

Comparison of Air Quality During Two Winter Episodes

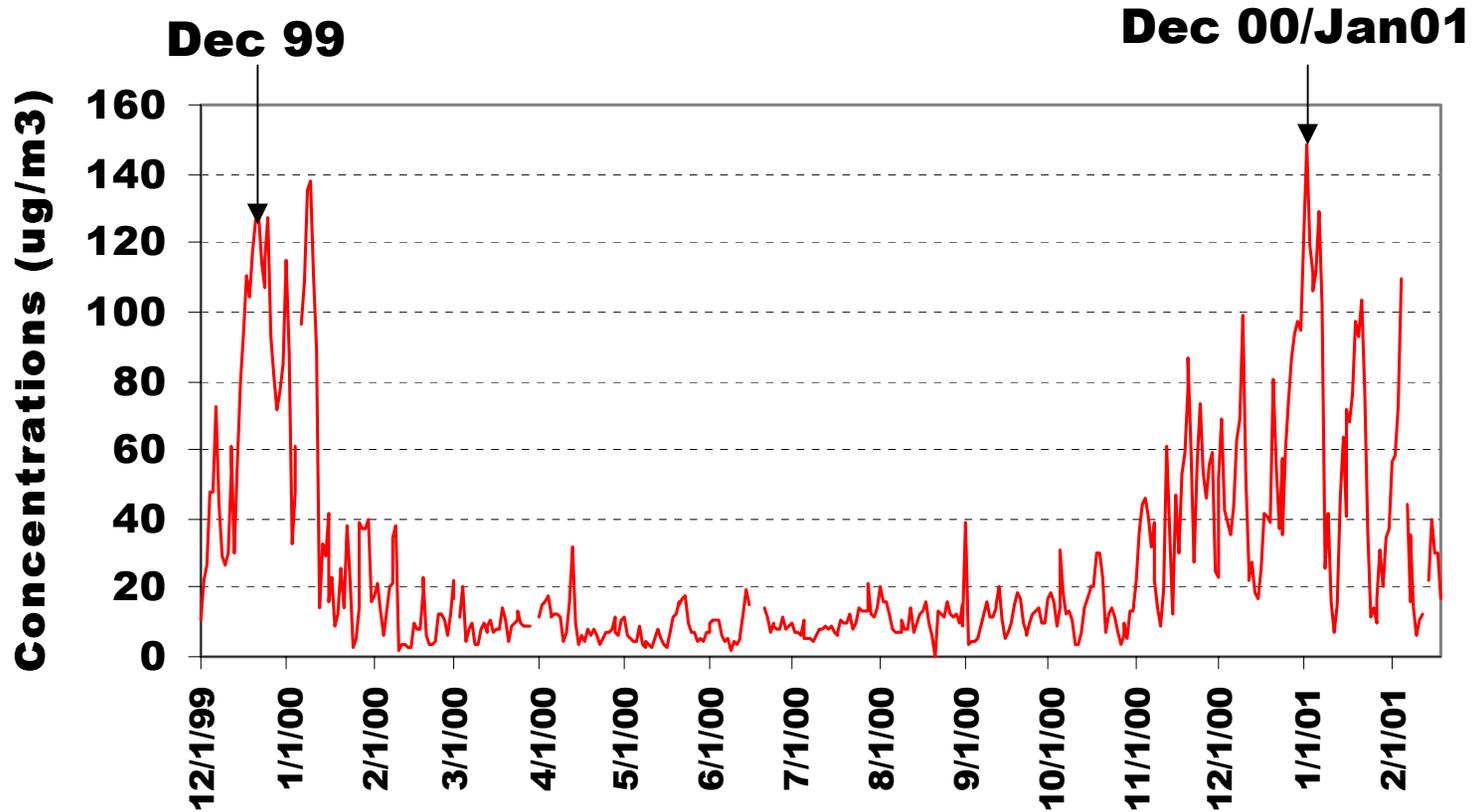


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**CRPAQS Workshop
Sacramento, California
March 9, 2004**

PM2.5 Concentrations

Fresno



Episode Comparison



- Episode duration and strength
 - Duration
 - Days above standard
 - Maximum concentrations
- Spatial and temporal patterns
- Chemical composition
 - Dominant components
 - Variations among sites and episodes

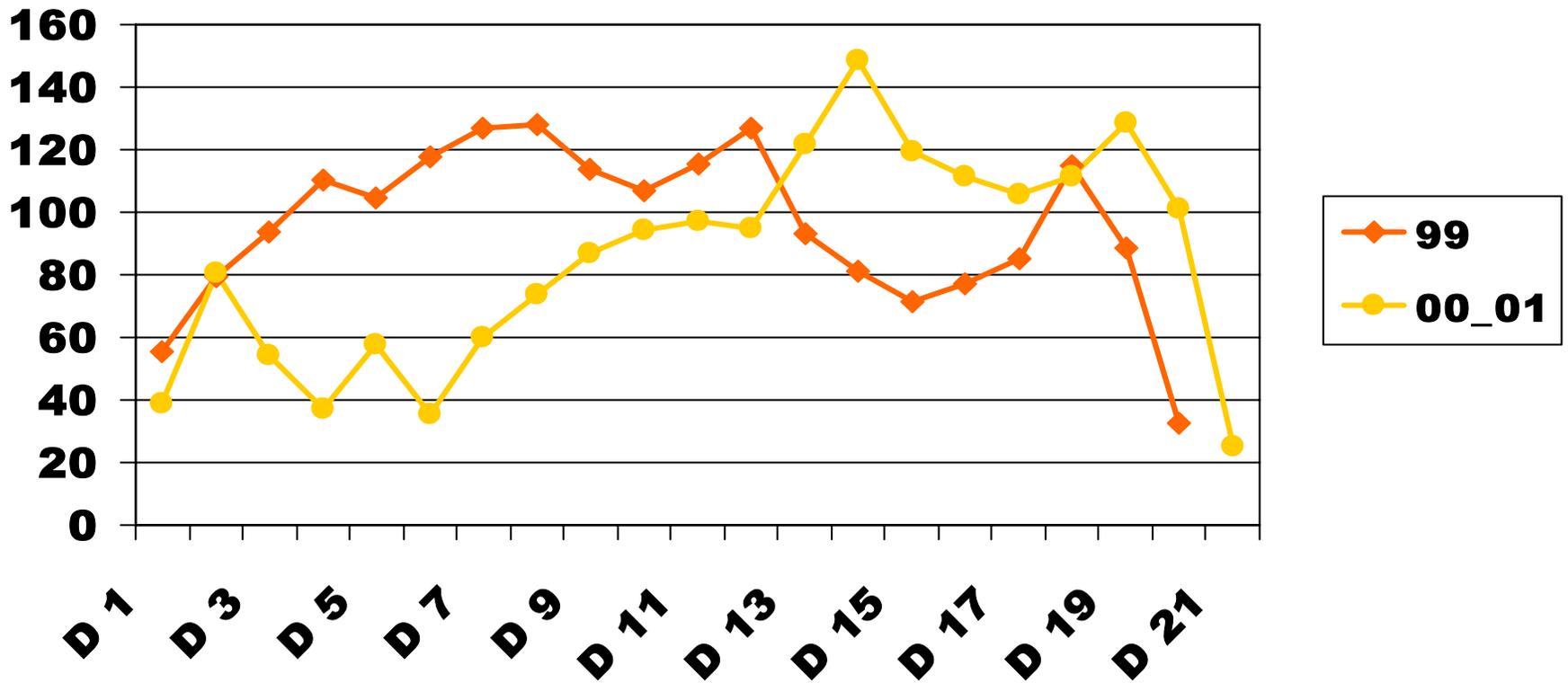
Duration and Strength



- Duration
- Days above standard
- Maximum concentrations
 - Episode maximum
 - Spatial variations

Episode Duration

PM2.5 Mass - Fresno



Episode Strength

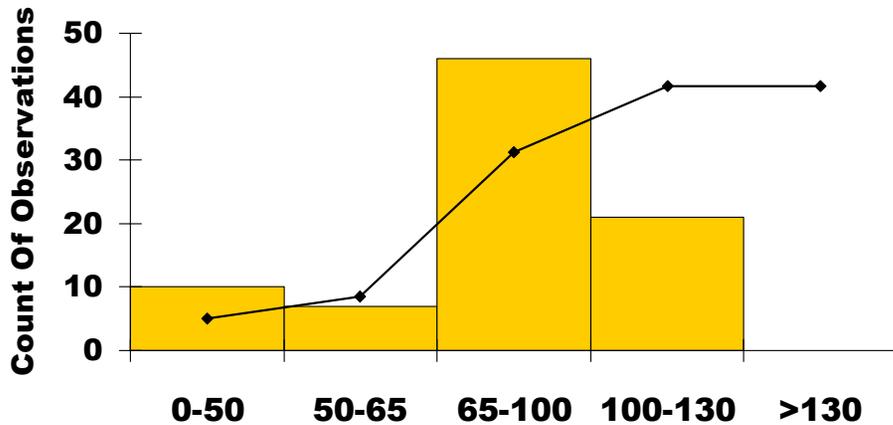


	Dec 99	Dec 00/Jan 01
Days Above PM2.5 24-hr NAAQS	18	15
Days Above PM2.5 2 x 24-hr NAAQS	0	5
Max PM10	174 ug/m3	208 ug/m3
Max PM2.5	129 ug/m3	179 ug/m3

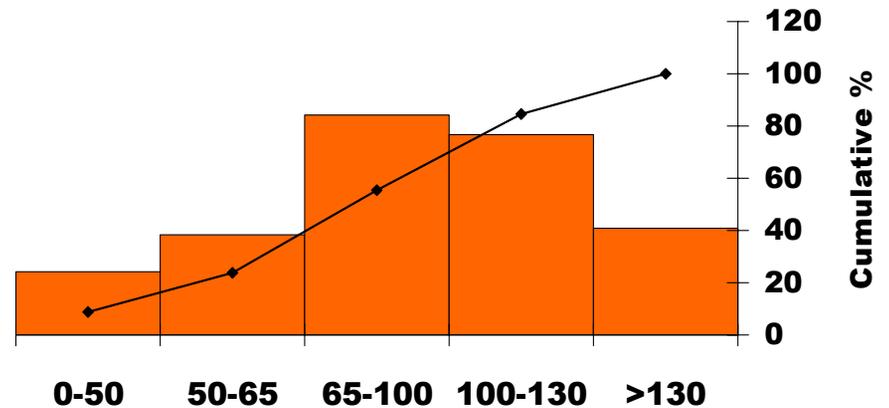
Episode Strength

PM2.5 Concentrations Community Sites

December 99



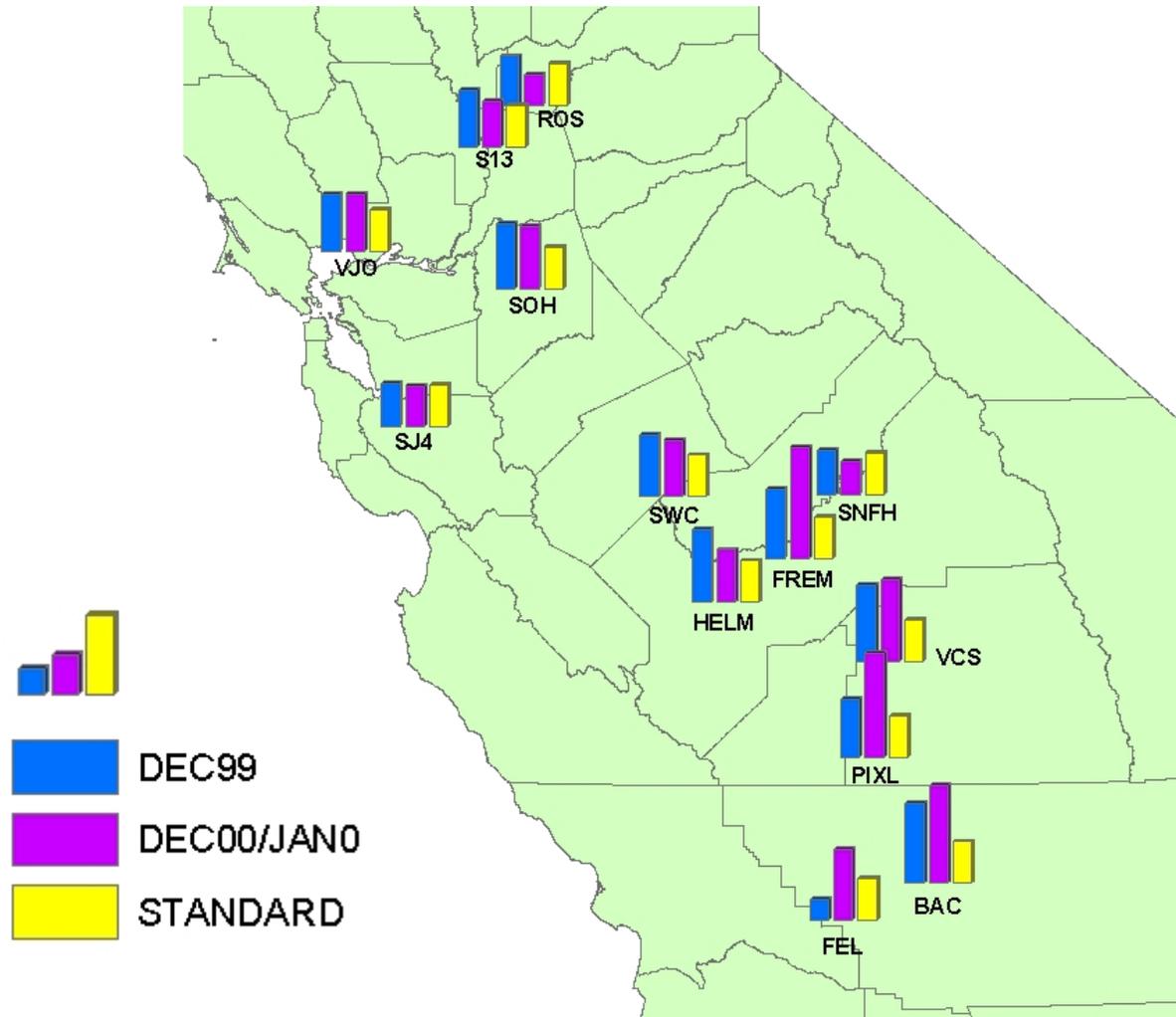
Dec 2000/Jan 2001



Concentration Range in $\mu\text{g}/\text{m}^3$

PM2.5 Concentrations

Episode Maximum



Spatial and Temporal Patterns



Dec 99

Dec 00/Jan 01

Extent

Northern and
central SJV

Central and
southern SJV

Buildup

Rapid

Slow

Spread

North
to south

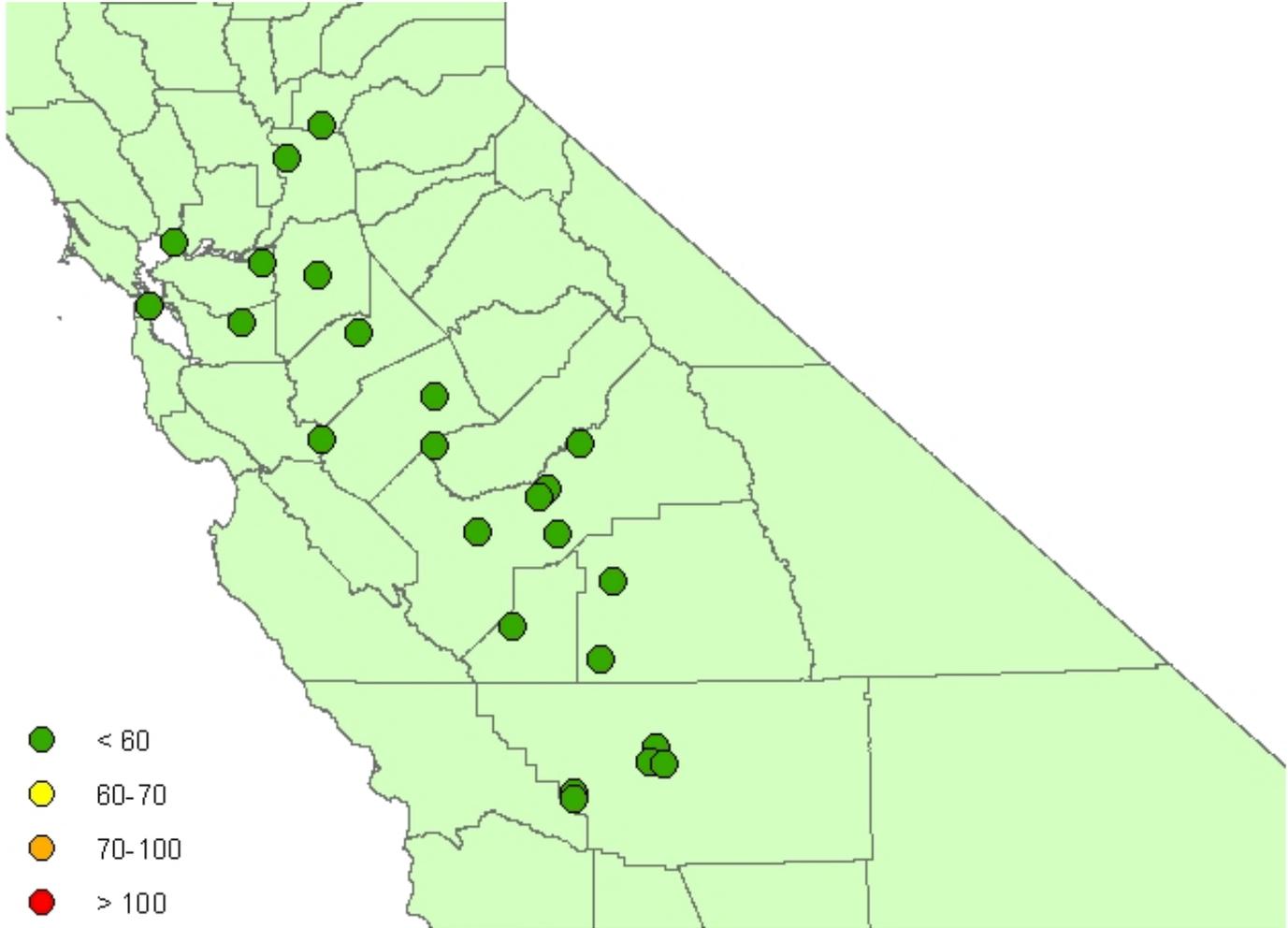
South
to north

December 1999 Episode

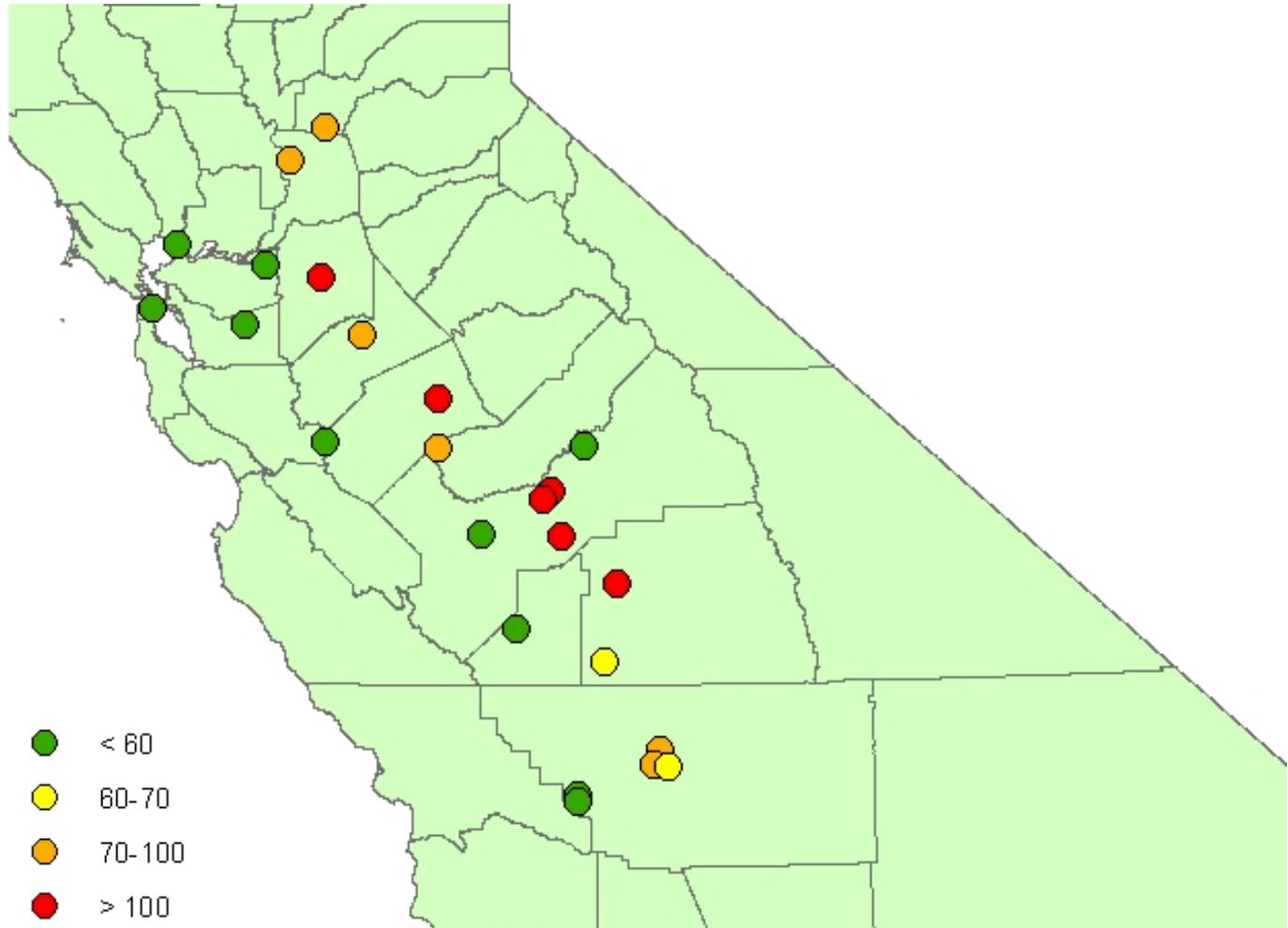


- Centered over northern and central SJV
- Concentrations increased rapidly
- Pollution spread from north to south

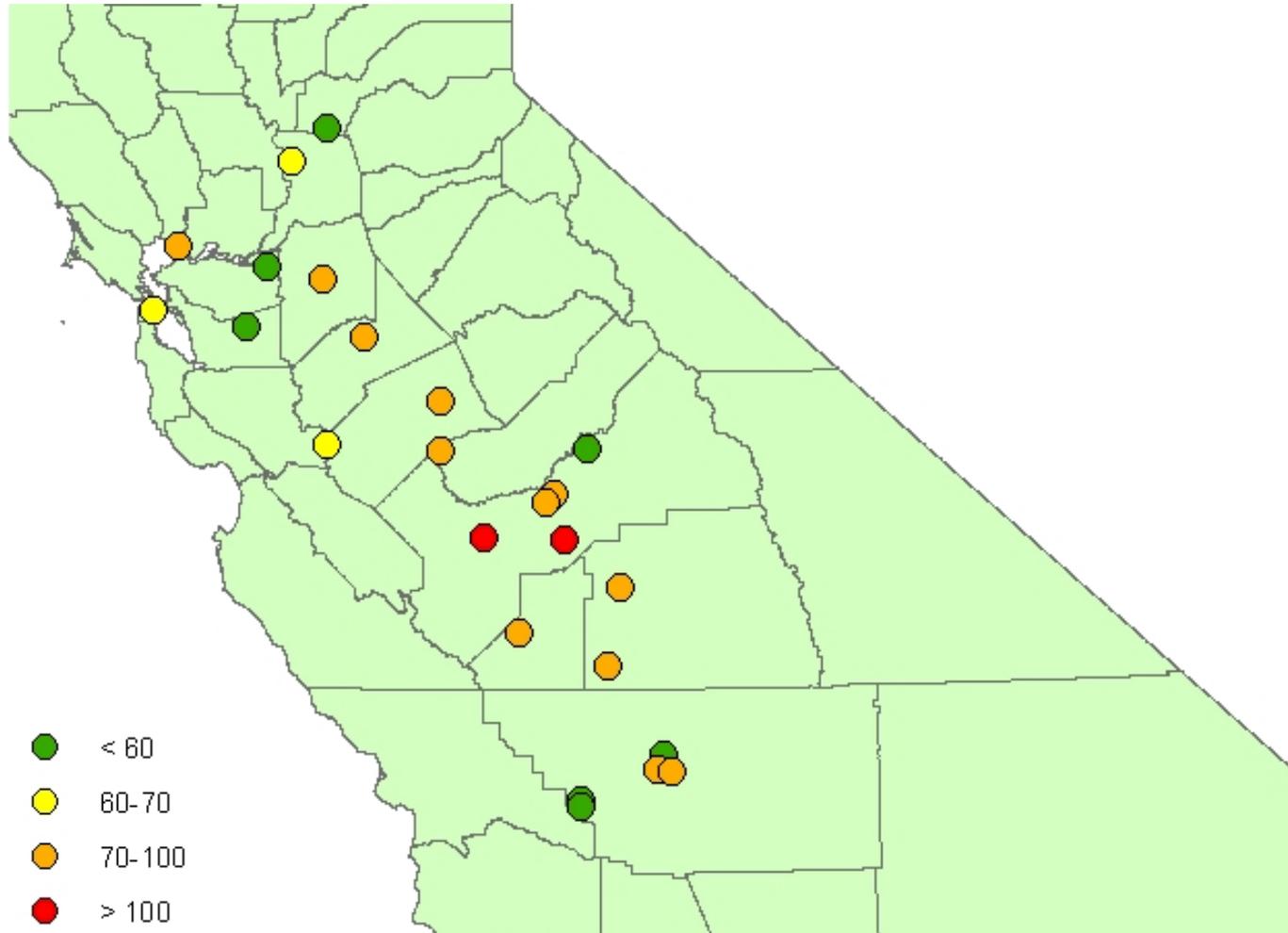
Day 1 (12/14/99)



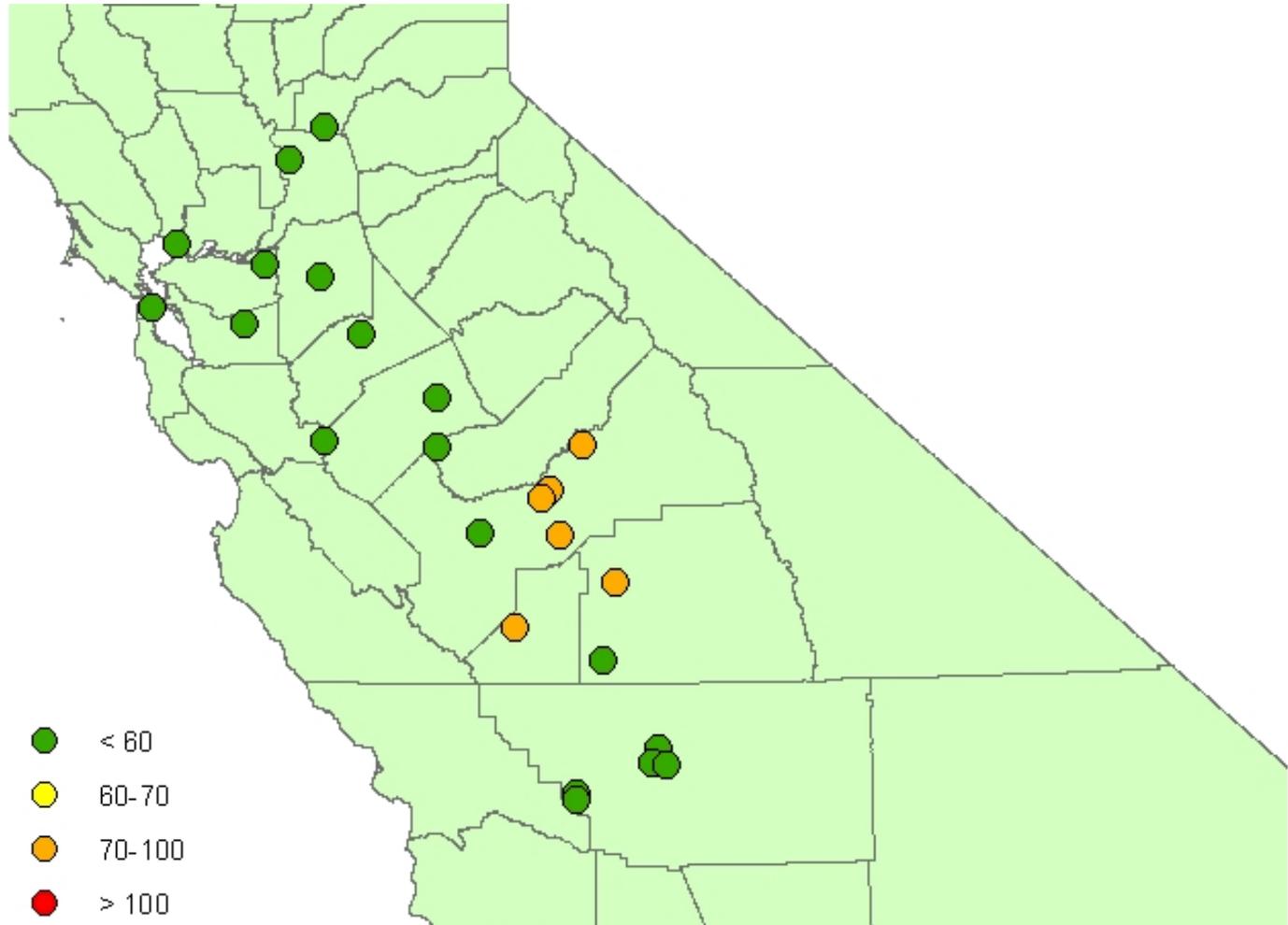
Day 7 (12/20/99)



Day 13 (12/26/99)



Day 19 (01/01/00)

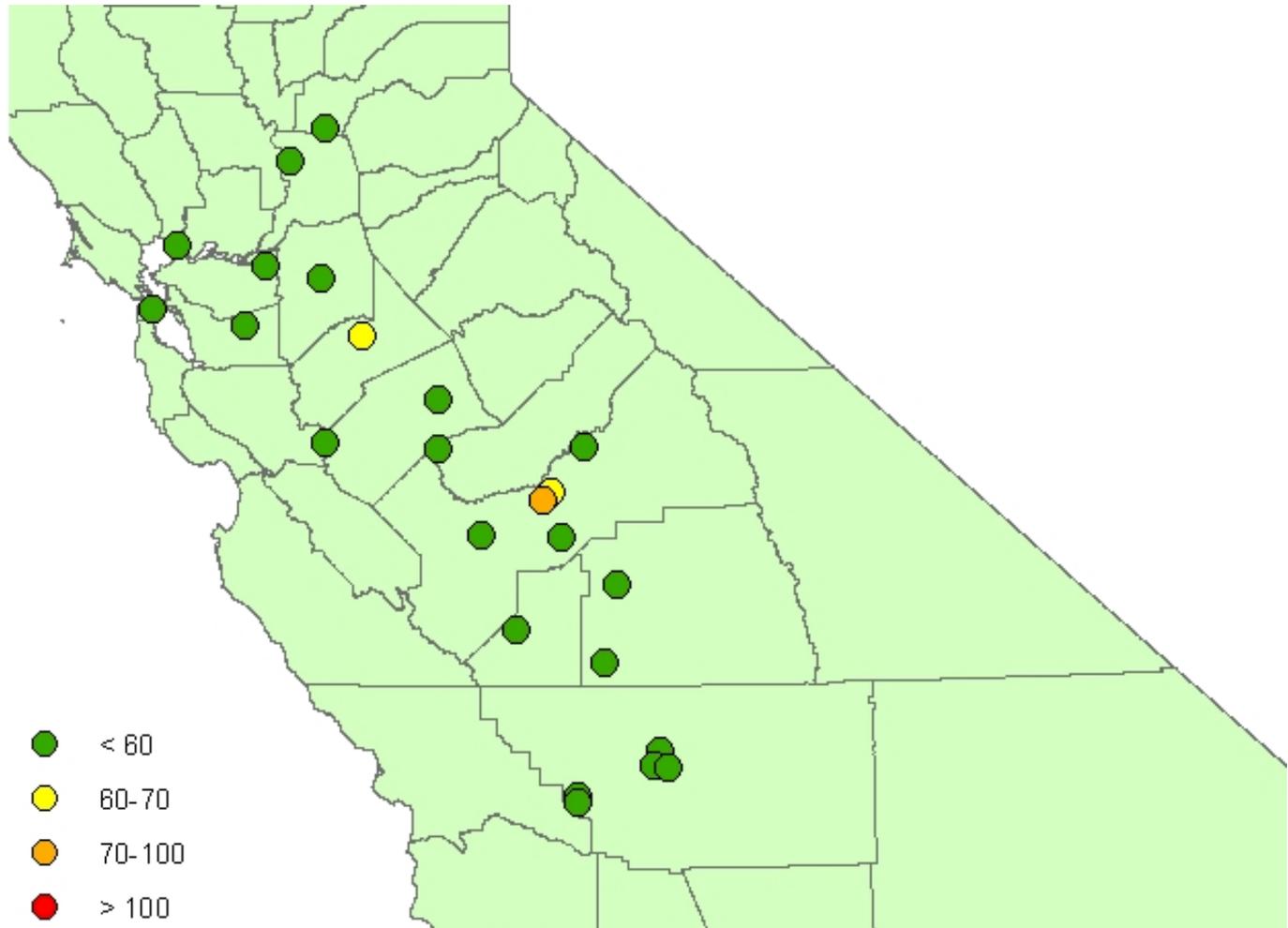


Dec 00/Jan 01 Episode

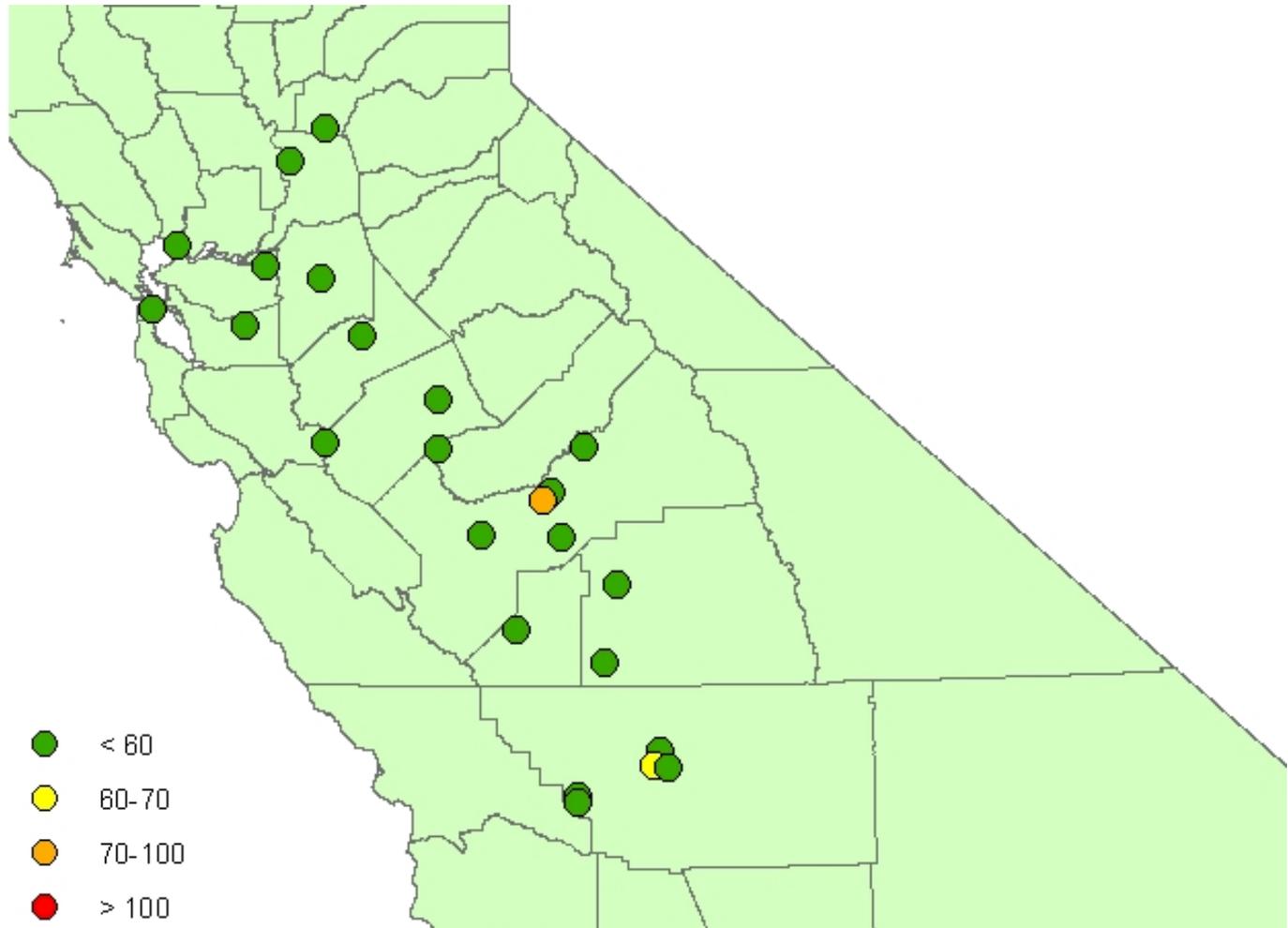


- Centered over central and southern SJV
- Concentrations increased slowly
- Pollution spread from south to north

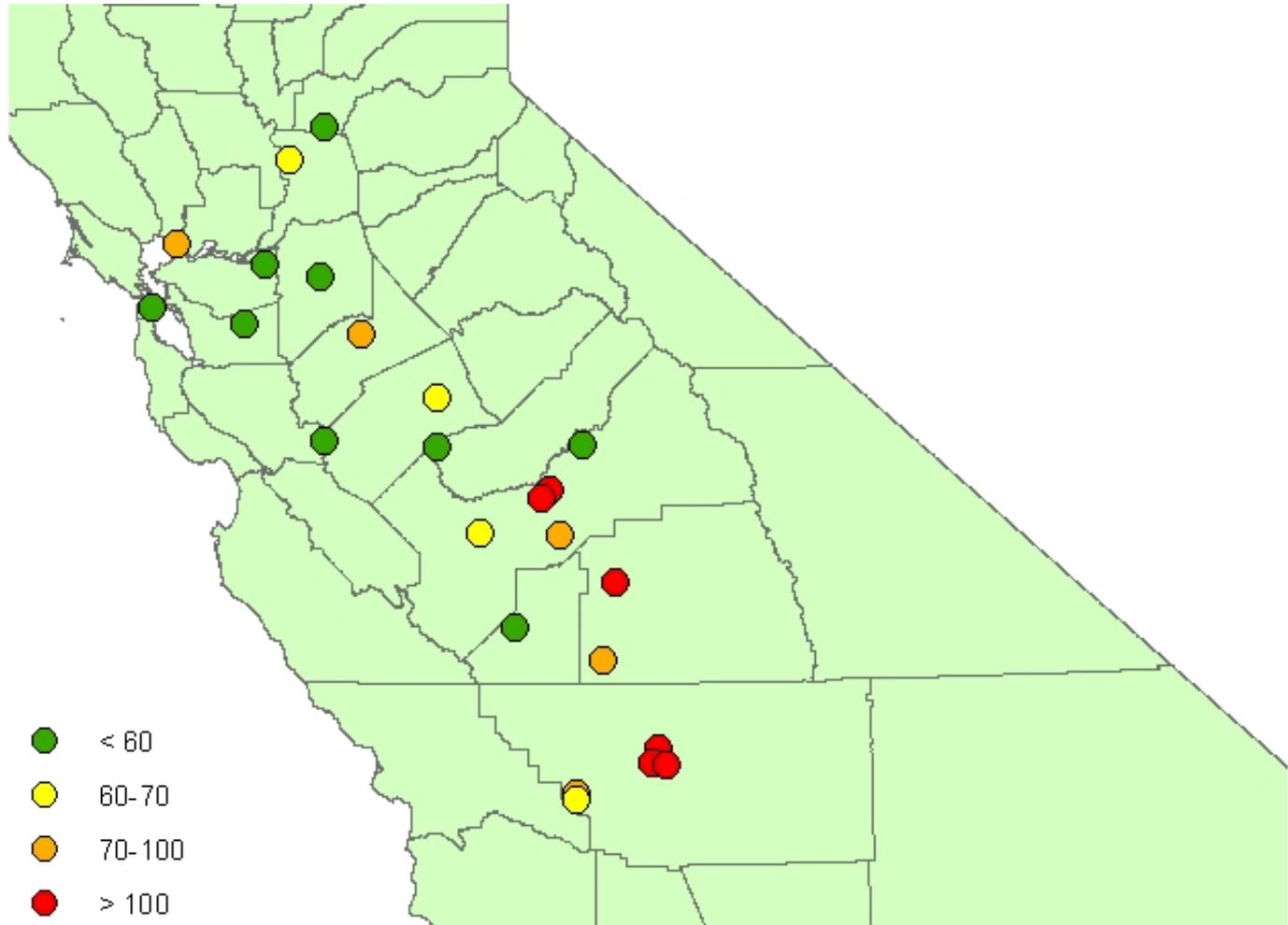
Day 1 (12/20/00)



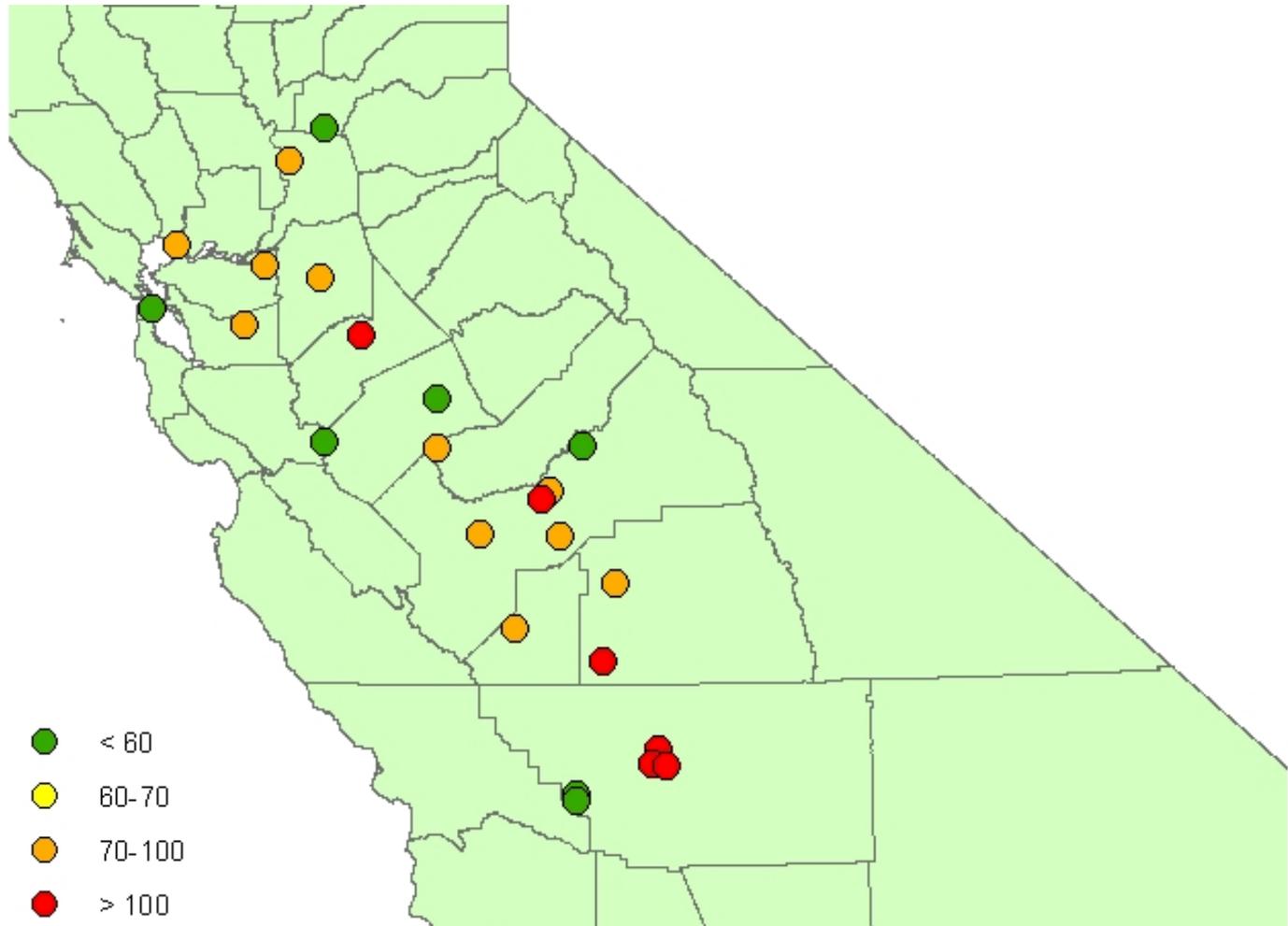
Day 7 (12/26/00)



Day 13 (01/01/01)

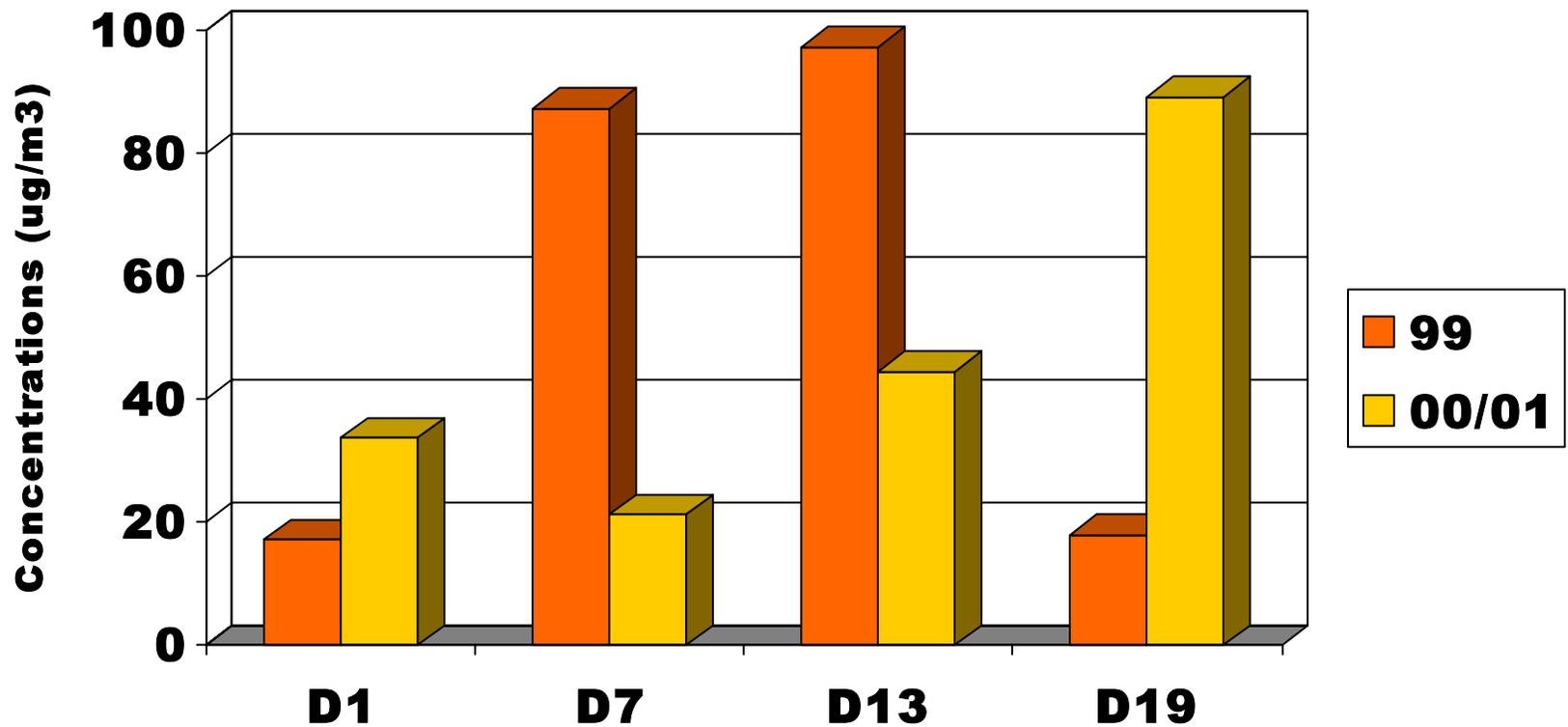


Day 19 (01/07/01)



Buildup Rate

Southwest Chowchilla



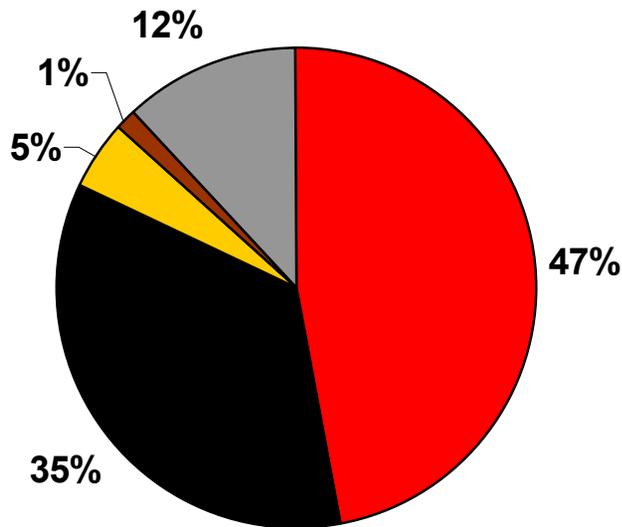
Chemical Composition



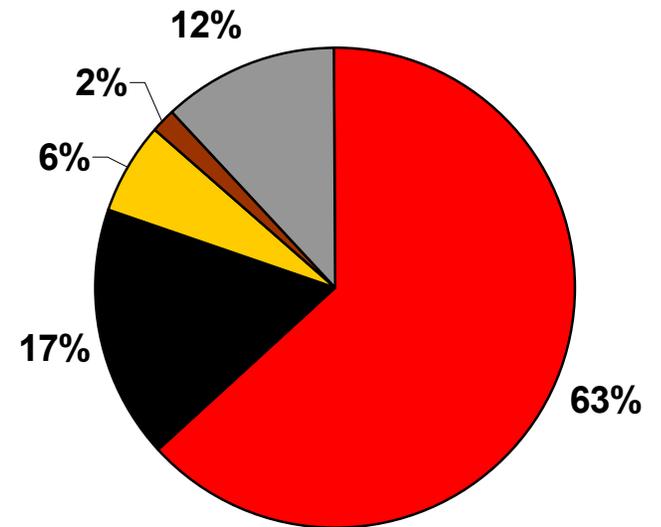
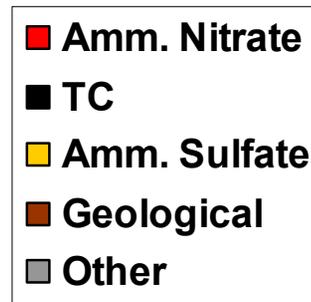
- Dominant components
- Variations
 - Urban sites versus rural
 - Among urban sites
 - Bakersfield versus Fresno

Chemical Composition

Average Urban and Rural Exceedance



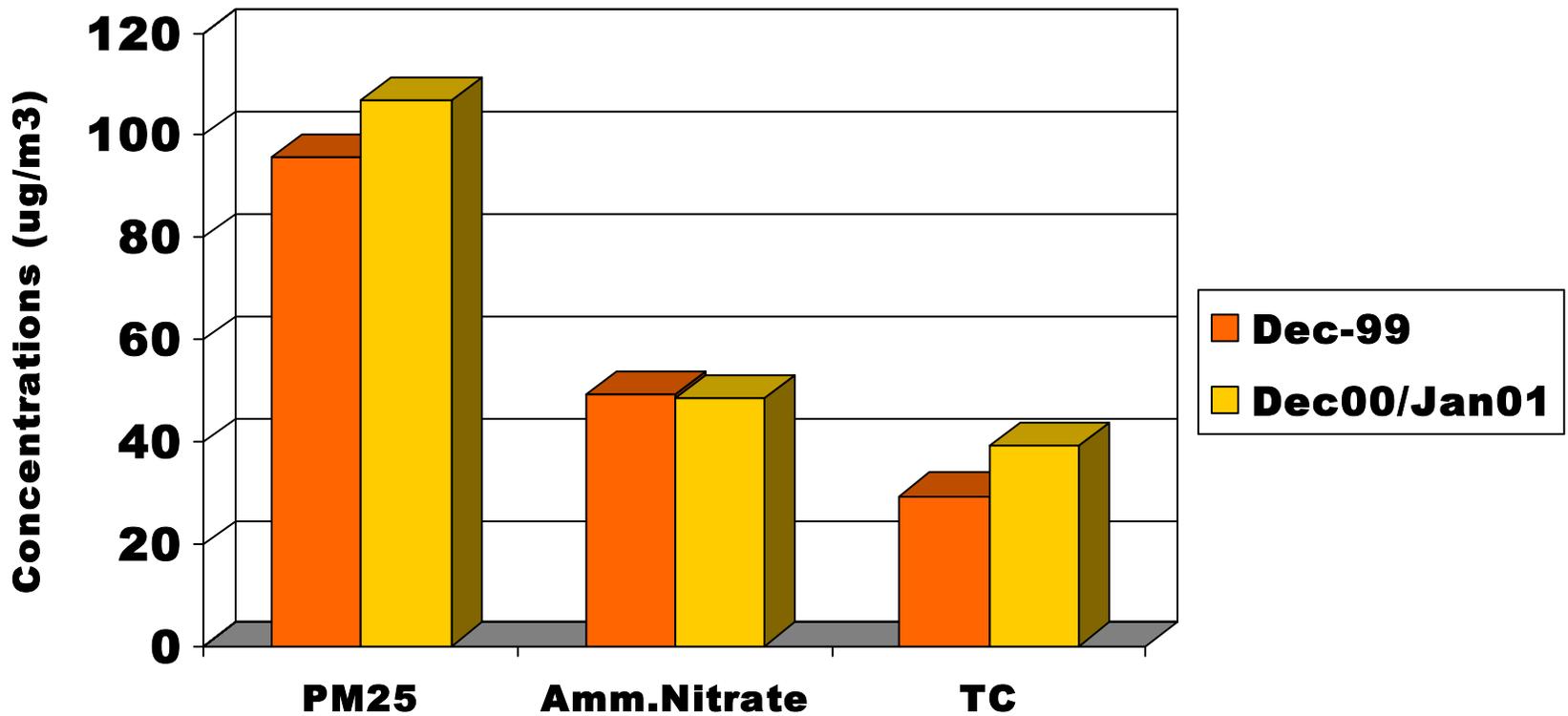
Urban



Rural

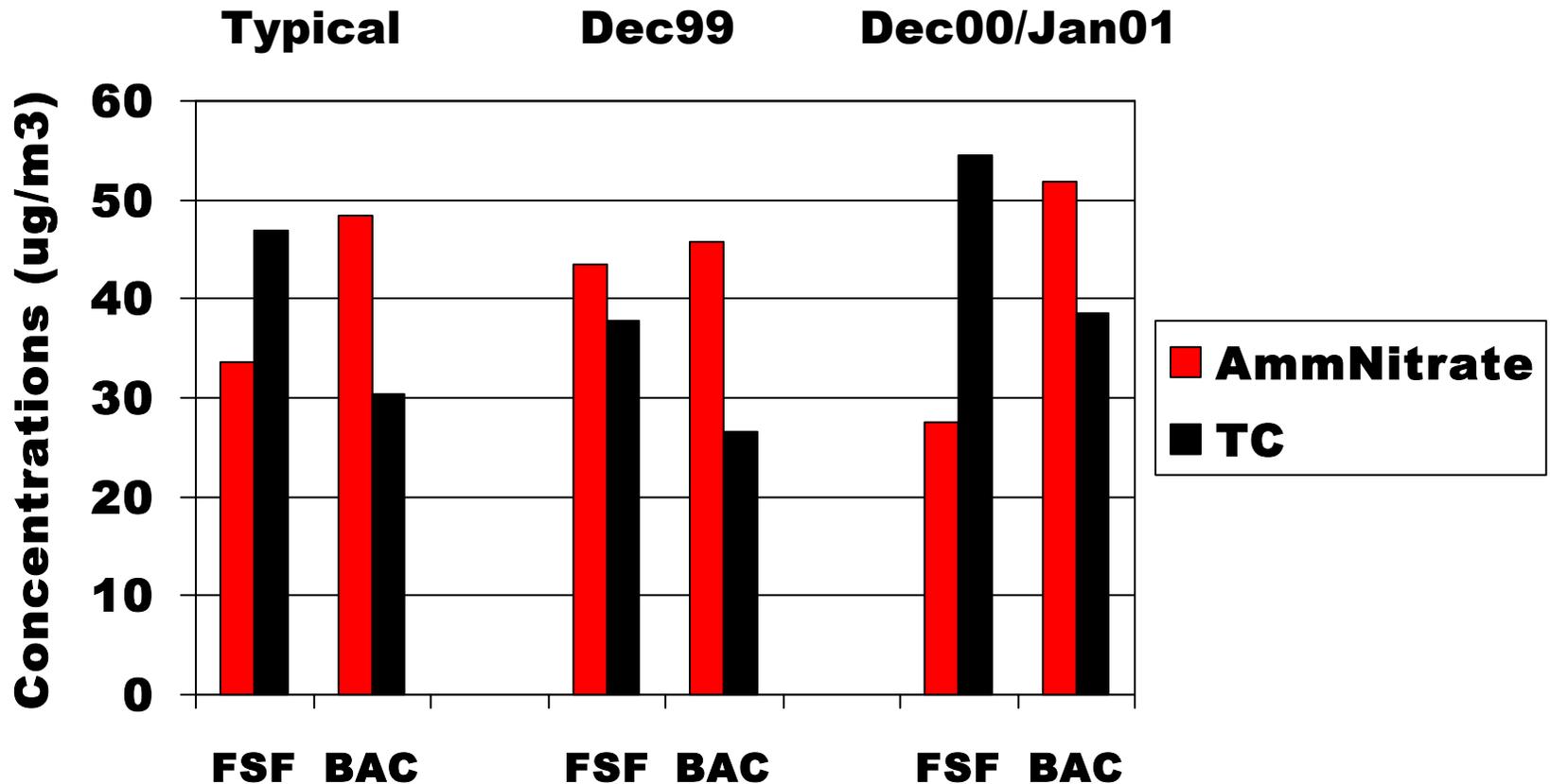
Chemical Composition

Variations Among Episodes



Chemical Composition

Variations Among Urban Sites



Conclusions



- Each episode is unique
 - Spatial and temporal patterns
 - Strength and duration
- Ammonium nitrate and total carbon comprise over 80% of PM_{2.5} mass
 - Rural sites: ammonium nitrate > carbon
 - Urban sites: vary among sites and episodes

IMS95 Conceptual Model



- CRPAQS confirmed spatial and temporal variations among the episodes
- Longer duration provided additional information
 - Less variation between urban and rural
 - More variation in ammonium nitrate