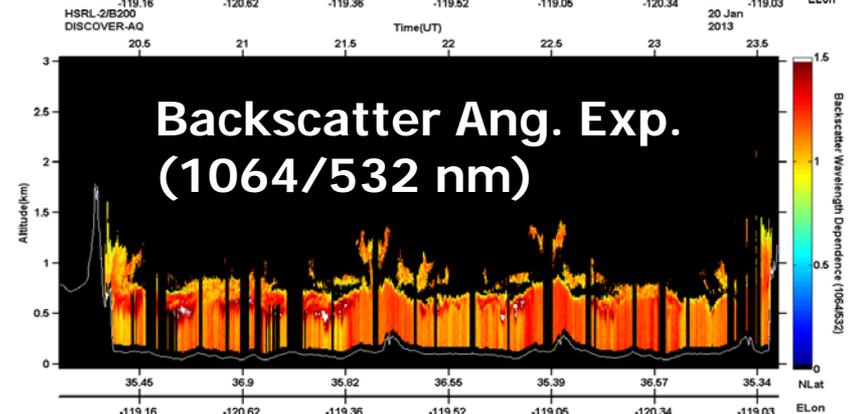
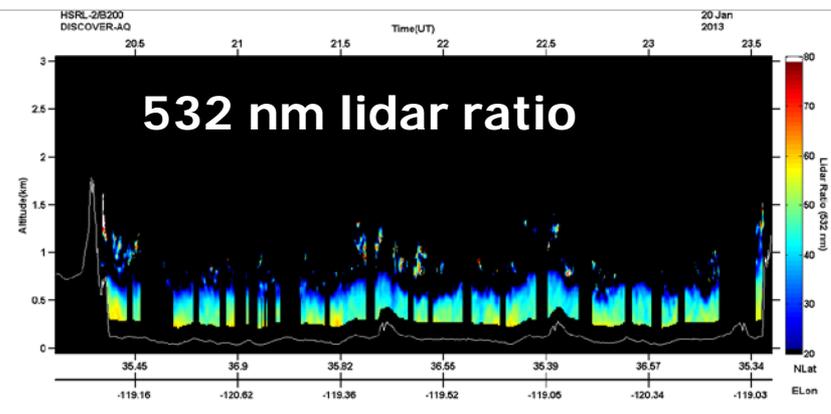
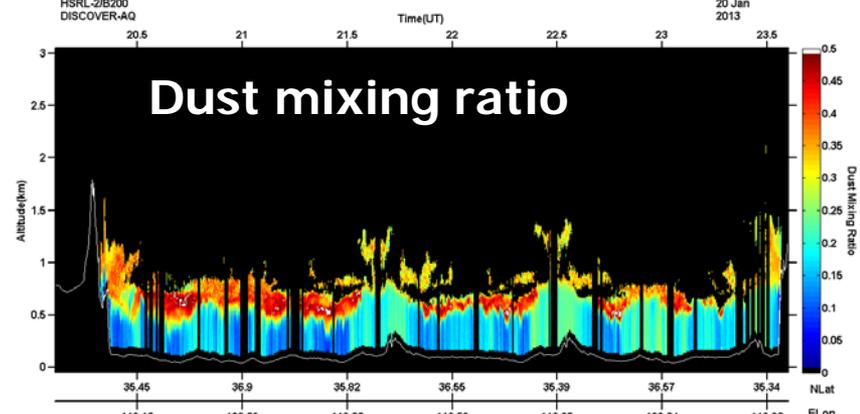
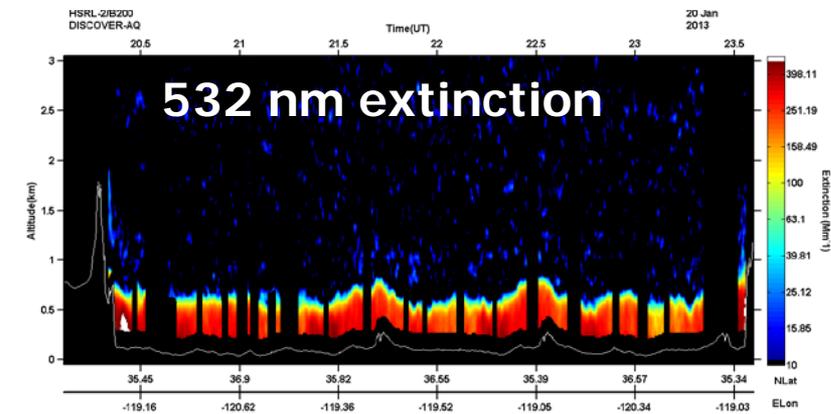
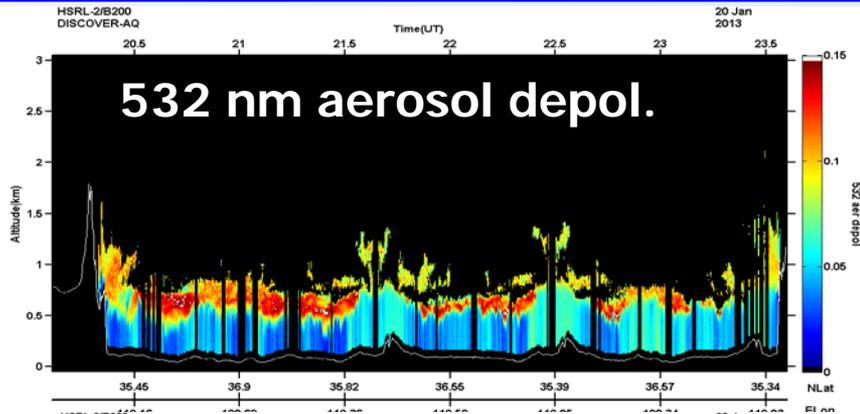
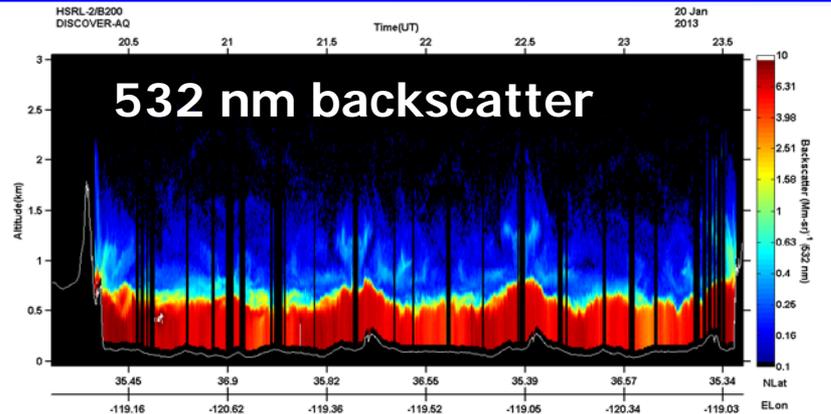
Afternoon



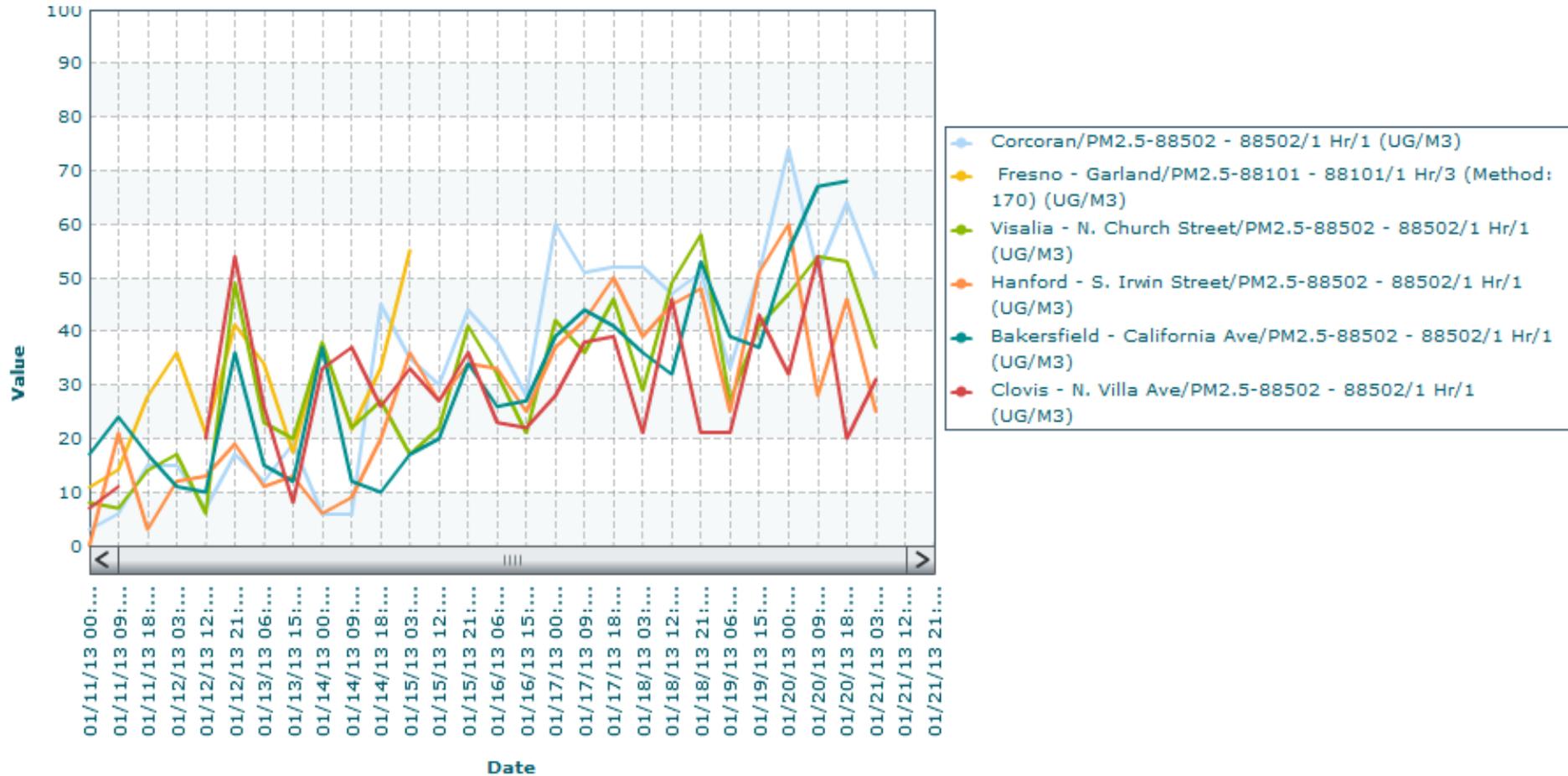
HSRL-2 Jan. 20, 2013 afternoon flight



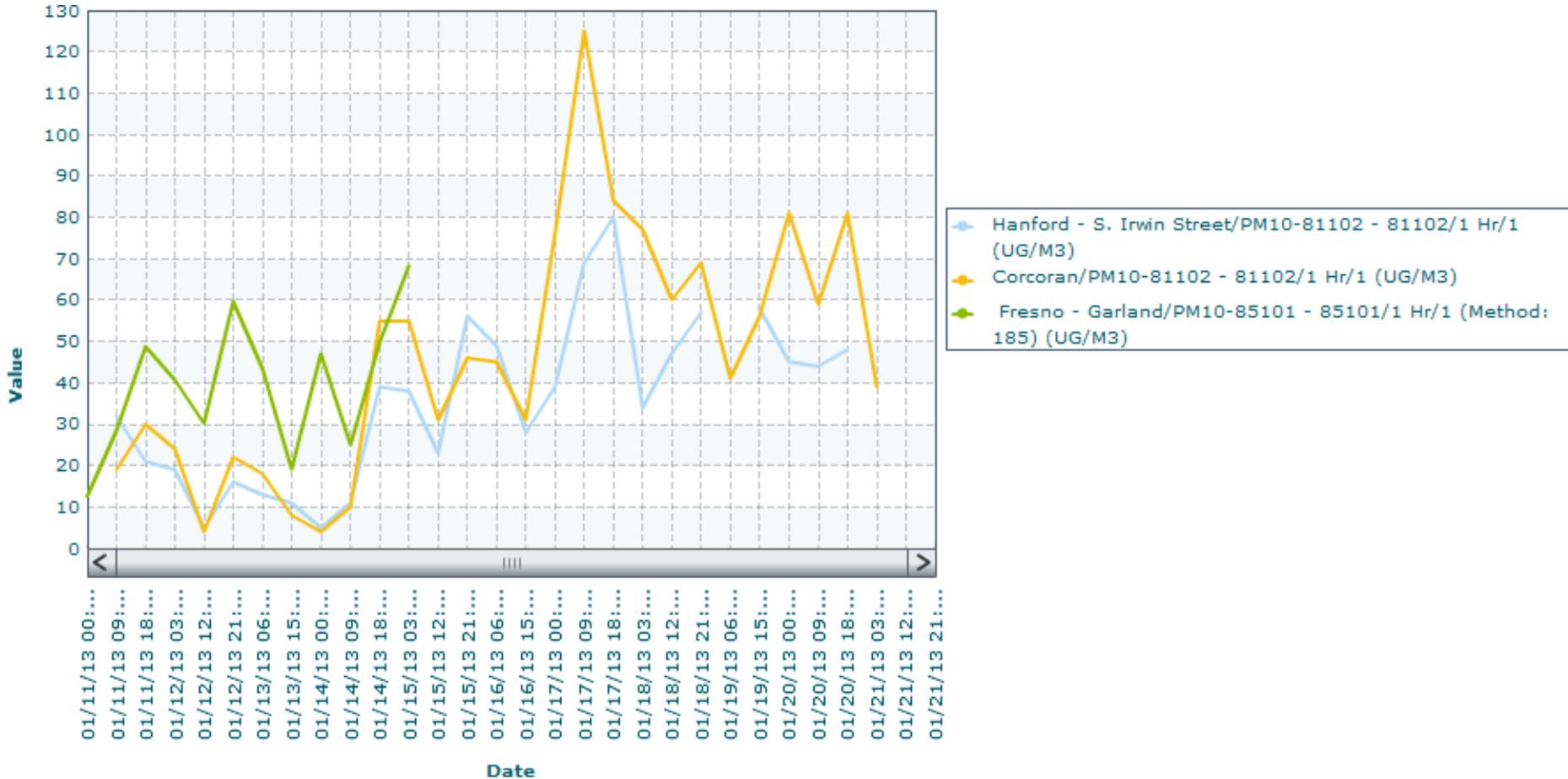
HSRL-2 Jan. 20, 2013 afternoon flight



Hourly PM_{2.5} (ug/m³) since Jan. 11th

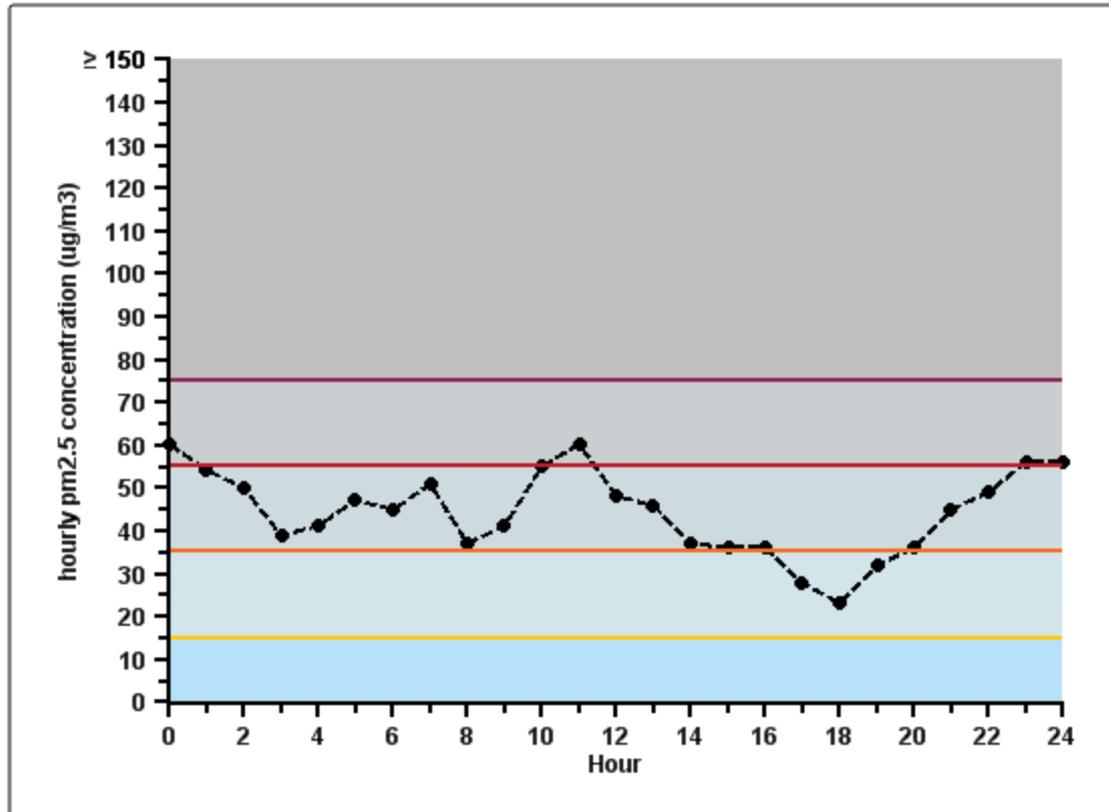


Hourly PM₁₀ (ug/m³) since Jan. 11th



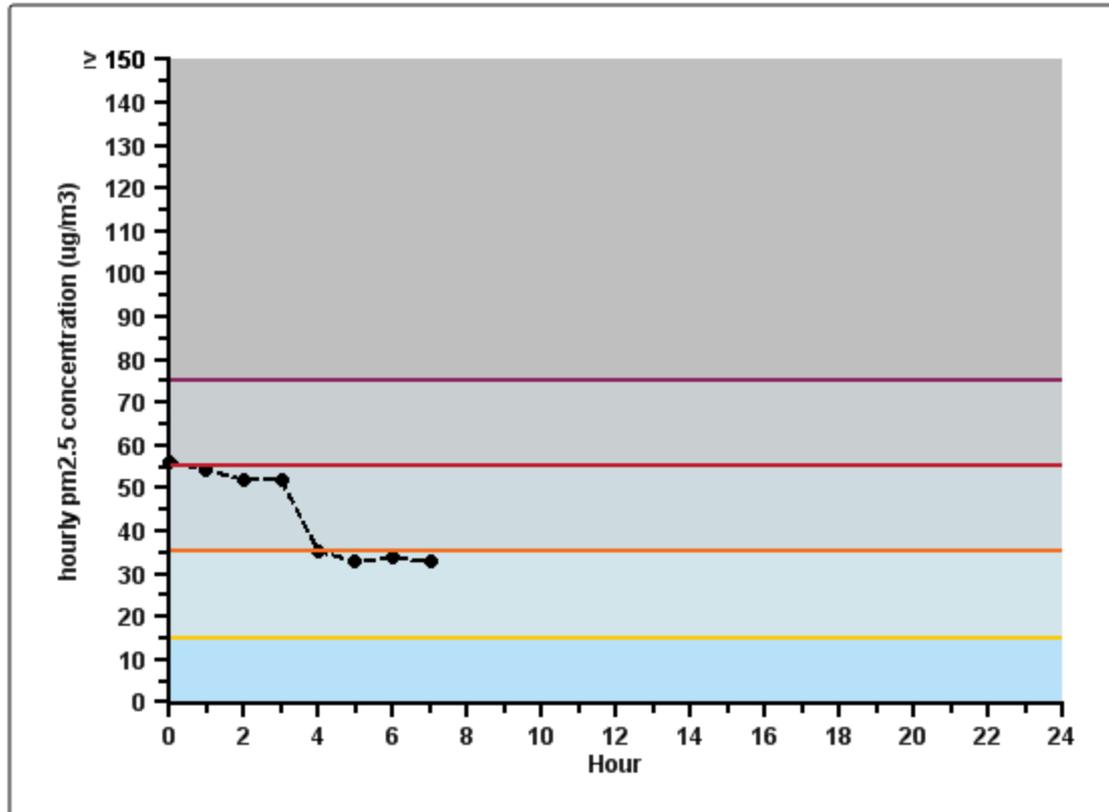
Fresno – Garland January 20, 2013

Air District Real-Time Outdoor Activity Risk



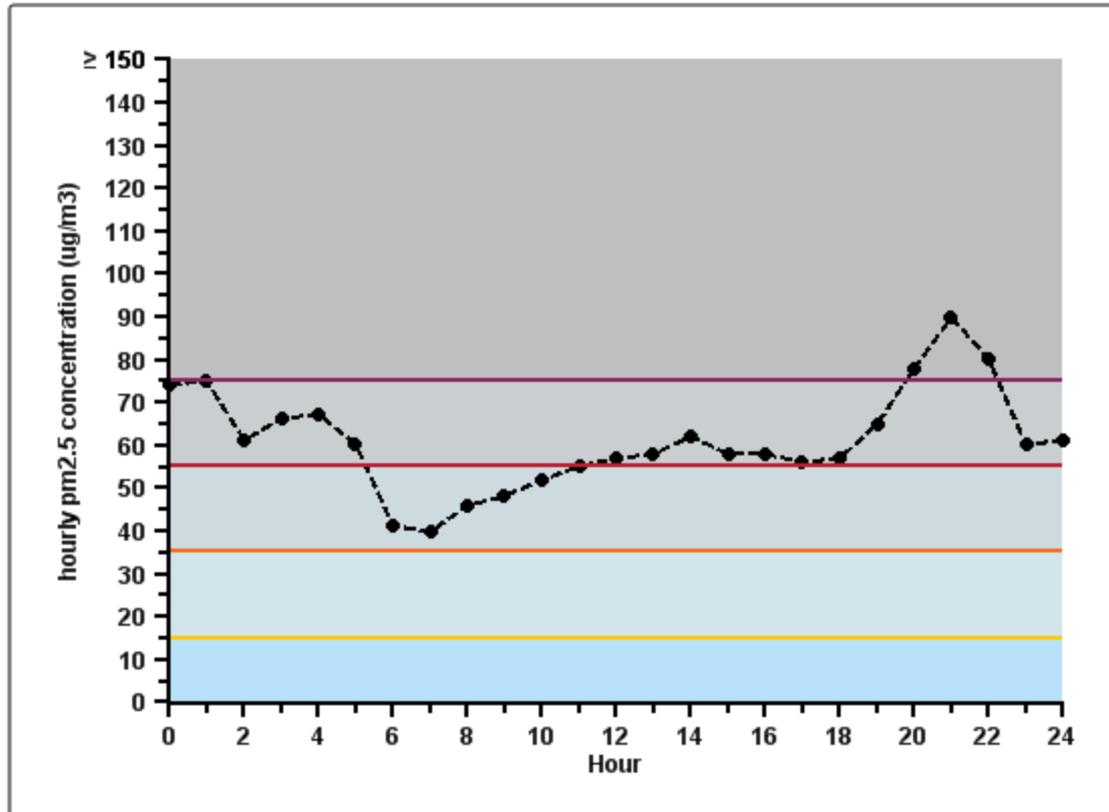
Fresno – Garland January 21, 2013

Air District Real-Time Outdoor Activity Risk



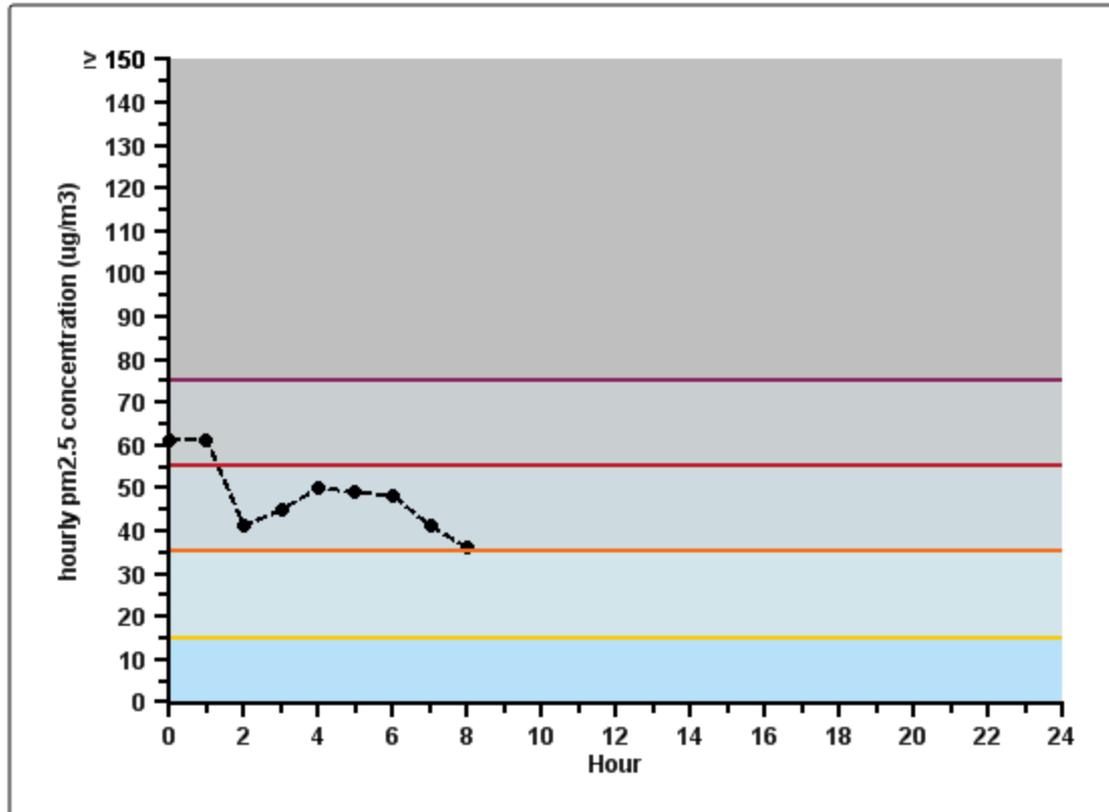
Corcoran - January 20, 2013

Air District Real-Time Outdoor Activity Risk



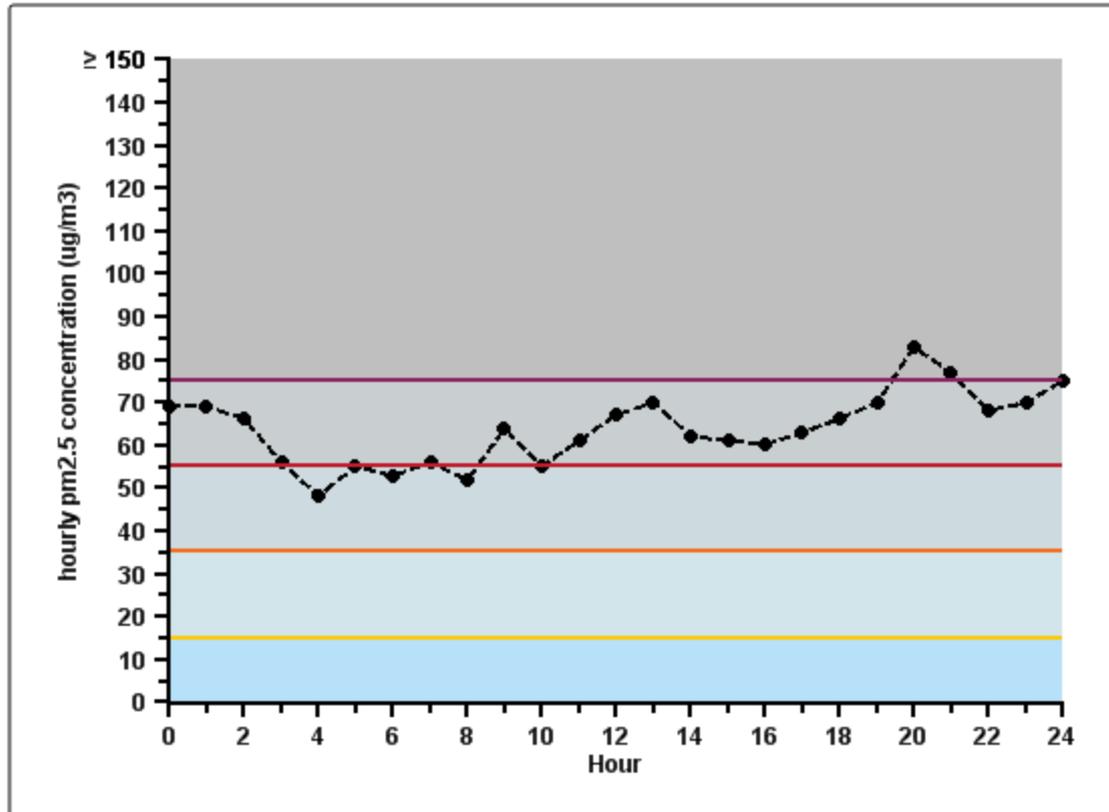
Corcoran - January 21, 2013

Air District Real-Time Outdoor Activity Risk



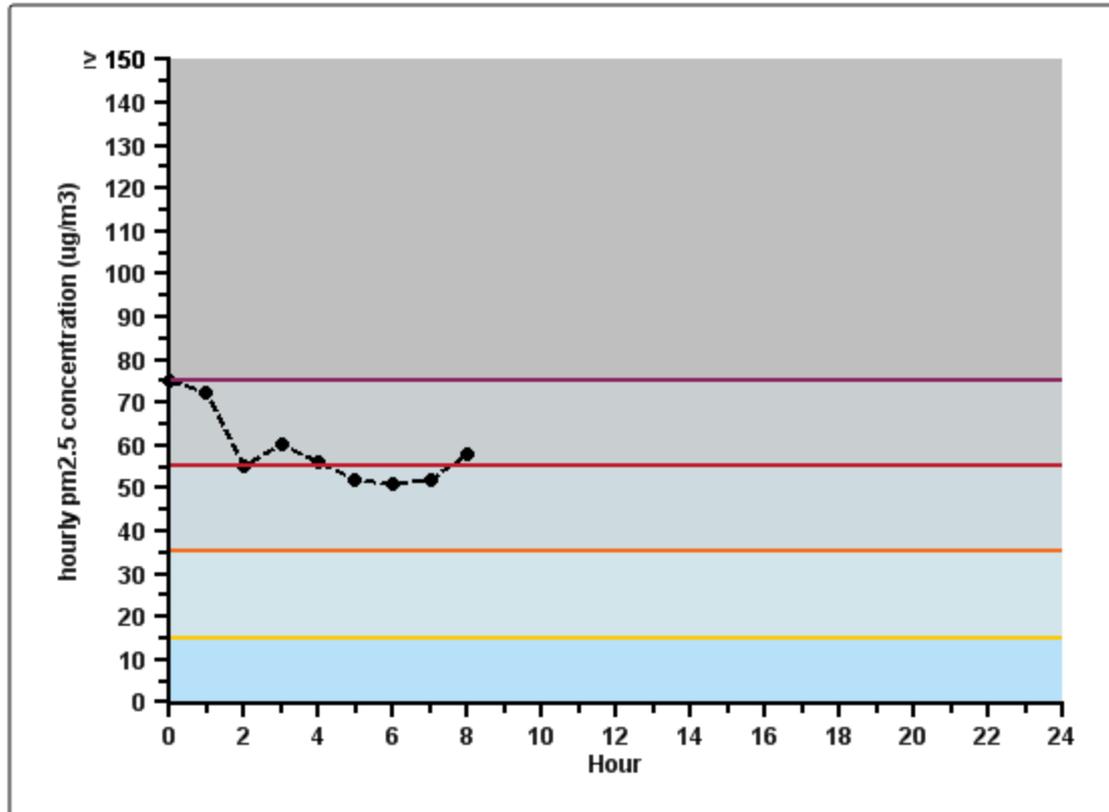
Bakersfield Munic. Airp. - Jan. 20, 2013

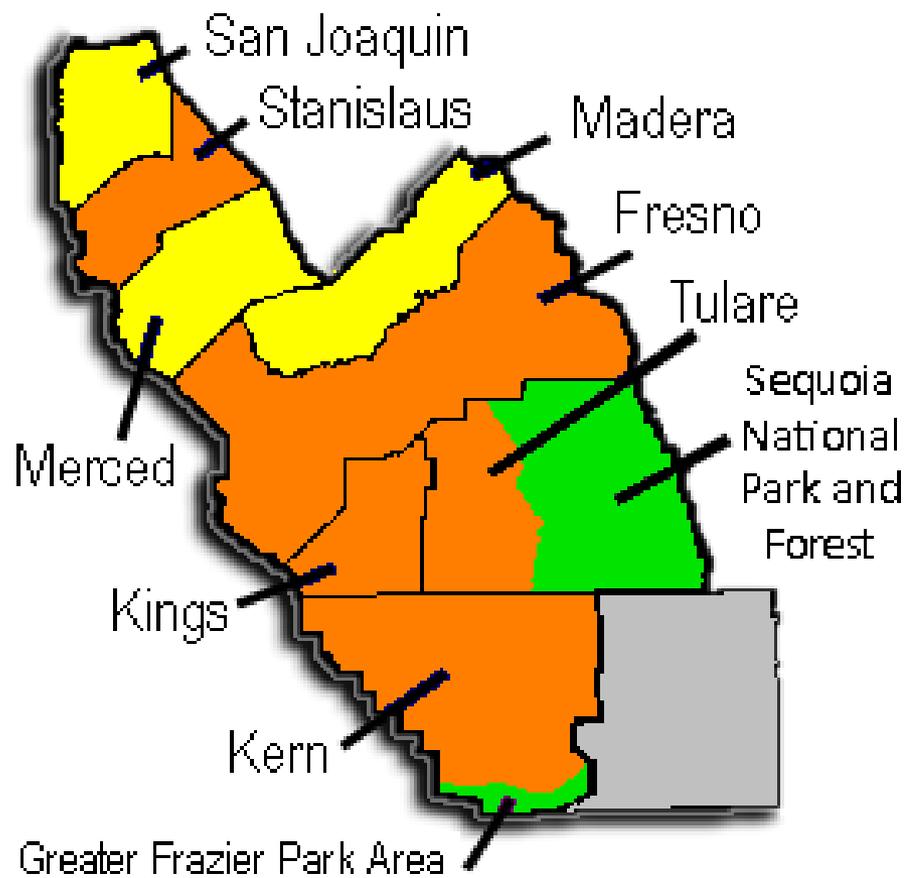
Air District Real-Time Outdoor Activity Risk



Bakersfield Munic. Airp. - Jan. 21, 2013

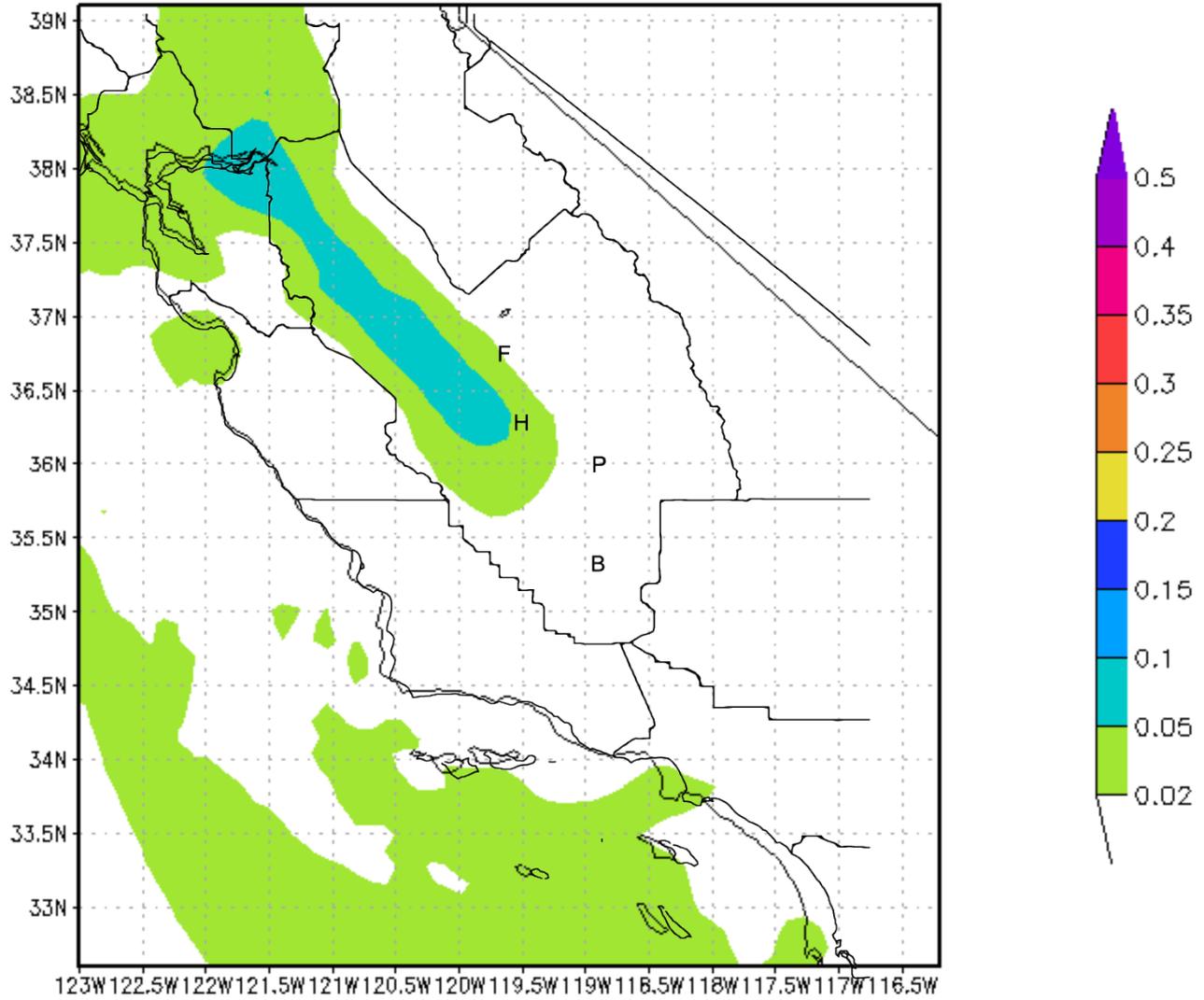
Air District Real-Time Outdoor Activity Risk





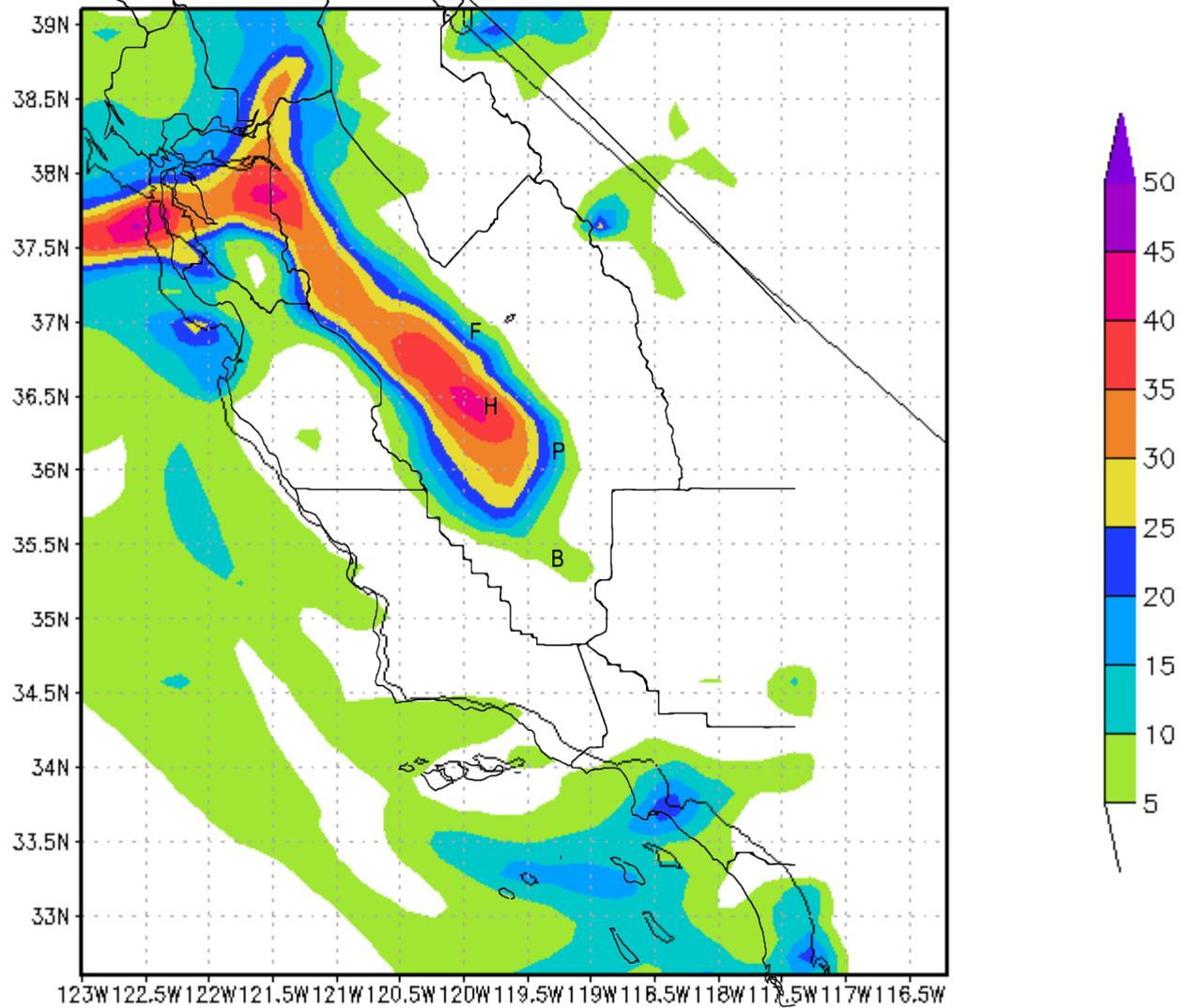
ROAR LEVEL	Ozone (O ³)	Particulate Matter (PM 2.5)
 LEVEL 1 Good	1-59 ppb	1-15 µg/m ³
 LEVEL 2 Moderate	60-75 ppb	16-35 µg/m ³
 LEVEL 3 Unhealthy for Sensitive Groups	76-95 ppb	36-55 µg/m ³
 LEVEL 4 Unhealthy	96-115 ppb	56-75 µg/m ³
 LEVEL 5 Very Unhealthy	>115 ppb	>75 µg/m ³

Column AOD [Dimensionless] at surface Valid 18 JAN 22 2013

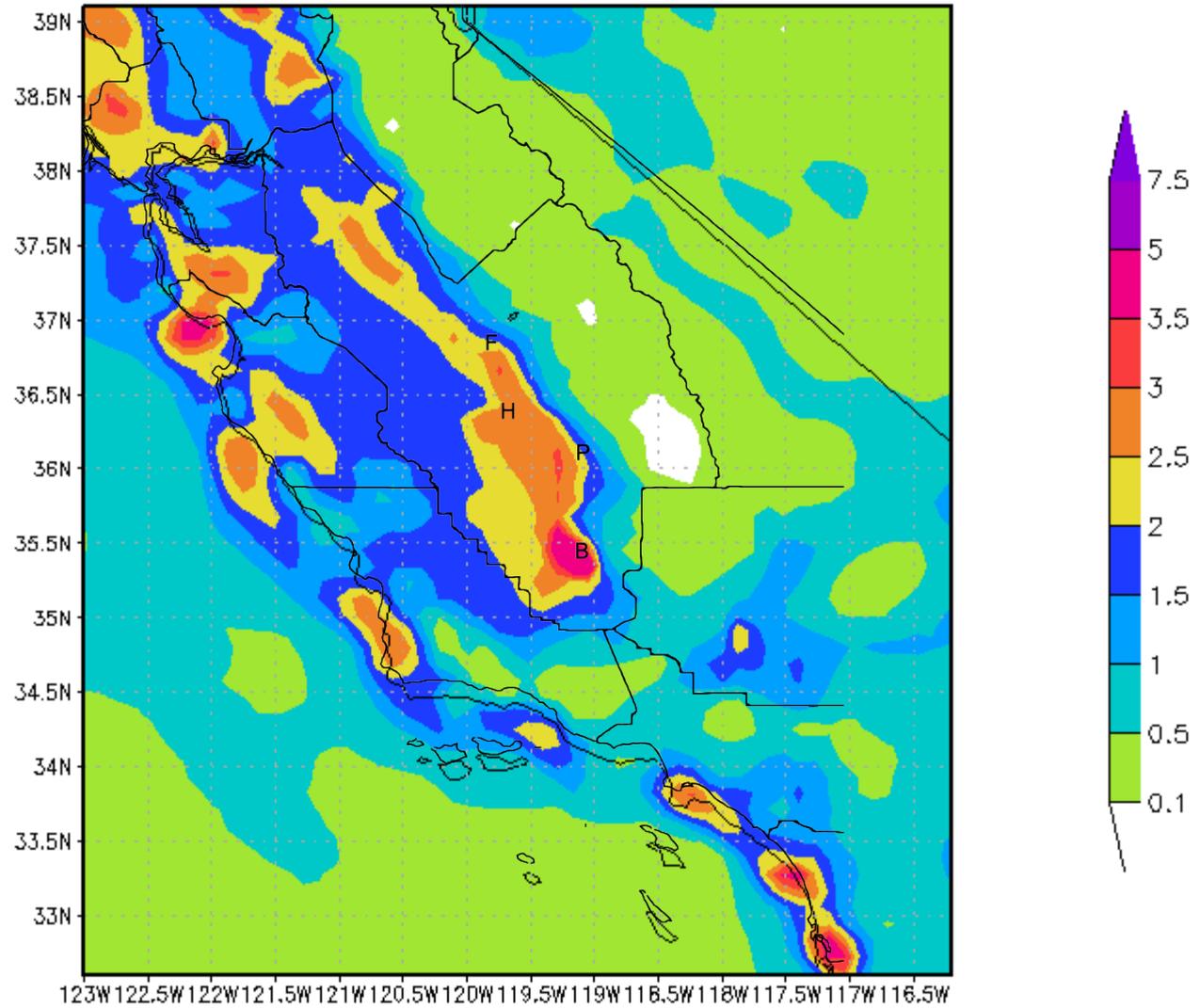




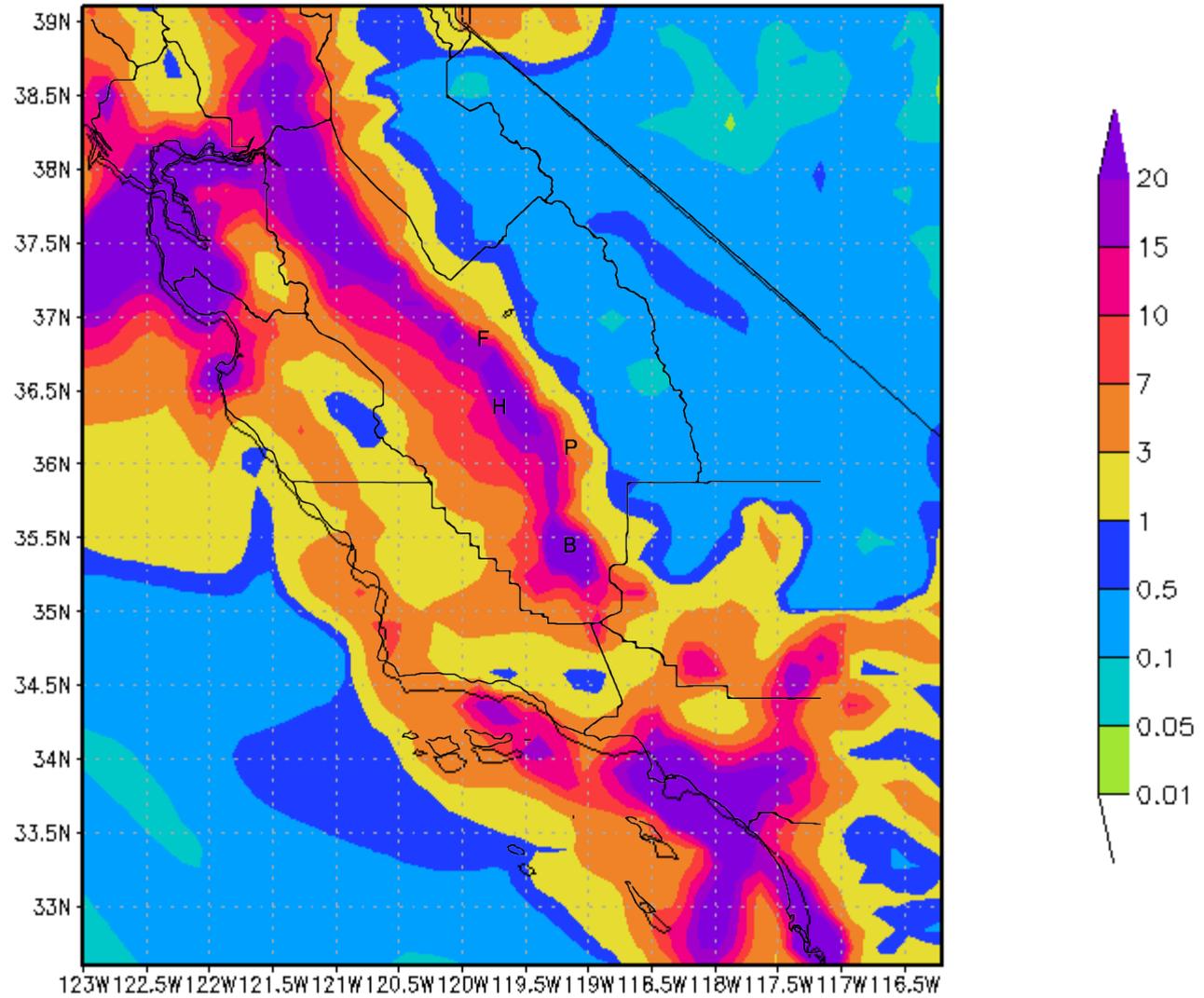
PM25 [$\mu\text{g}/\text{m}^3$] at surface Valid 18 JAN 22 2013



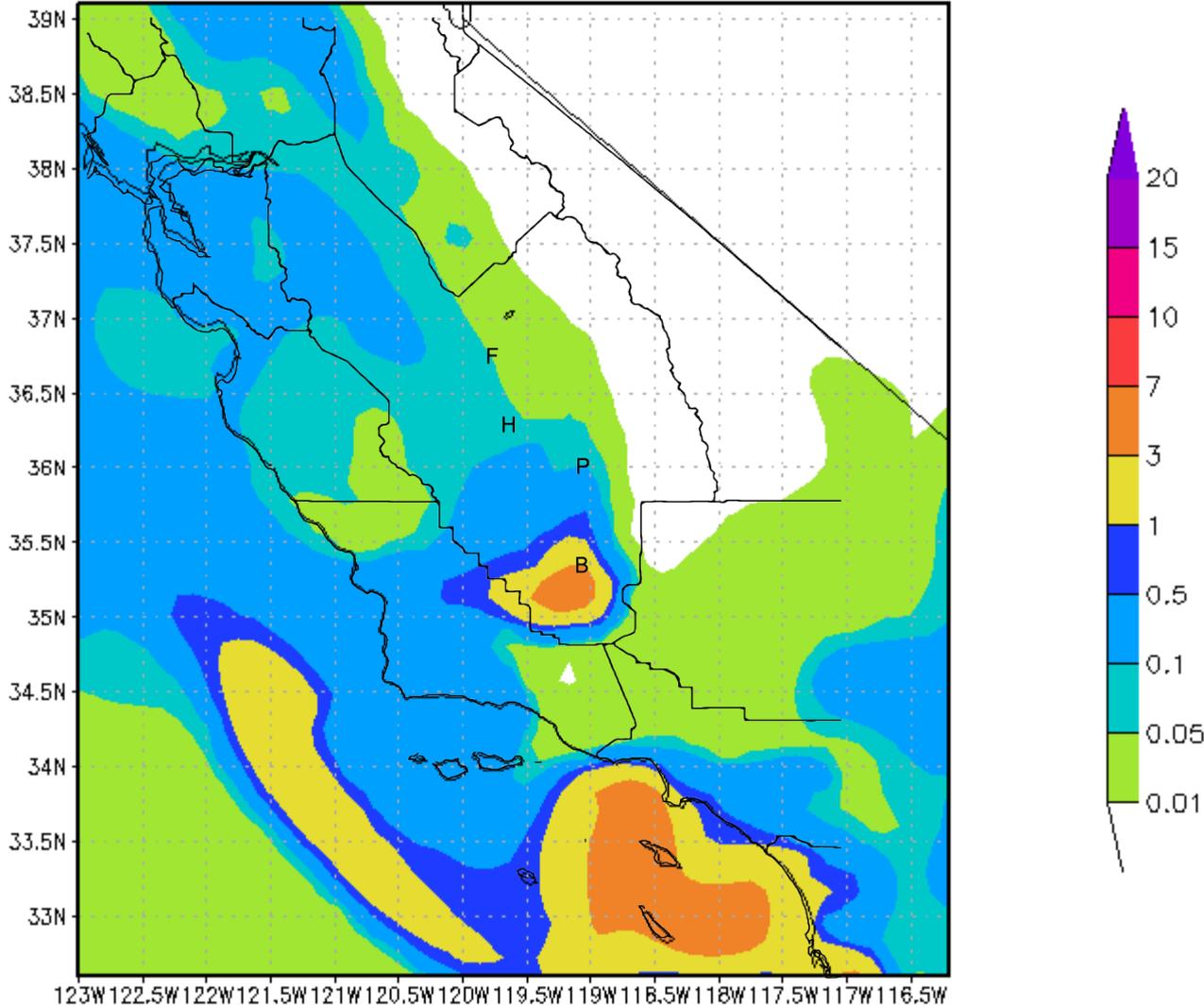
FORM [ppb] at 1013 [hPa] Valid 18 JAN 22 2013



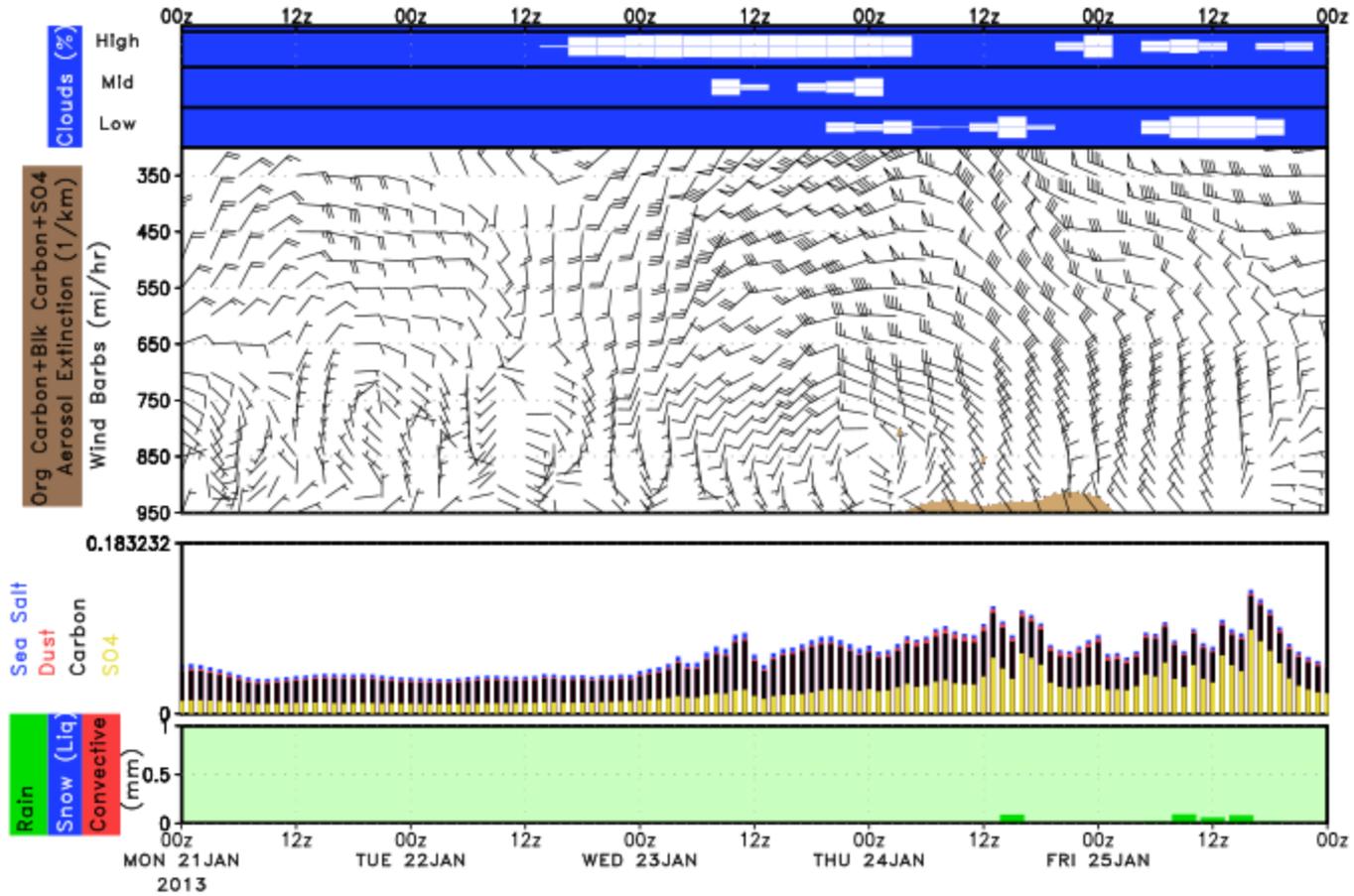
NO2 [ppb] at 1013 [hPa] Valid 18 JAN 22 2013



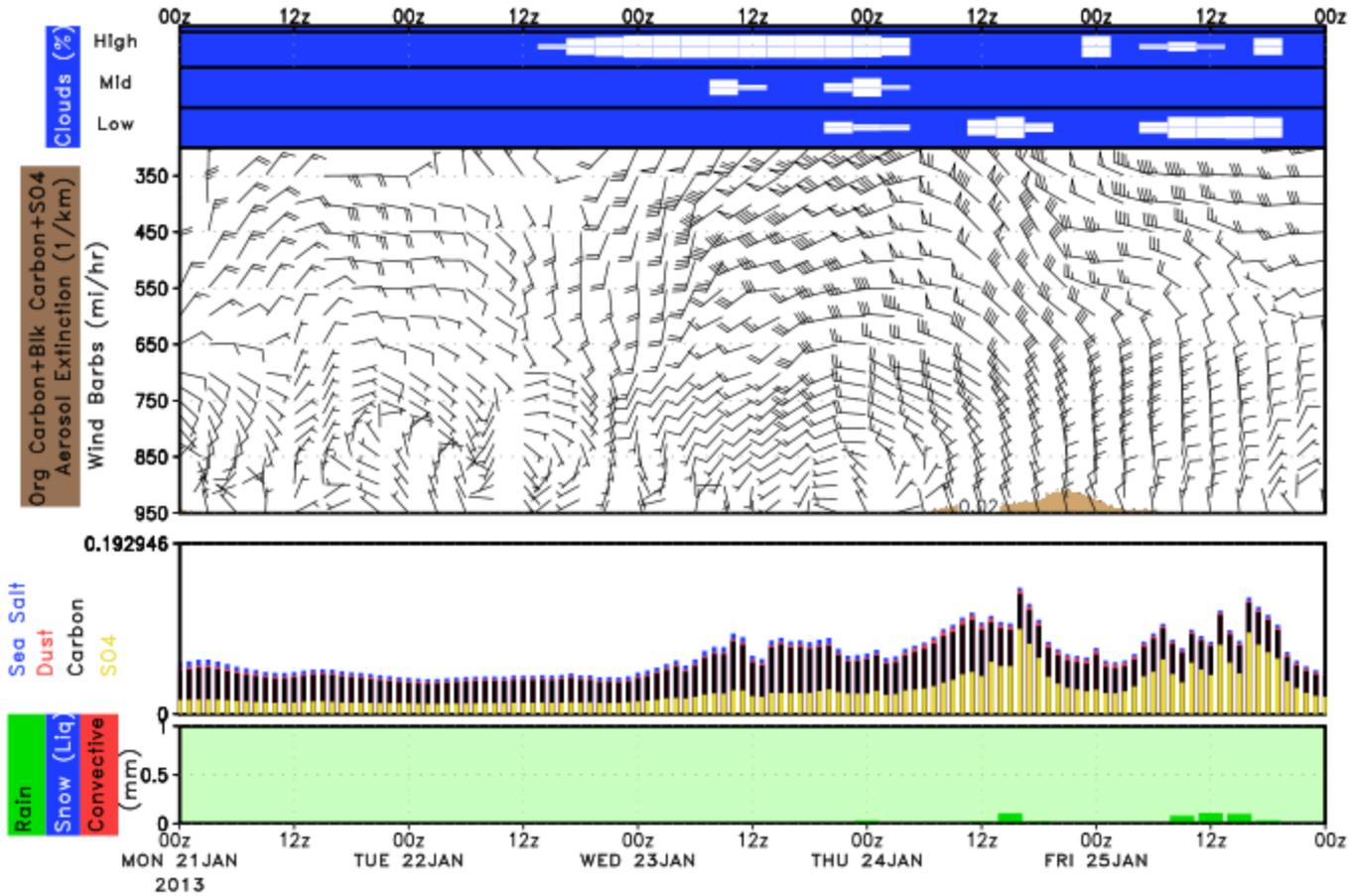
NO2 [ppb] at 900 [hPa] Valid 18 JAN 22 2013



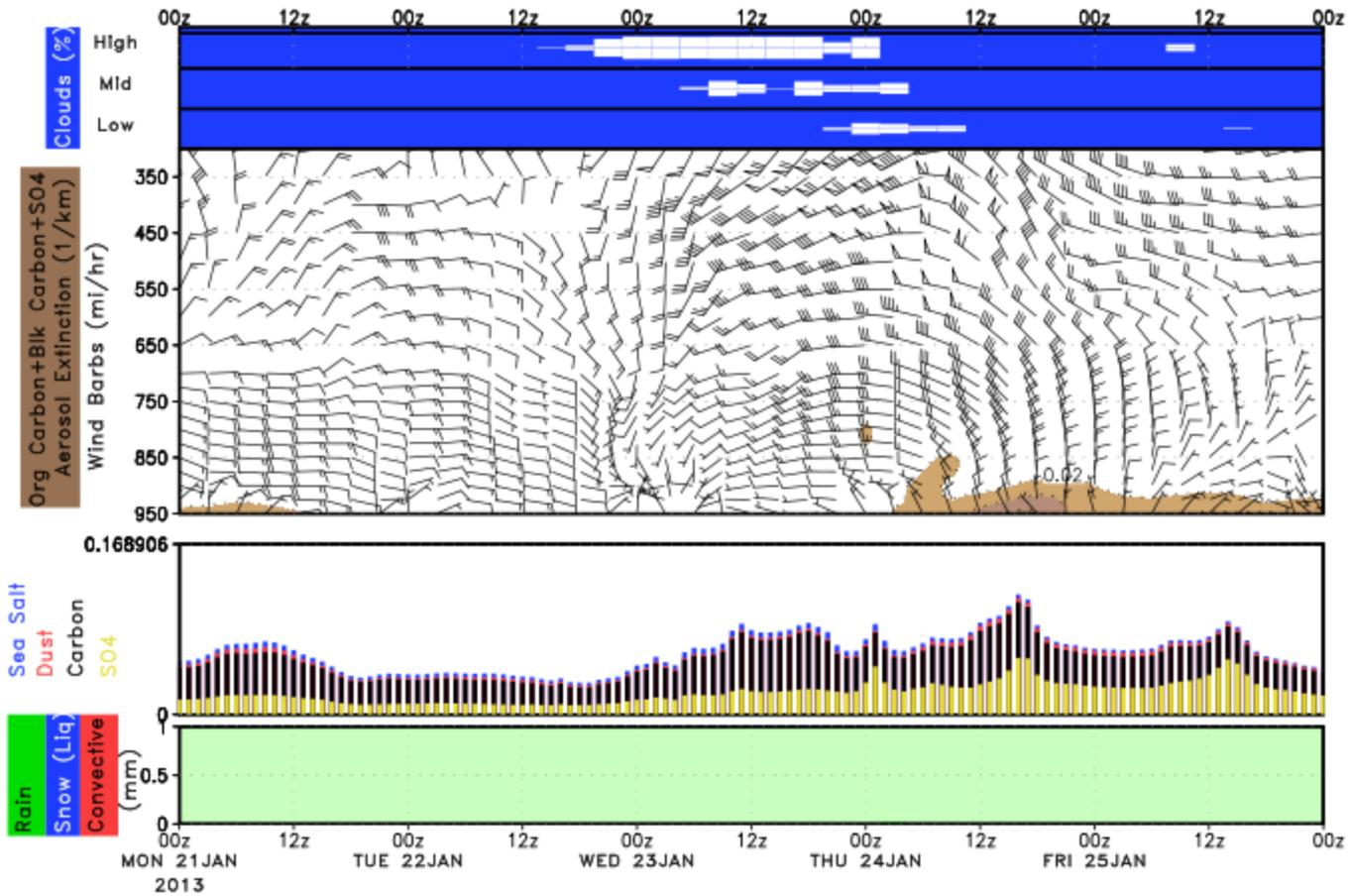
Fresno - GEOS-5 Aerosol Forecast



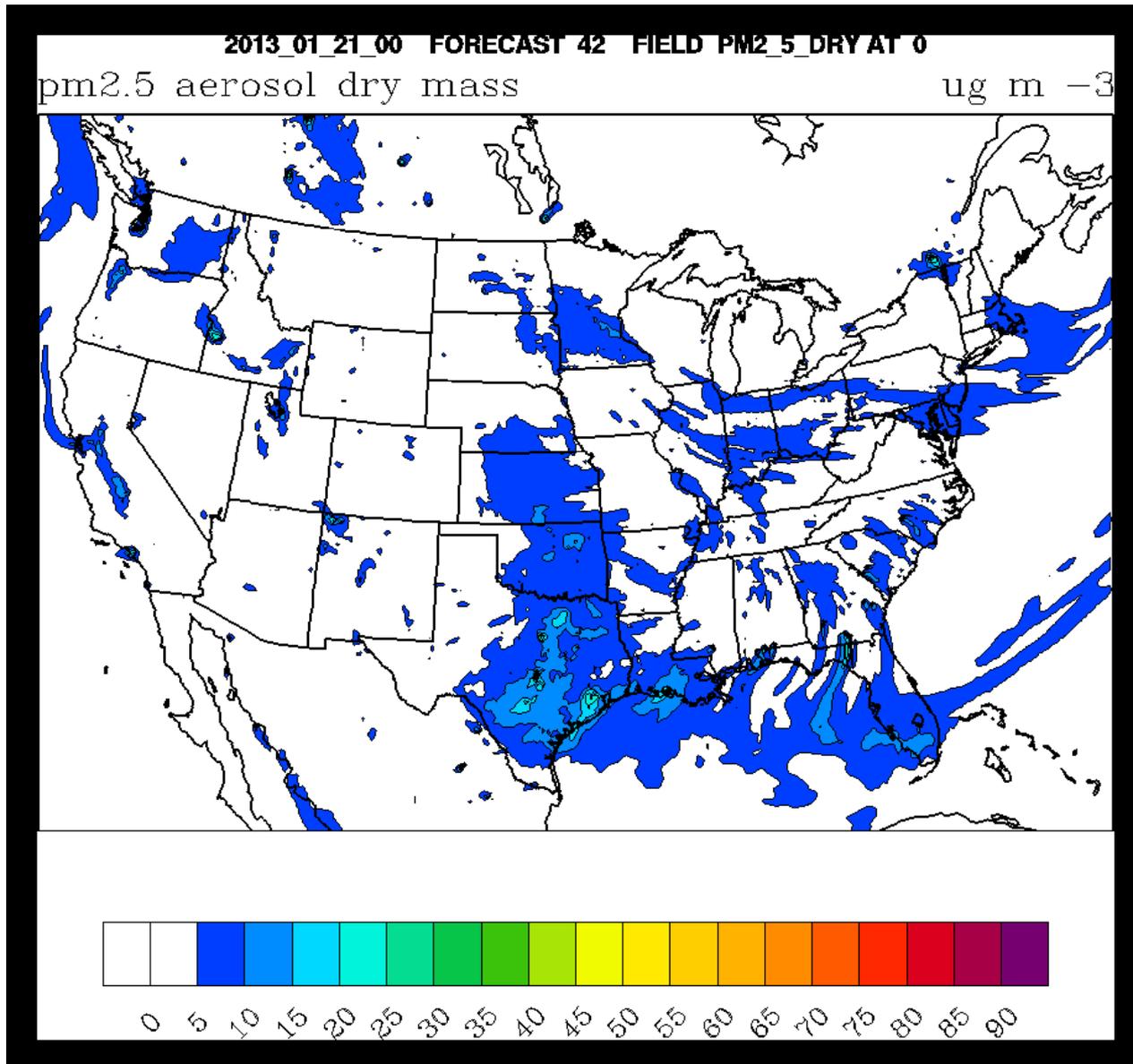
Hanford -- GEOS-5 Aerosol Forecast



Bakersfield -- GEOS-5 Aerosol Forecast



NOAA RAP PM2.5 Forecast



Recommendations

- Tuesday looks like a good day to fly. However, some chance of scattered cirrus by afternoon
- Wednesday will feature considerable cloudiness from a system passing to our north
- Thursday – clearing – flight may be possible
- Friday through Sunday – moisture from the cut-off low will enter CA, and a frontal system associated with a new northerly system will pass through on Sun. Change of air mass for next Monday.