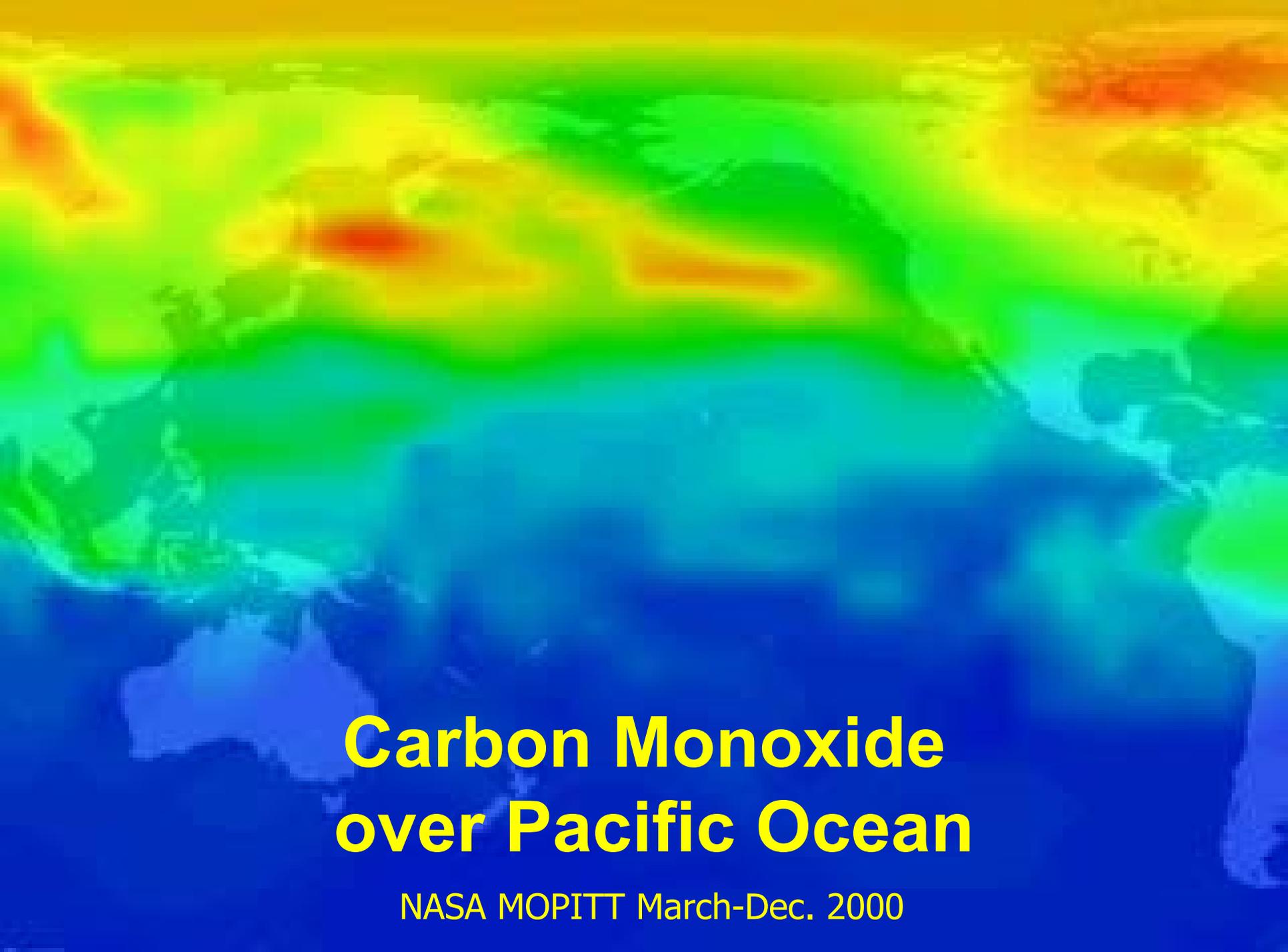


***The Asian Continental
Aerosol Plume:
Impacts on California***

Richard VanCuren, Ph.D.

ARB Research

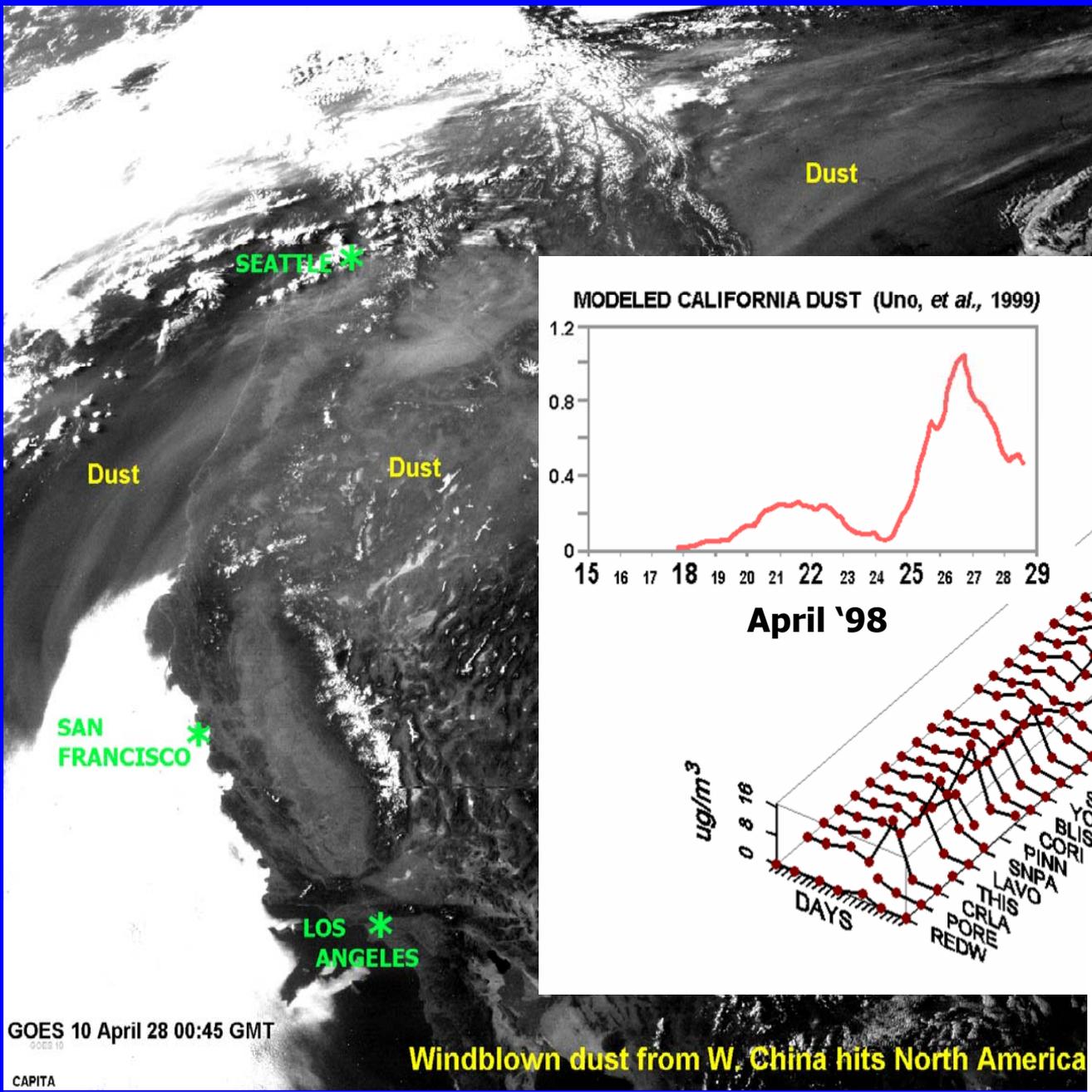
January 22, 2004

A global map showing Carbon Monoxide concentration over the Pacific Ocean. The map uses a color scale from blue (low concentration) to red (high concentration). The highest concentrations are shown in the northern Pacific, particularly in the North Pacific and North Atlantic regions, with values reaching into the red and orange. The concentration decreases as one moves south, with the lowest concentrations shown in the southern Pacific and Atlantic, appearing in shades of blue and cyan. The map also shows the outlines of the continents.

Carbon Monoxide over Pacific Ocean

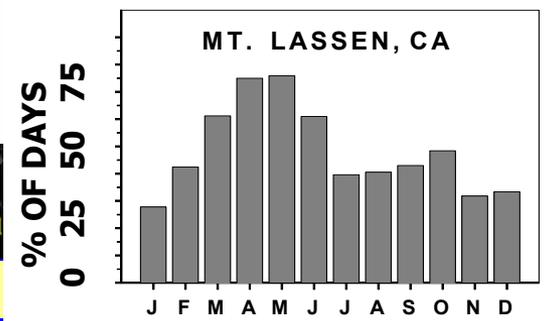
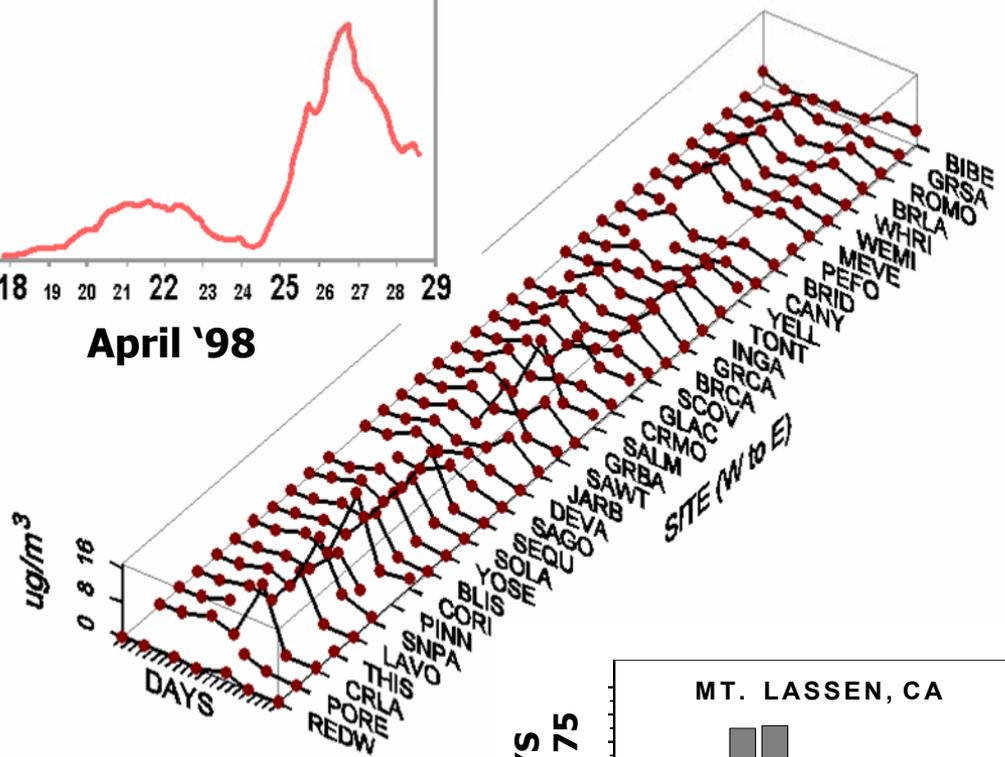
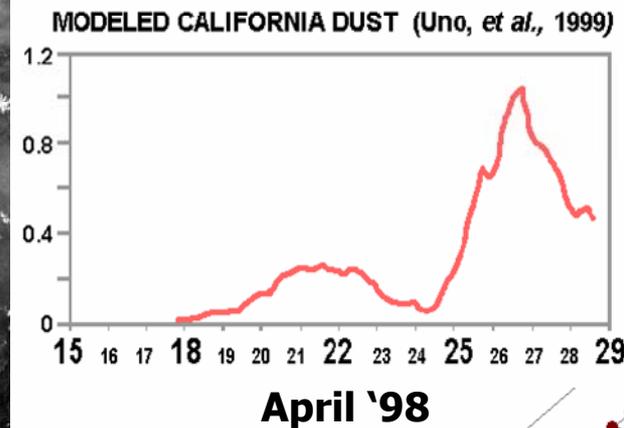
NASA MOPITT March-Dec. 2000

Recognizing Asian Dust Transport



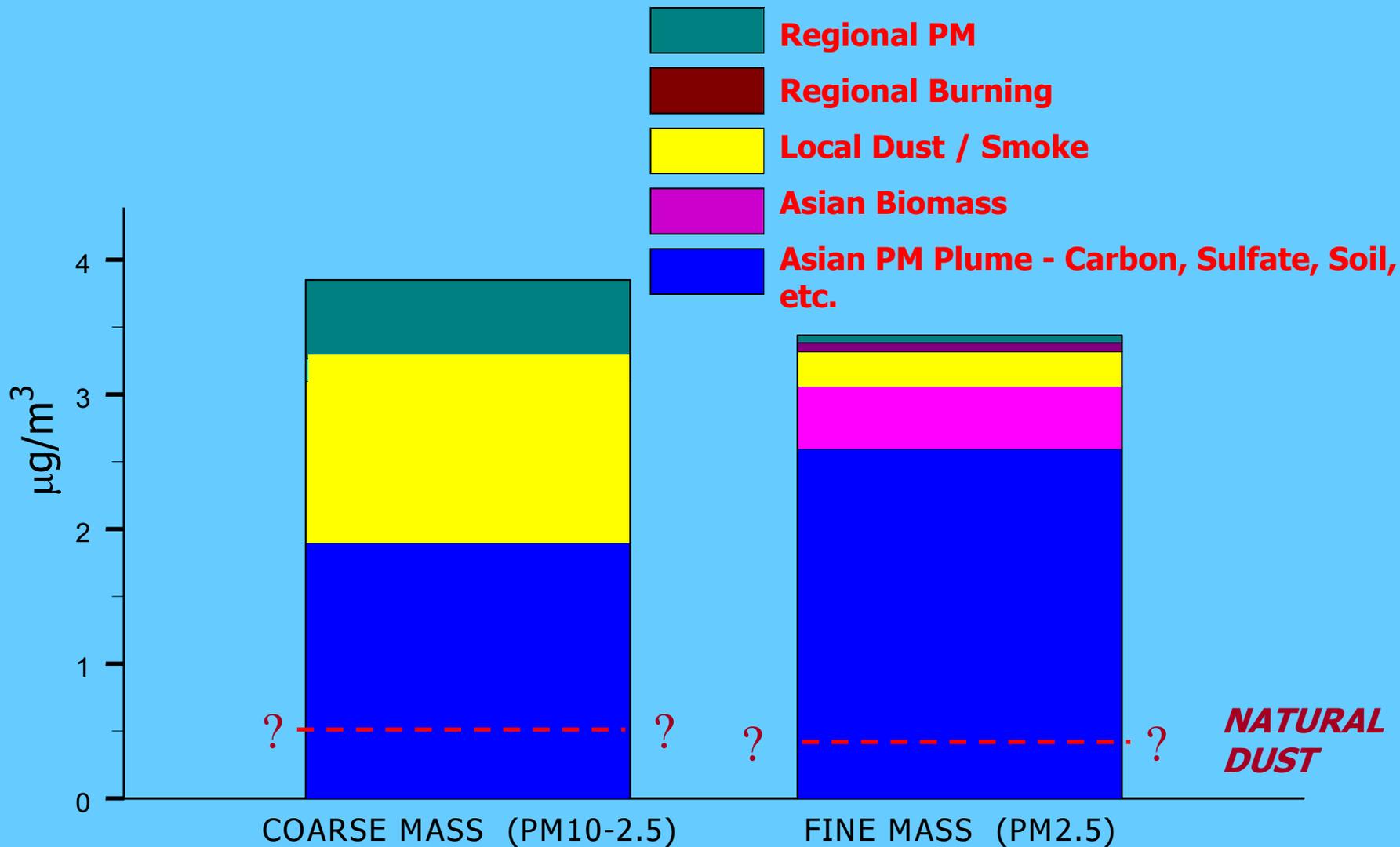
Windblown dust from W. China hits North America

VanCuren, R., and T. Cahill, *J. Geophys. Res.* 107, December, 2002.



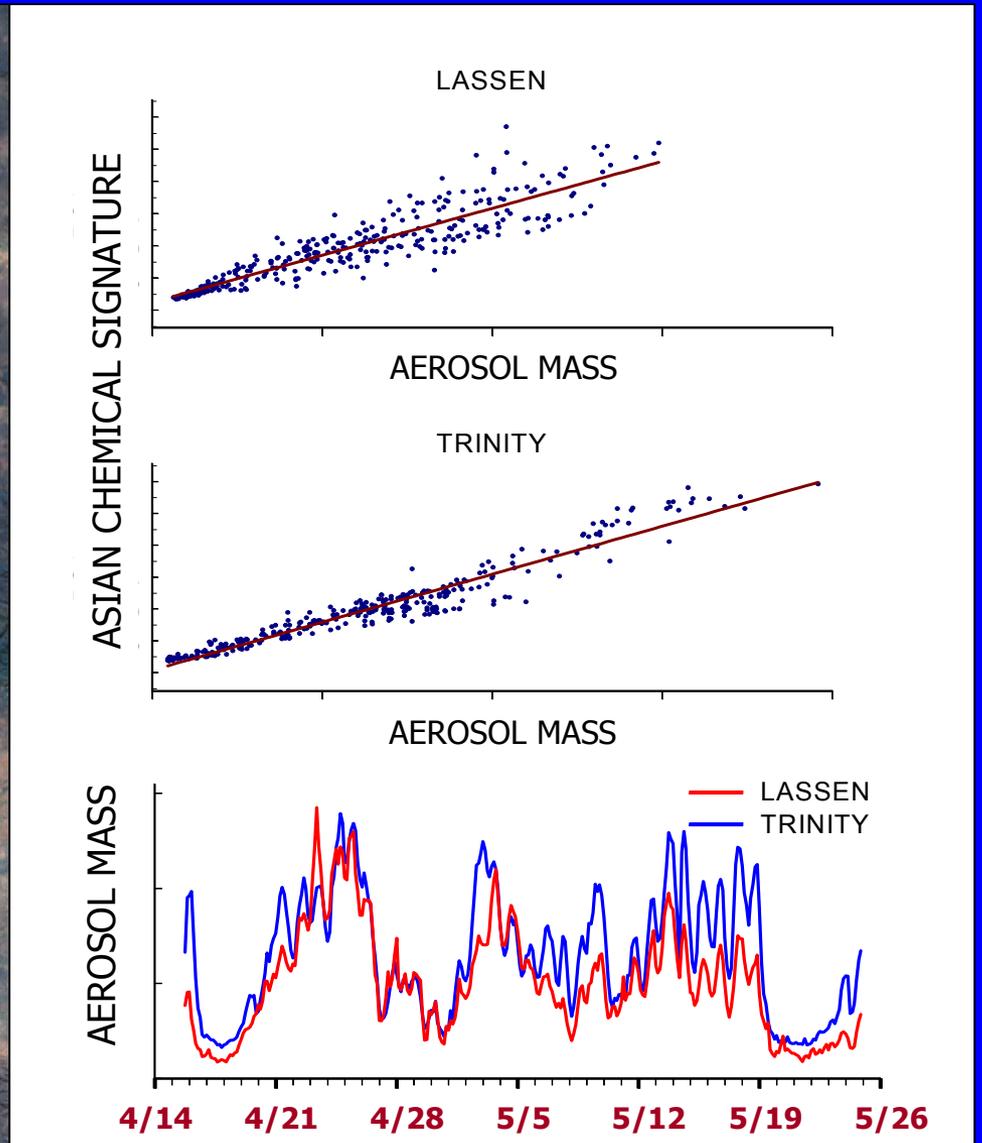
Mean Aerosol Composition

March - October 1989-1999 at Crater Lake and Mt. Lassen



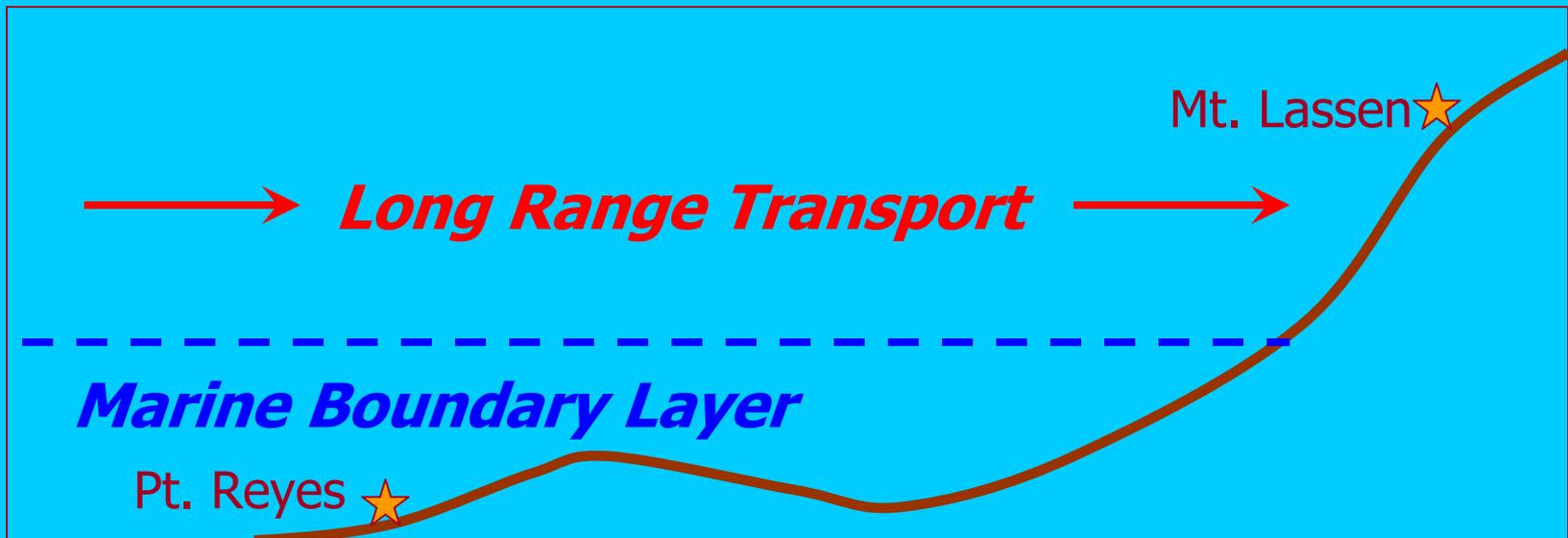
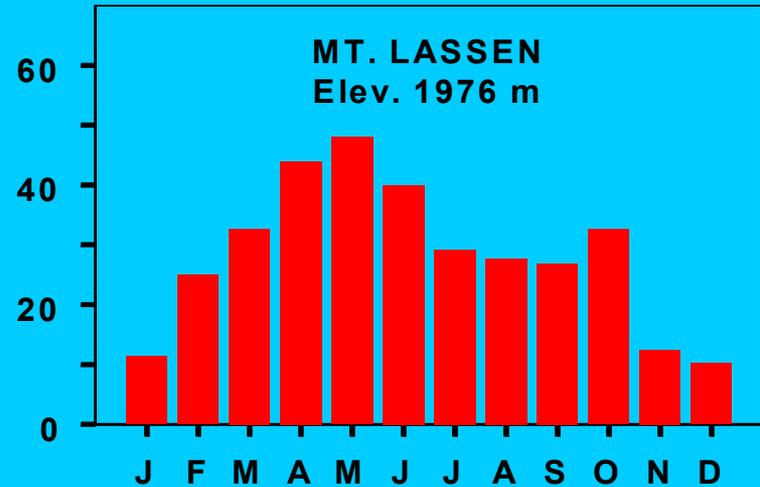
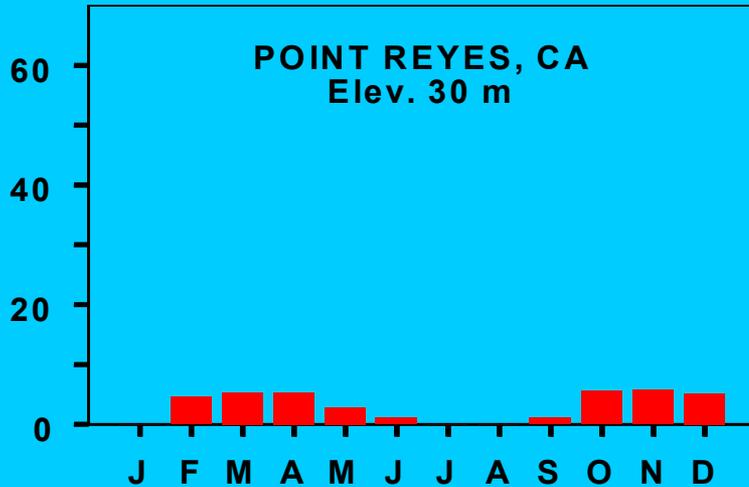
VanCuren, R. A., *J. Geophys. Res.*, 108, October 2003.

ITCT-2K2 Confirms Asian Influence



Mountain vs. Coastal Impact

Asian Dust Frequency %



Findings

- **Some Asian dust is natural - not itself a major problem**
- **Dust is accompanied by biomass smoke, agricultural dust, motor vehicle and industrial emissions**
- **Average Asian aerosol load at mountain sites is about 1/4 of CA PM10 and PM2.5 standards; 1/5 and 1/10 of Federal PM10 and PM2.5 standards.**
- **Asian aerosols can be a major component of PM in otherwise “clean” rural sites.**
- **Asian aerosols are a minor component of PM in heavily polluted areas, and the same conditions that trap pollutants near the ground preclude Asian PM from contributing to peak PM concentrations.**

Implications

- **Typical low concentrations are a “floor” for PM concentrations**
 - Only a small contribution to human exposure
 - Needs to be considered in Regional Haze programs
- **Rare high concentrations (e.g. 1998 dust storms) may exceed PM standards**
 - Low frequency (once a decade?) has little health significance
 - Need to be recognized as exceptional events
- **Asian emissions may grow with economic expansion**
 - Need to improve understanding and track changes