

## Status Summary

- **July/August Modeling**
  - Meteorological modeling completed (for now)
    - CCOS Level “1B” wind data for July 28 pending
      - To be completed by District
  - Emission updates pending:
    - New temperature-specific biogenic and on-road
    - SAPRC99 issues to be resolved
    - Refinery flares
    - Shipping emissions
    - 1-km gridding surrogates

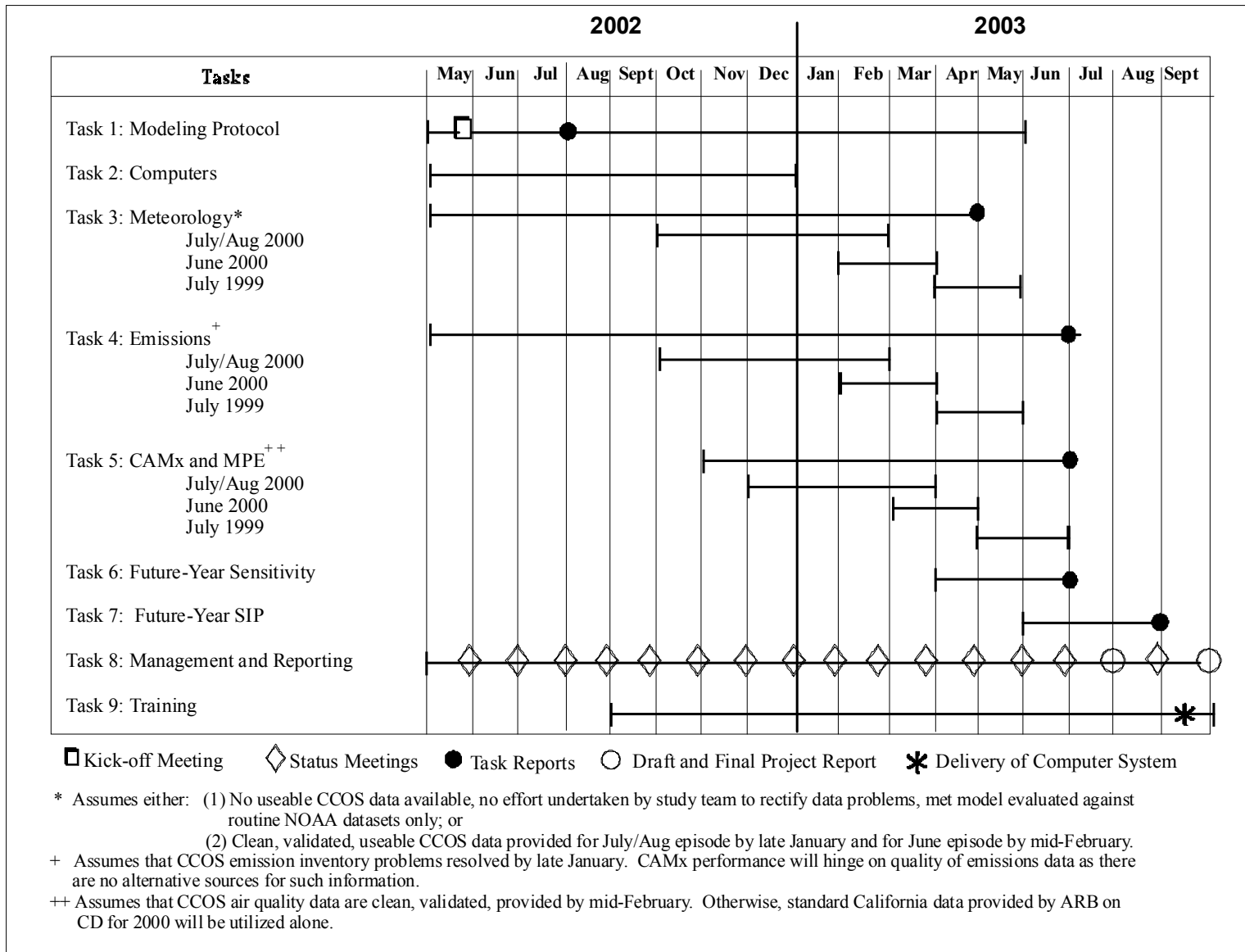
## Status Summary

- CCOS Level “1A” AQ data pending
  - “1B” QA to be completed by District
- Numerous interim model runs completed
  - Several emission updates
  - 2 sets of meteorology
  - 1-km ozone modeling (incl. met, not emissions)
  - BC sensitivity (simple, detailed)
  - Kv sensitivity
  - Vegetation drought stress (incomplete)

## Status Summary

- **June Modeling**
  - Emissions started
  - Met modeling started
  - CCOS met and AQ pending
- **July 1999 Modeling**
  - Emissions started
  - Initial met and AQ database in-house

## Project Schedule

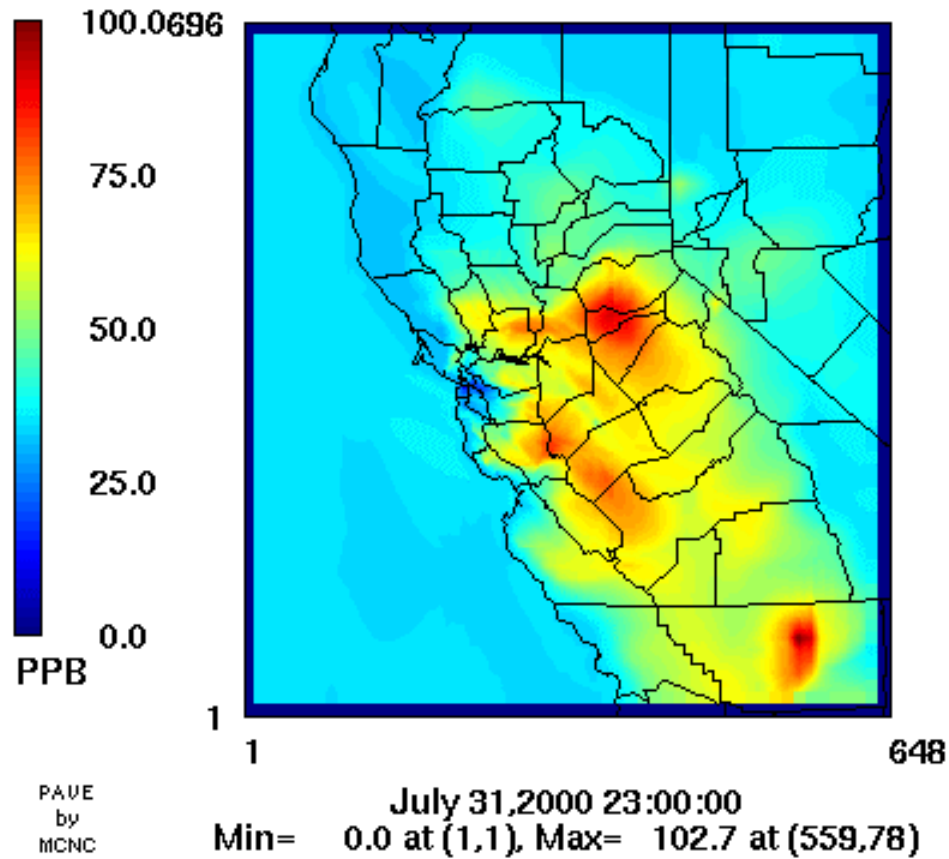


## **CAMx Modeling**

- **Run 2b (12/4-km grid)**
  - Latest emissions (3/03 submission, revised point, on-road)
  - Last meteorology (Run “w4”)
  - No fire emissions
- **Run 2c (12/4/1-km grid)**
  - Same as Run 2b, but:
  - Includes hi-resolution met, not emissions
  - Fires added back in

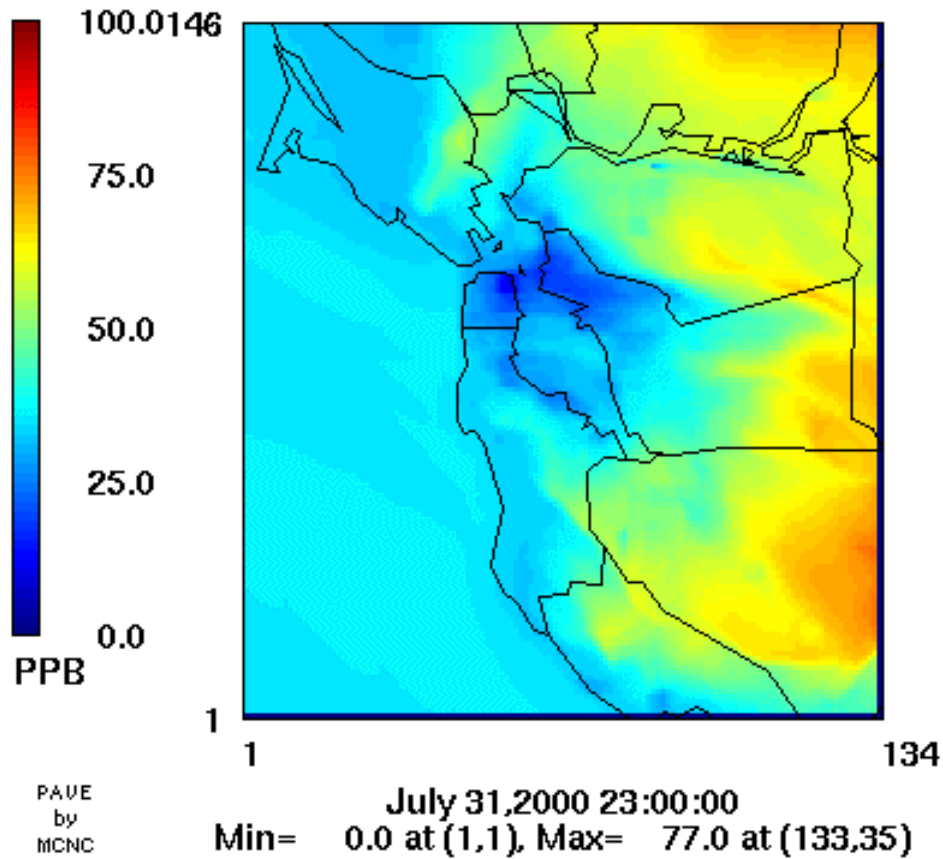
## Daily Max Ozone

CAMx v3.10 Run 2c  
July 28 - August 2, 2000 Episode

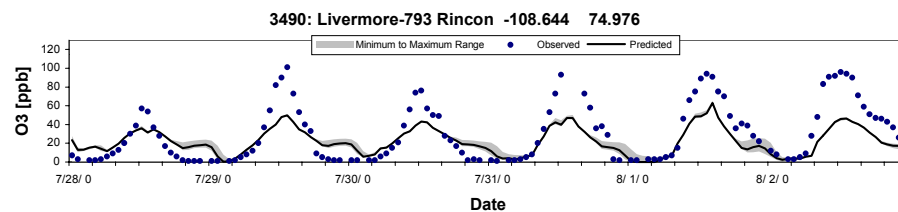
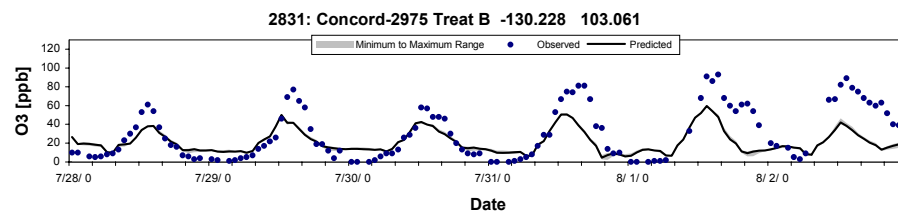
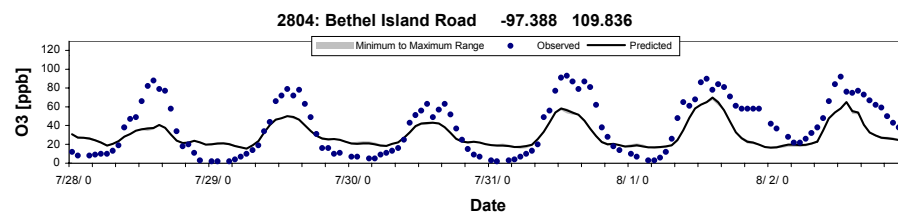
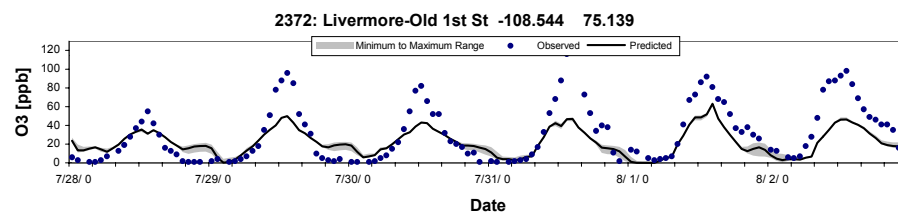
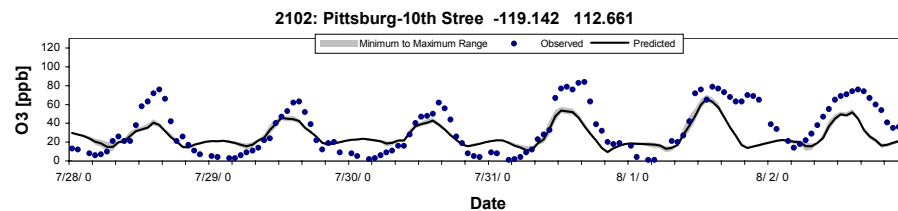
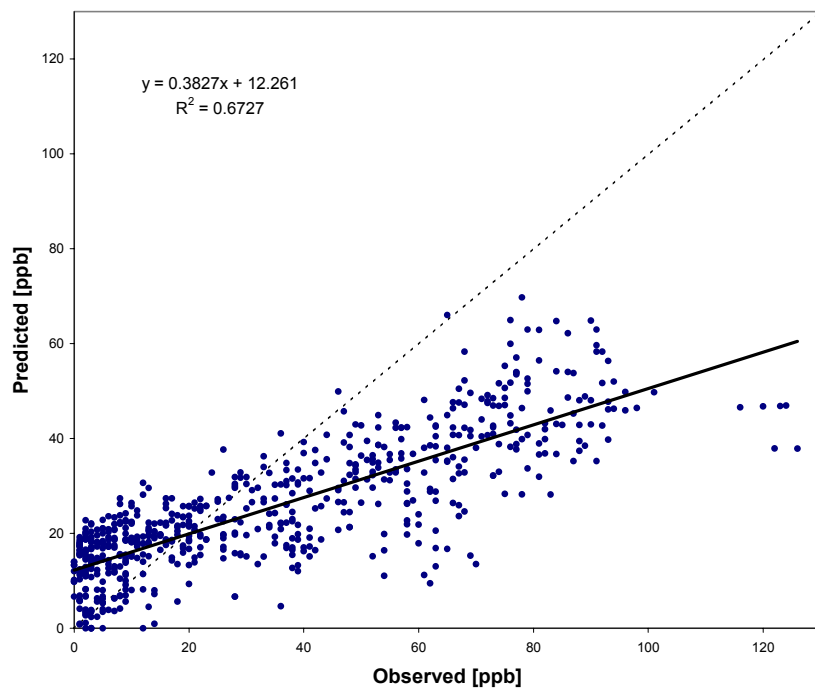


## Daily Max Ozone

CAMx v3.10 Run 2c  
July 28 - August 2, 2000 Episode



**Scatter Plot of Predicted vs. Observed Concentrations**  
sfeast Base Case run2c

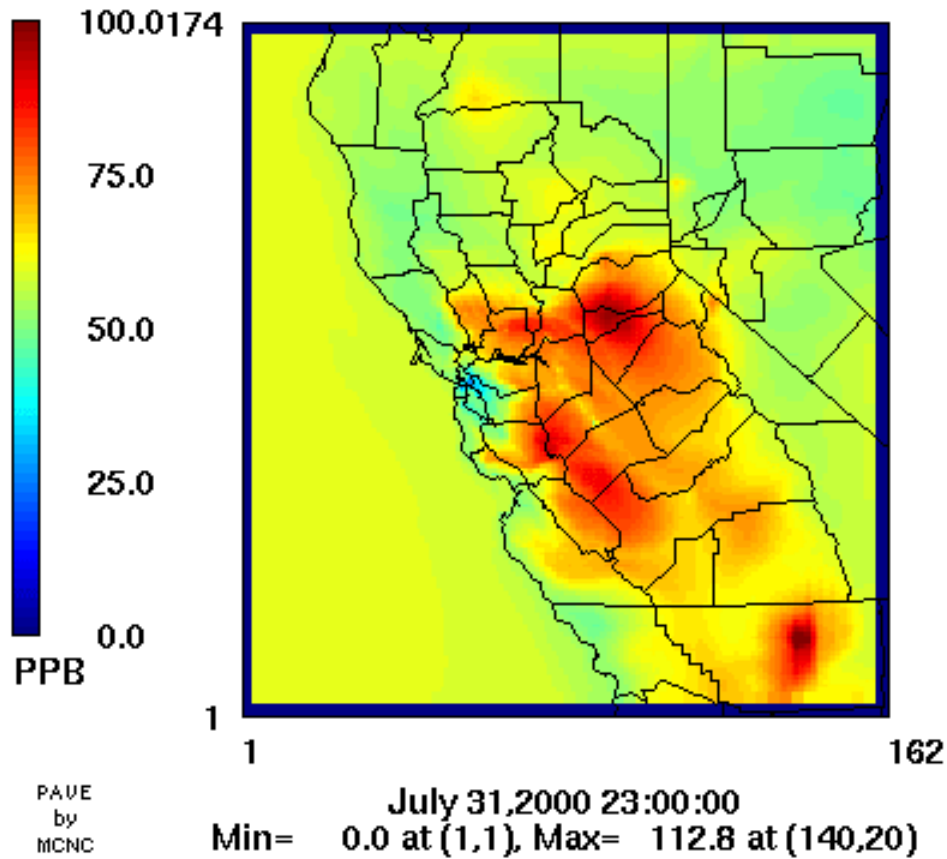


## CAMx Modeling

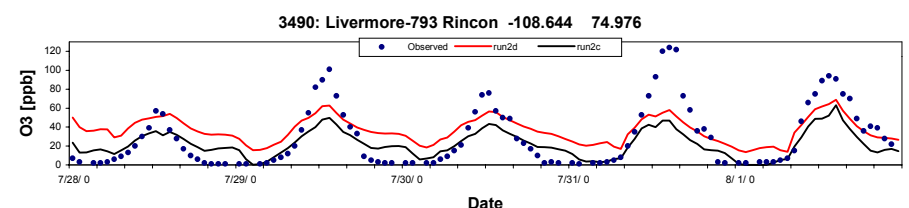
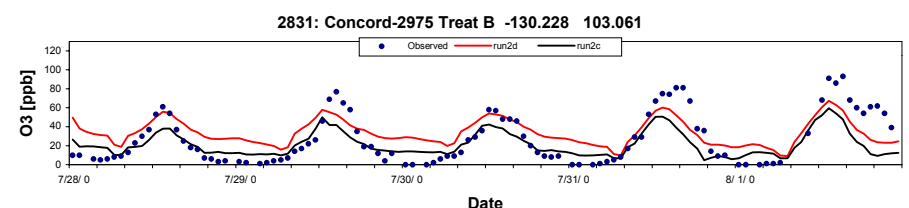
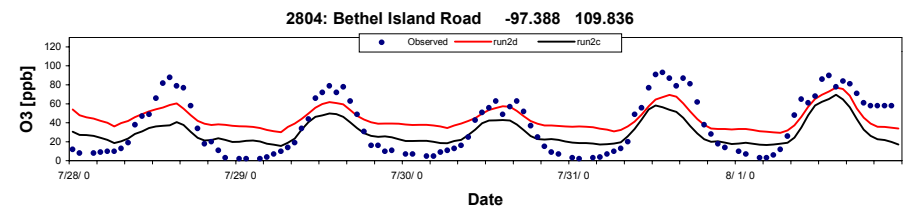
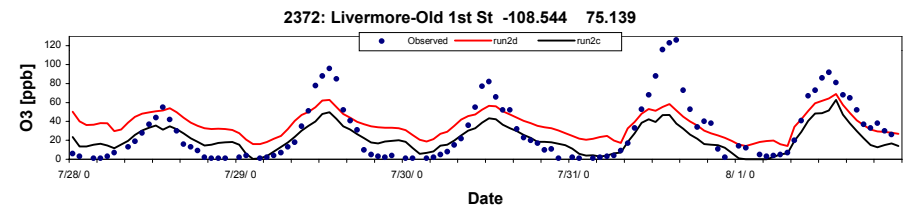
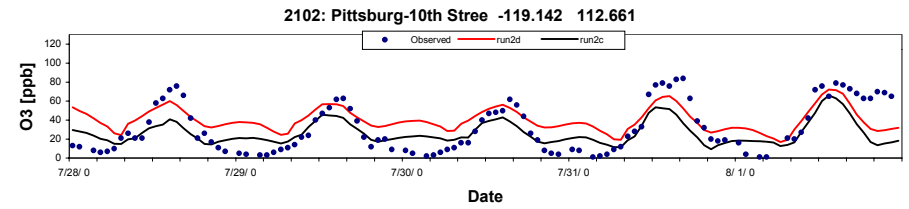
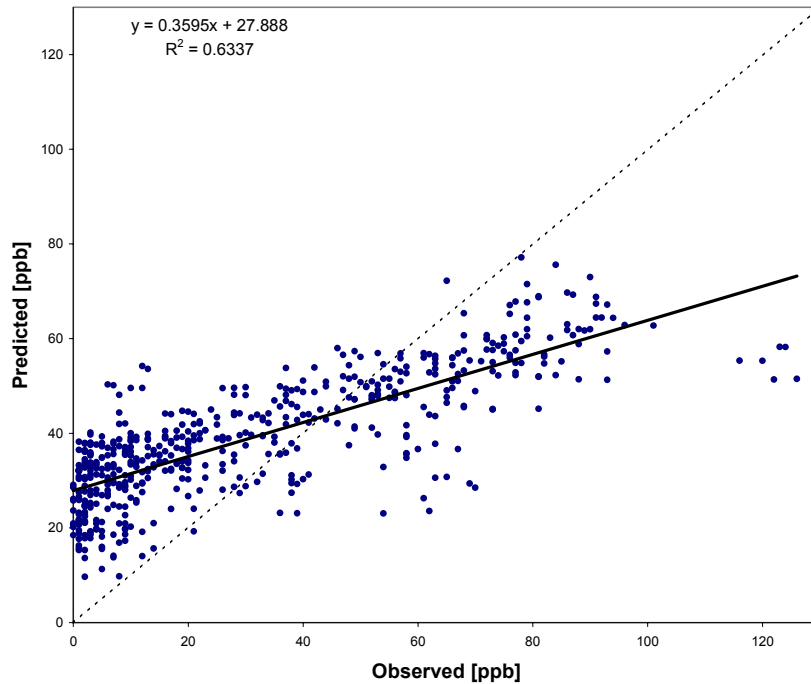
- **Run 2d (12/4-km grid)**
  - As in Run 2c, but:
  - O3 BC's increased to 60 ppb everywhere

## Daily Max Ozone

CAMx v3.10 Run 2d  
July 28 - August 2, 2000



Scatter Plot of Predicted vs. Observed Concentrations  
sfeast Base Case run2d

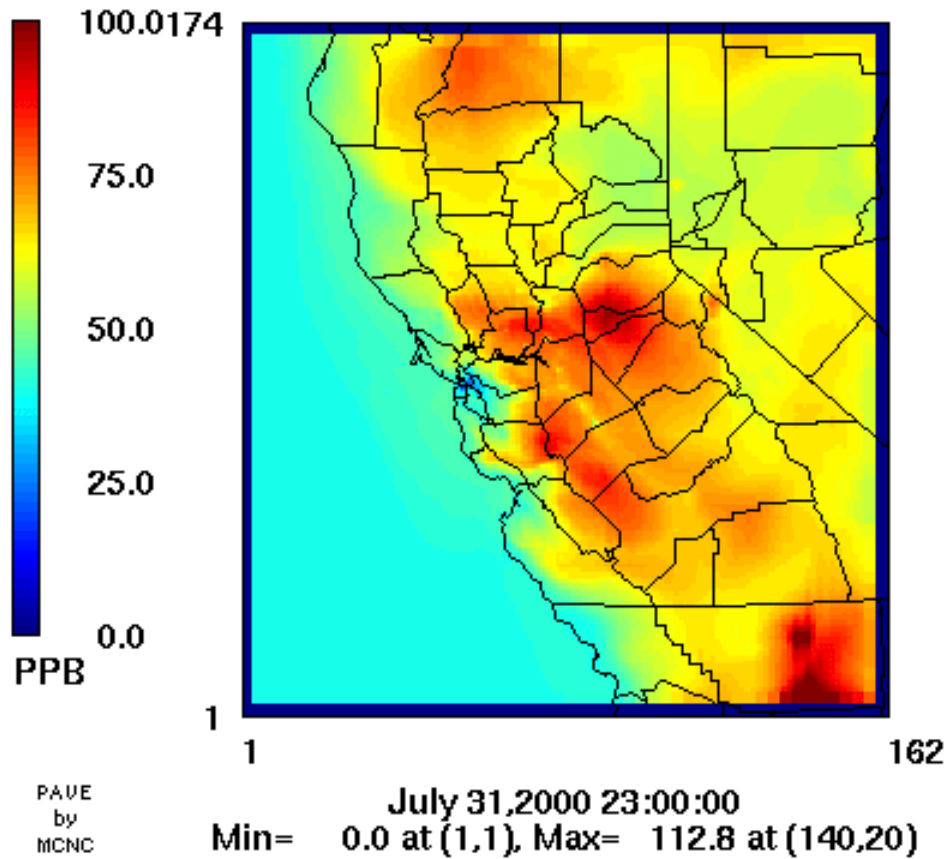


## **CAMx Modeling**

- **Run 2e (12/4-km grid)**
  - As in Run 2c, but:
  - First run with PiG
  - Processing problem (not shown)
- **Run 2f (12/4-km grid)**
  - As in Run 2c, but:
  - BC's reflect observations (except on west boundary)

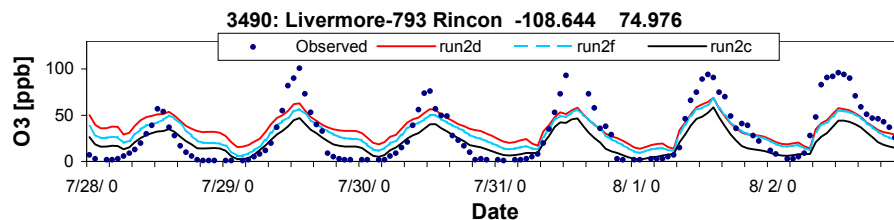
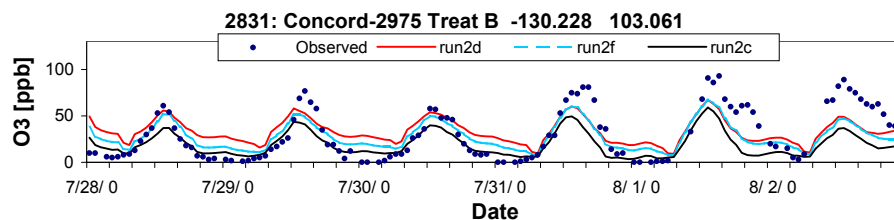
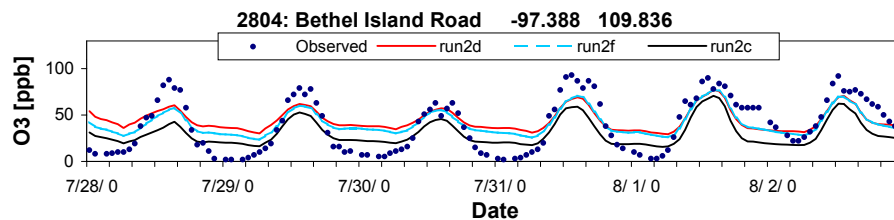
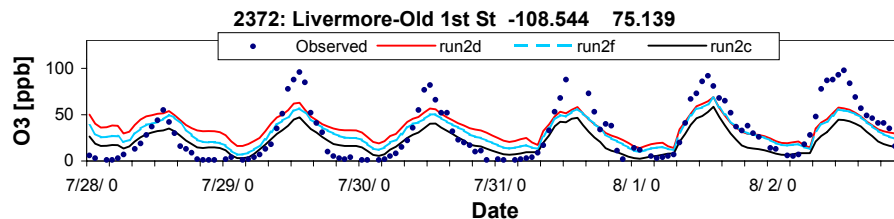
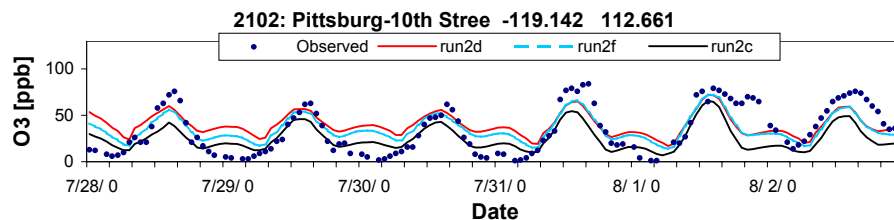
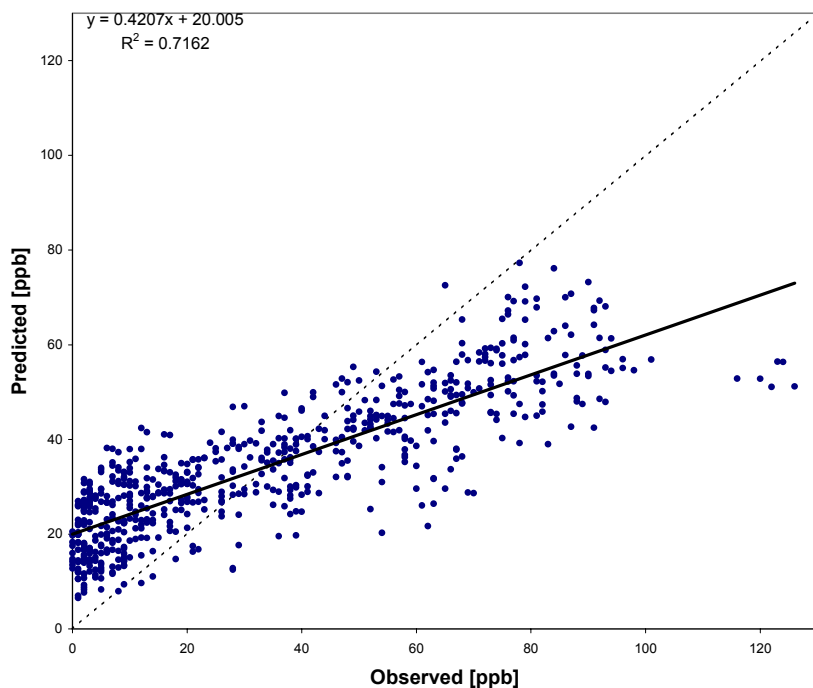
## Daily Max Ozone

CAMx v3.10 Run 2f  
July 28 - August 2, 2000



sfeast Base Case run2c + run2d + run2f

**Scatter Plot of Predicted vs. Observed Concentrations**  
sfeast Base Case run2f

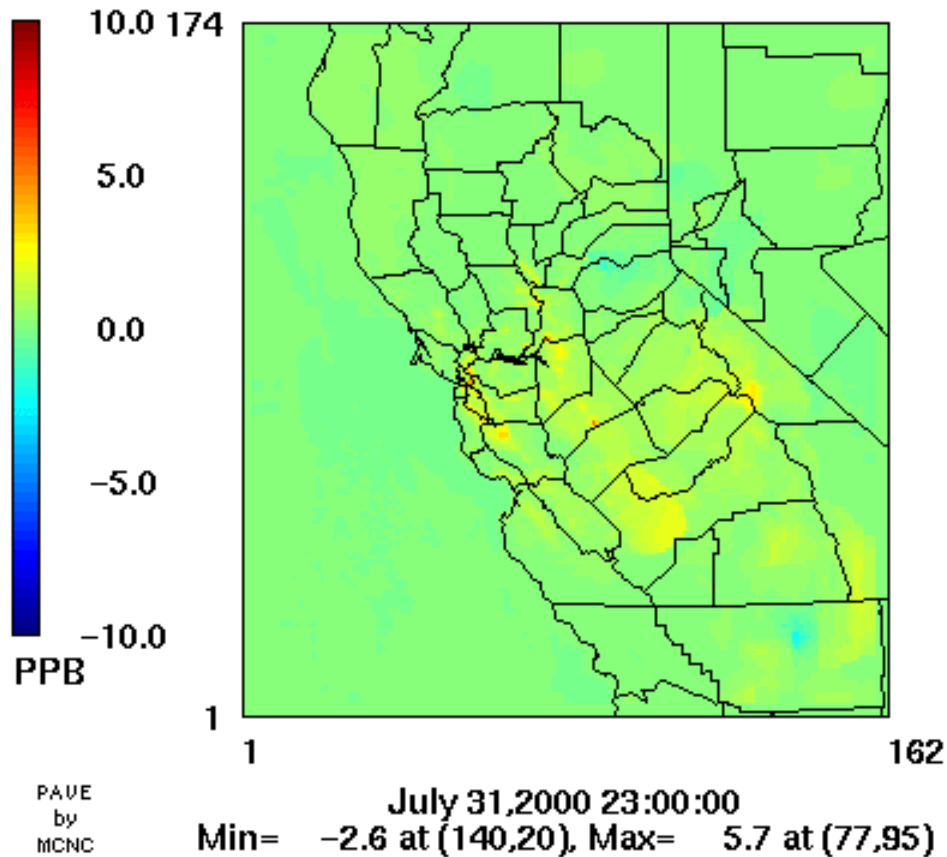


## CAMx Modeling

- **Run 2g (12/4-km grid)**
  - As in Run 2c, but:
  - Nighttime Kv's pegged to landuse-dependent minima
    - Reduces nightly over-stagnation and high NO<sub>x</sub> buildup
    - Often kick-starts chemistry earlier

## Difference in Daily Max Ozone

Run 2g - Run 2c  
Kv Patch vs No Kv Patch



## CAMx Modeling

- **Run 2h (12/4-km grid)**
  - As in Run 2c, but:
  - Drought stress specified for dry deposition
  - Incomplete

## Next Steps

- **Additional CAMx sensitivity tests**
  - Invoke PiG
  - Invoke drought stress
  - Further improvements to BC's
    - Aircraft obs, others...
  - Revised T-dependent emissions (bio + MV)
  - SAPRC99
  - Hi-resolution emissions
    - Surrogates to be developed by Environ

## Next Steps

- **New RAMS simulation(s) of July/August**
  - Obs-nudging to CCOS Level “1B” wind obs
  - Other changes noted from June episode modeling?
    - Soil moisture
    - Humidity nudging (stratus effects)
- **Continue to develop inputs for other episodes**
- **Develop attainment demonstration approach**



## ***Meteorology for Episode 2***

- Six full episode 3-grid sensitivity runs done in past month, primarily focusing on soil moisture and FDDA
- More difficult meteorological situation than Episode 1
  - Earlier in season, different vegetation/soil characteristics
  - Upper level high dominates
  - Weaker winds in general, but...



## ***Meteorology for Episode 2***

- Upper level high caused easterly mid-level flow, strongest on 14-15 June
- Easterly winds caused downslope flow from the Sierras
- Interaction of downslope with diurnal cycle in central valley.

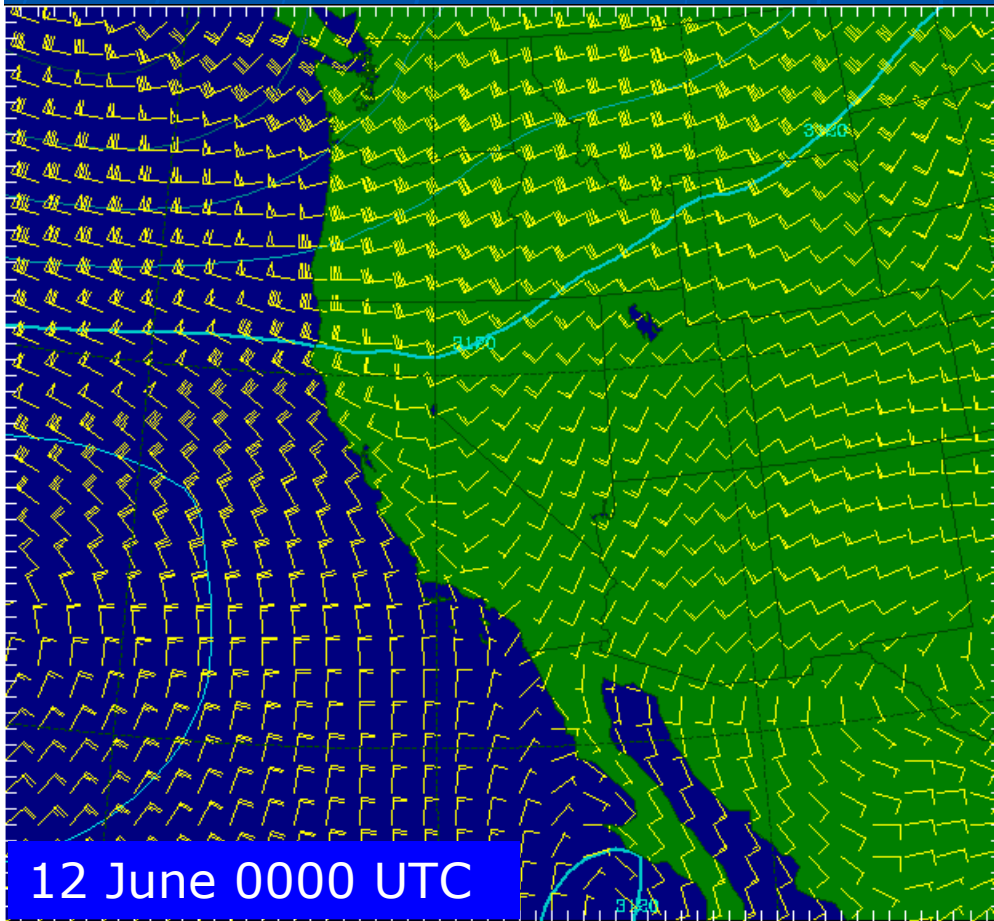


## *Meteorology for Episode 2*

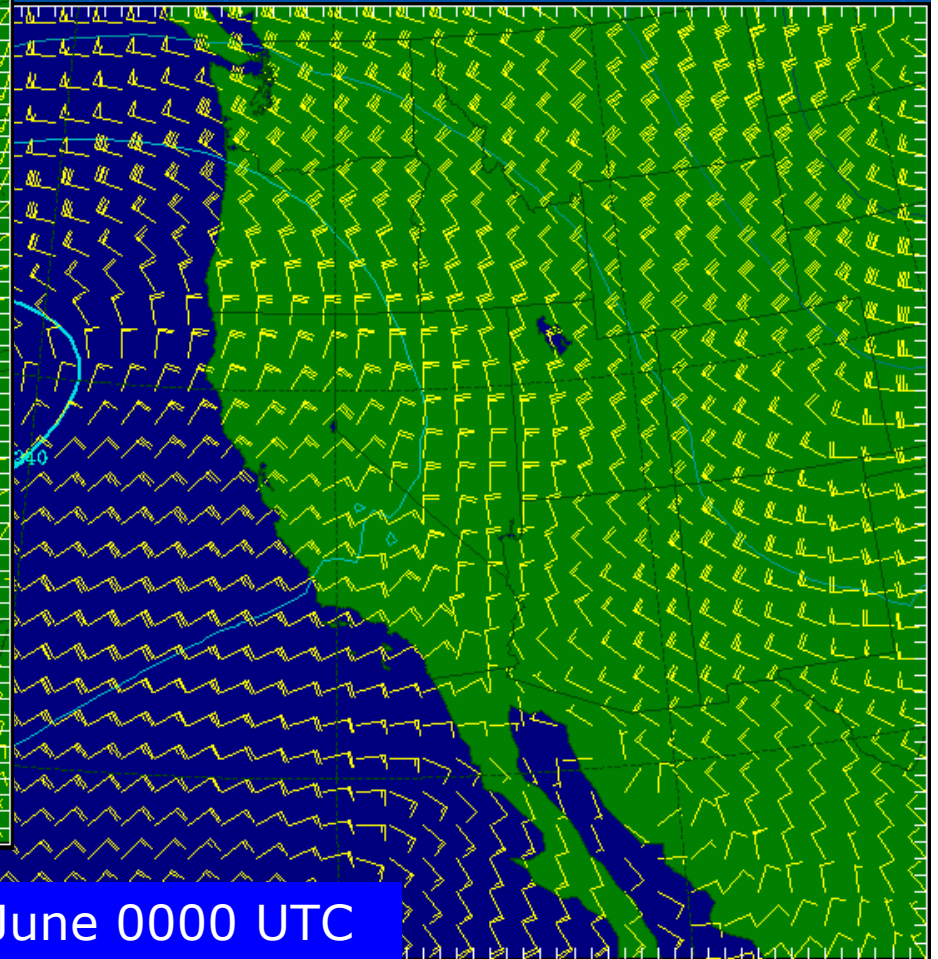
- Difficult to capture mountain-induced mid-level structure along with correct boundary-layer structure to correctly simulate downward momentum mixing and subsidence warming...
- *Especially 48-90 hours from initialization relying on FDDA*
- *4 km resolution also plays a role*



# 700 mb geopotential and winds



12 June 0000 UTC



14 June 0000 UTC

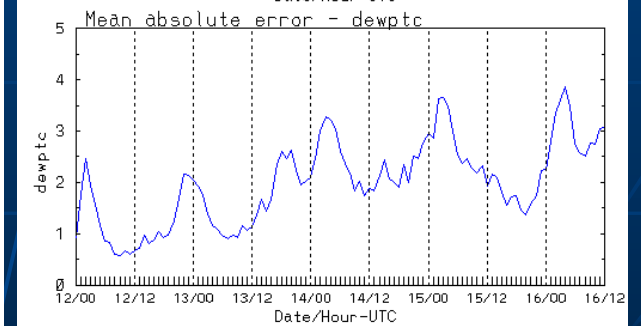
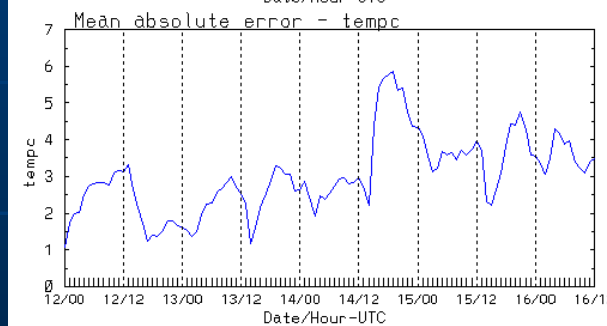
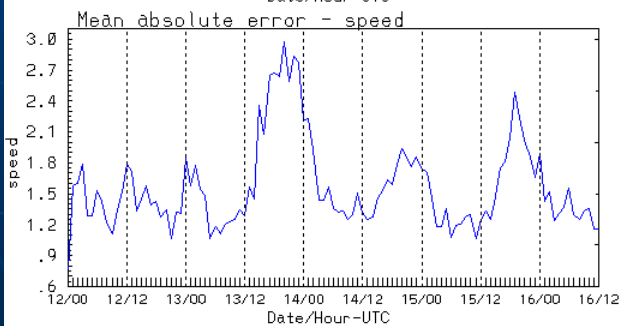
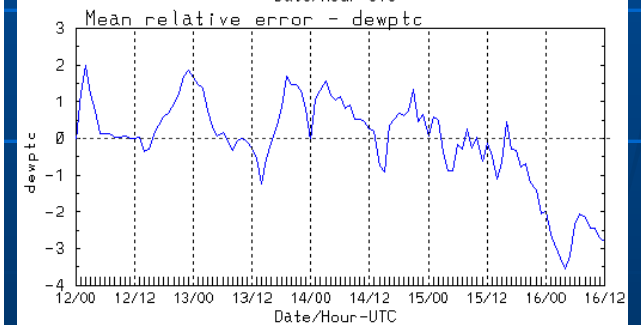
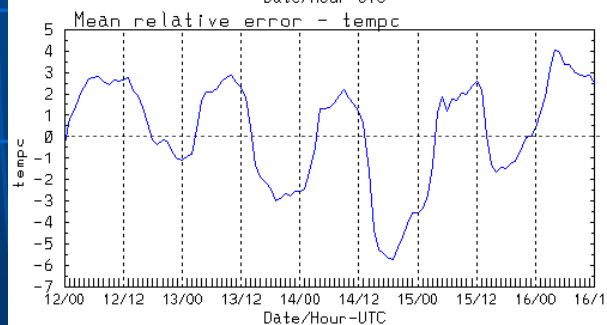
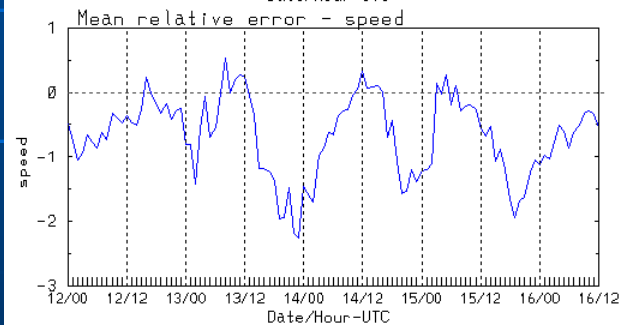
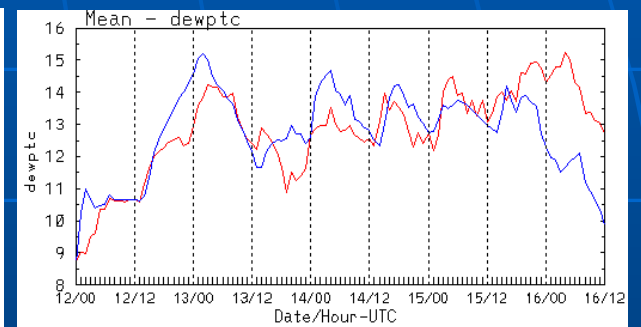
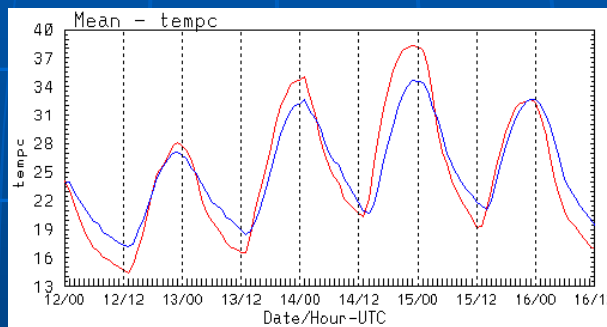
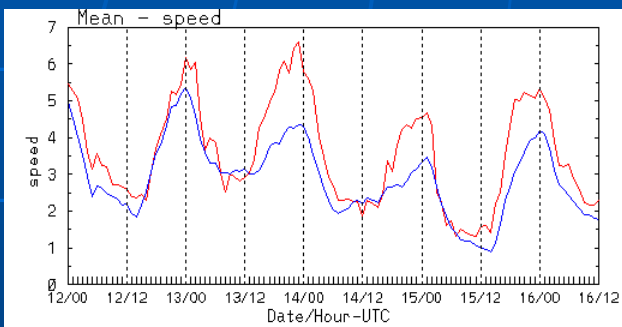


# *Latest RAMS configuration*

- Same as episode 1, except:
  - Weaker analysis nudging
    - Wind timescale: 6 vs. 4 hrs
    - 1/4 strength for T and vapor
  - Initial soil moisture profile:
    - Ep1: SLMSTR = 0.30, 0.30, 0.30, 0.30, 0.25, 0.25, 0.25, 0.25, 0.2, 0.20, 0.20,
    - Ep2: SLMSTR = 0.55, 0.50, 0.45, 0.40, 0.40, 0.35, 0.35, 0.30, 0.25, 0.20, 0.15,



# Episode 2 – Mean errors





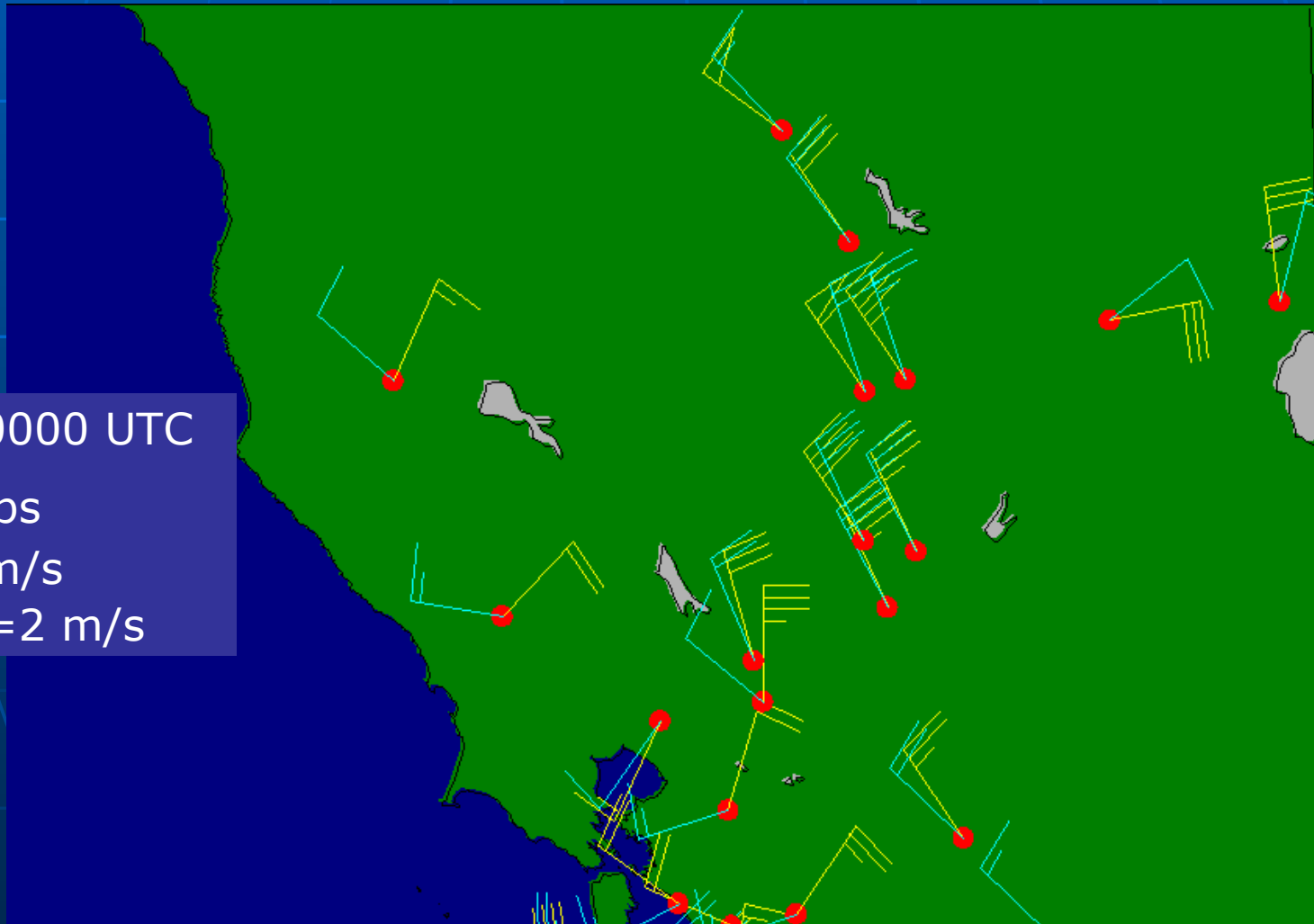
# Winds - 14 June 0000 UTC

14 June 0000 UTC

yellow=obs

flag=10 m/s

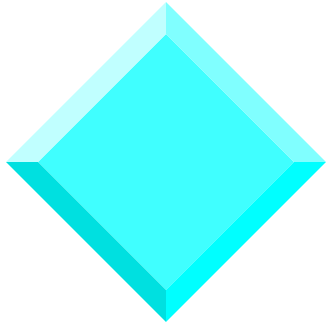
Full barb=2 m/s





## *Summary*

- Episode 2 average errors only slightly larger than Episode 1. However, specific periods have higher biases.
- 4-grid run is begun with latest configuration. Will not help with resolution in Sierras.
- Further sensitivities will be conducted:
  - shorter runs with no FDDA
  - additional modifications of surface characteristics (e.g., roughness length)



*BAAQMD SIP:  
Status Of Emissions Modeling*

James G. Wilkinson

Cynthia F. Loomis

Alpine Geophysics



# Overview

- ❖ Data that have been delivered
- ❖ Graphical summary of emissions
- ❖ Tabular summary of emissions
- ❖ Problems
- ❖ Current standing of overall emissions modeling effort

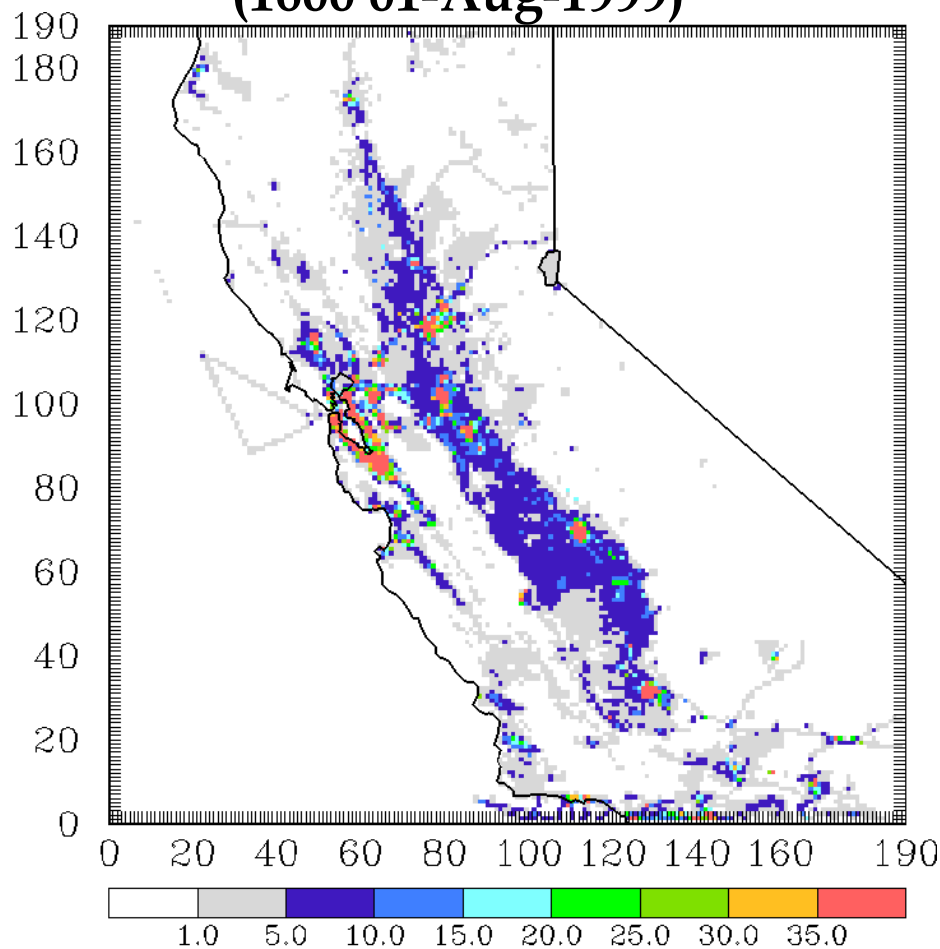


# *Emissions Data From ARB & BAAQMD*

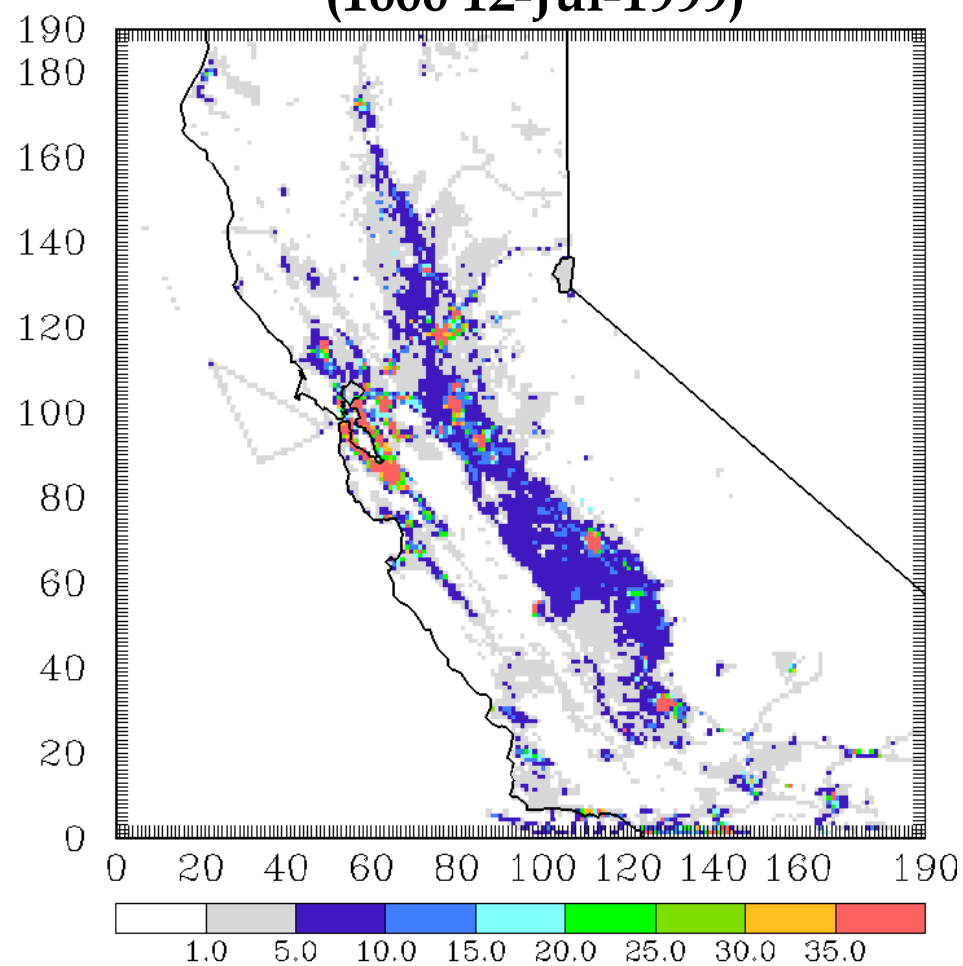
- ❖ Received New July-August 2000 On-Road Mobile Source Emissions Estimates (new Calmet temperatures)
- ❖ Received New July-August 2000 Biogenic Emissions Estimates (new Calmet temperatures)

# Comparison Of Area Source $\text{NO}_x$ (kg/hr)

**25-Feb-2003**  
**(1600 01-Aug-1999)**

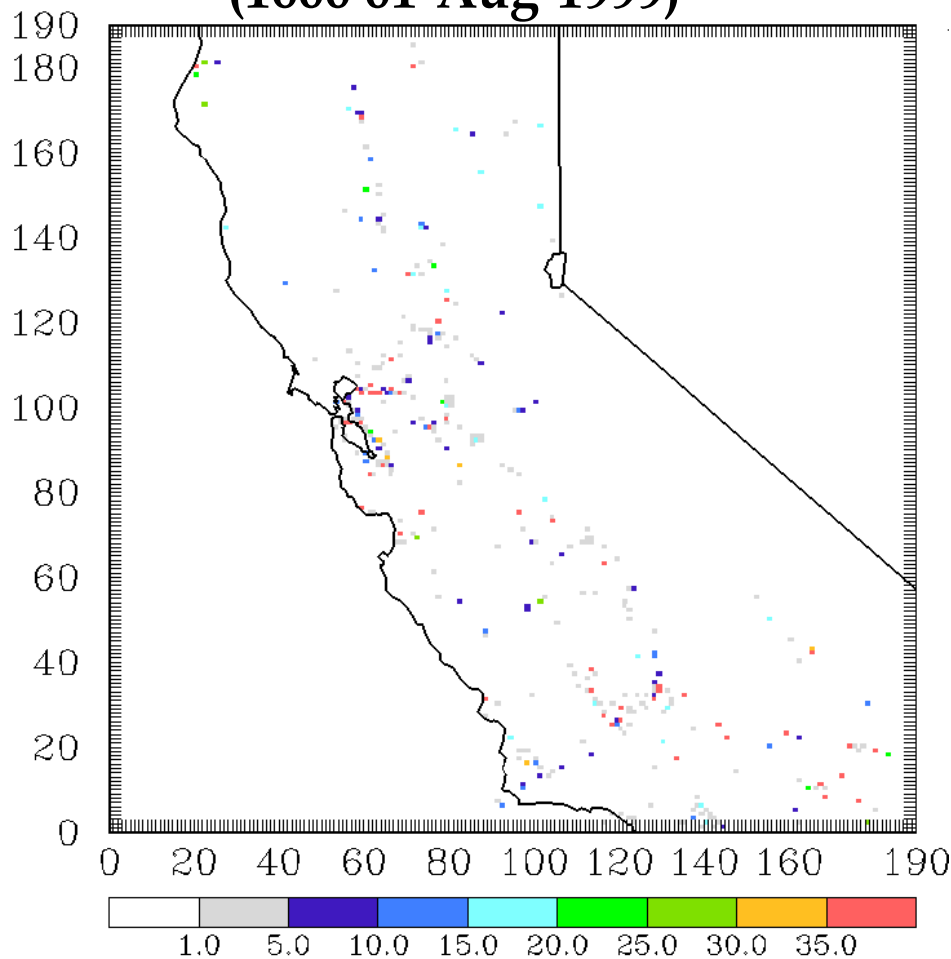


**28-Apr-2003**  
**(1600 12-Jul-1999)**

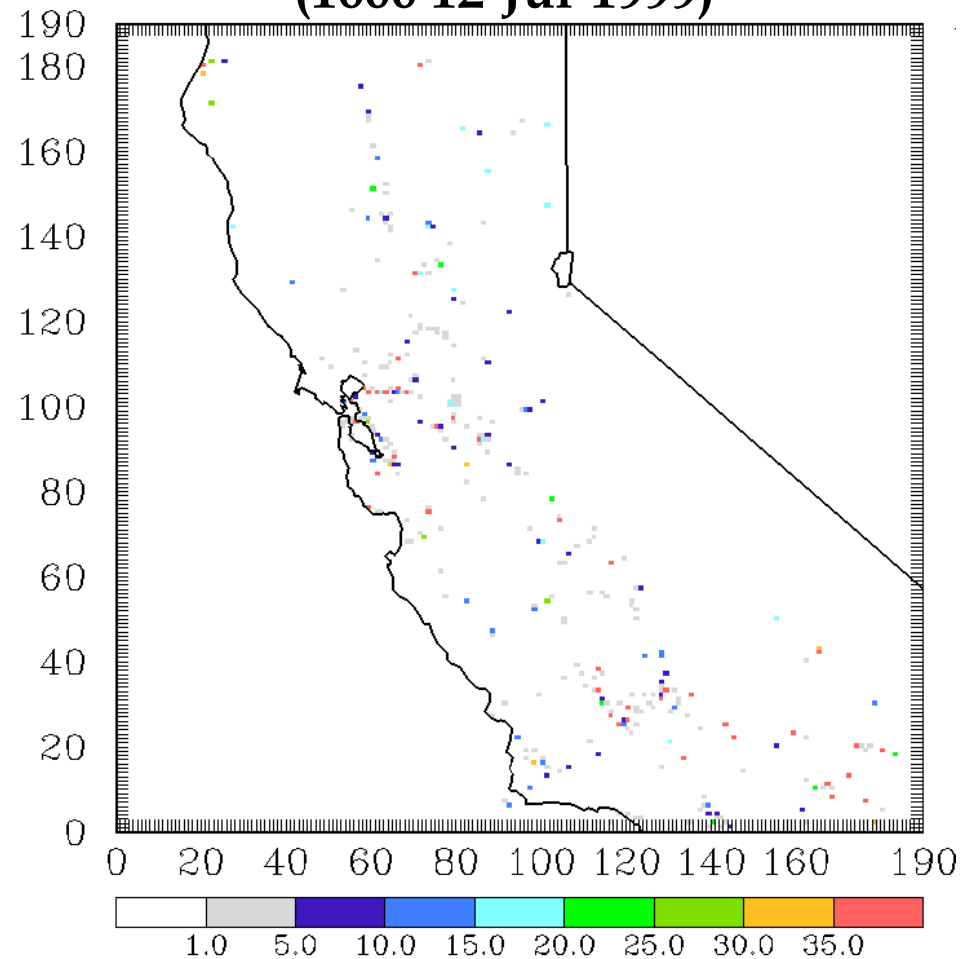


# Comparison Of Point Source $\text{NO}_x$ (kg/hr)

**25-Feb-2003**  
**(1600 01-Aug-1999)**



**28-Apr-2003**  
**(1600 12-Jul-1999)**



# EMS-95 Episodic Emissions Comparison For BAAQMD

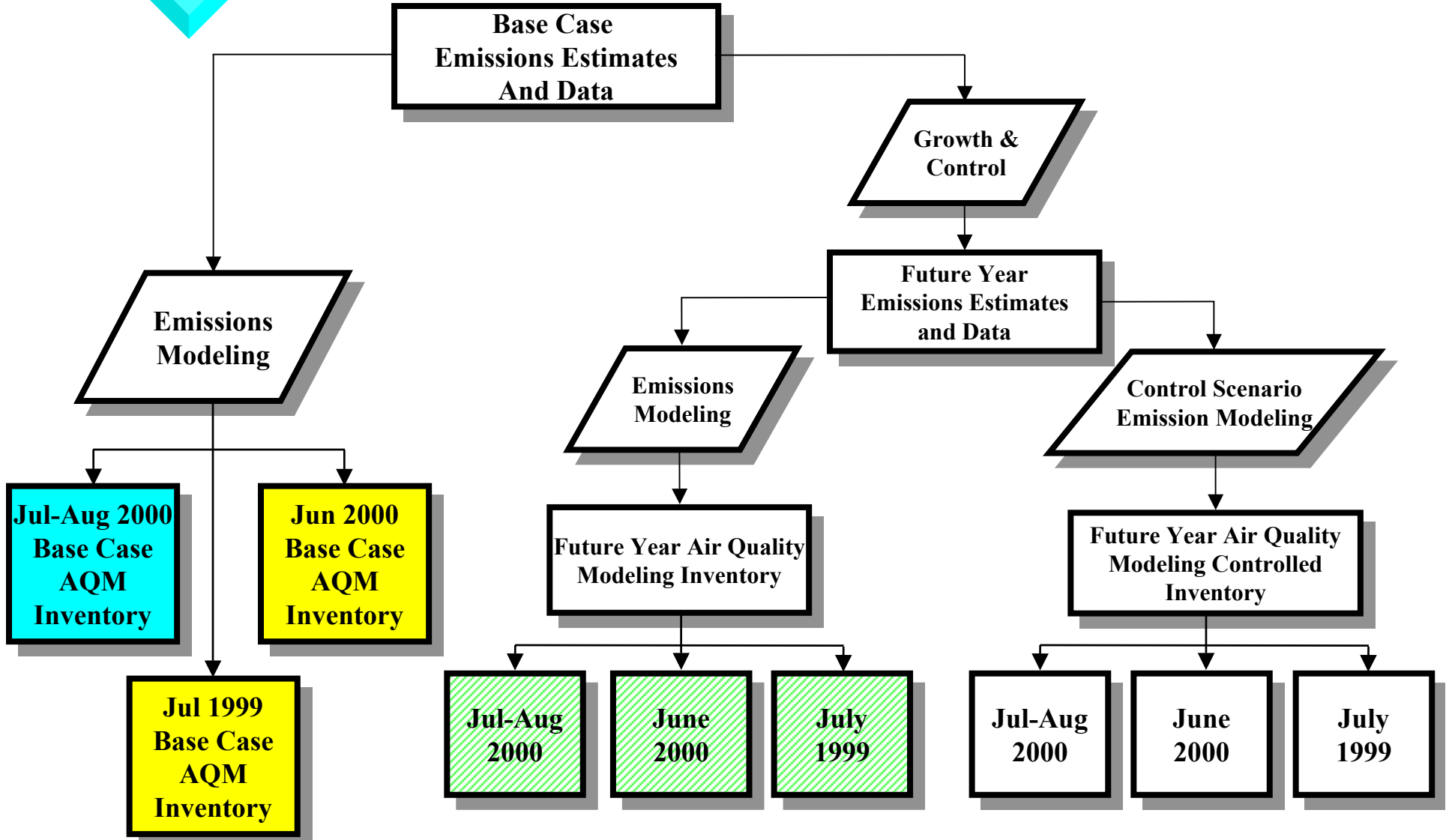
Source	CO			NOX			PM			SOX			TOG		
	Jul-2000	Jun-2000	Jul-1999	Jul-2000	Jun-2000	Jul-1999	Jul-2000	Jun-2000	Jul-1999	Jul-2000	Jun-2000	Jul-1999	Jul-2000	Jun-2000	Jul-1999
EGU	17	5	4	23	9	7	3	1	1	1	2	1	17	13	14
Other	26	23	23	60	39	44	11	17	17	63	39	39	361	382	379
Area	20	22	20	19	21	23	303	421	421	0	1	1	394	401	408
Ship	3	4	4	16	17	16	2	2	1	11	9	8	2	3	3
Off-road	861	484	486	140	213	212	13	15	15	0	10	9	154	89	90
On-road	2,161			332			10			3			243		
Total	3,088			590			342			78			1,171		



# *Problems Fixed & New Problems*

- ❖ On-Going: commercial marine emissions
- ❖ On-Going: on-road mobile sources (ARB/AG are performing final checks on recent emissions estimates)
- ❖ On-Going: final checks on biogenics
- ❖ On-Going: ARB/MTC still working out VMT growth procedure
- ❖ On-Going: Emissions reasonableness checks

# Current Standing





## *Next Updates*

- ❖ ARB to deliver new July-August 2000 temperatures (to complete BNO estimates). No other data expected.
- ❖ There are still questions concerning stack parameters for flares and who will supply these data
  - If no data available, we will generate defaults based on existing valid data
- ❖ Draft final June 2000 and July 1999 on-road mobile source emissions estimates (will move when adjustment procedure is final and temperatures are available)
- ❖ Incorporate shipping emissions estimates into July-August 2000, June 2000, and July 1999 episodes
- ❖ Incorporate biogenic emissions into July-August 2000, June 2000 and July 1999 episodes (will move when temperatures are available)

