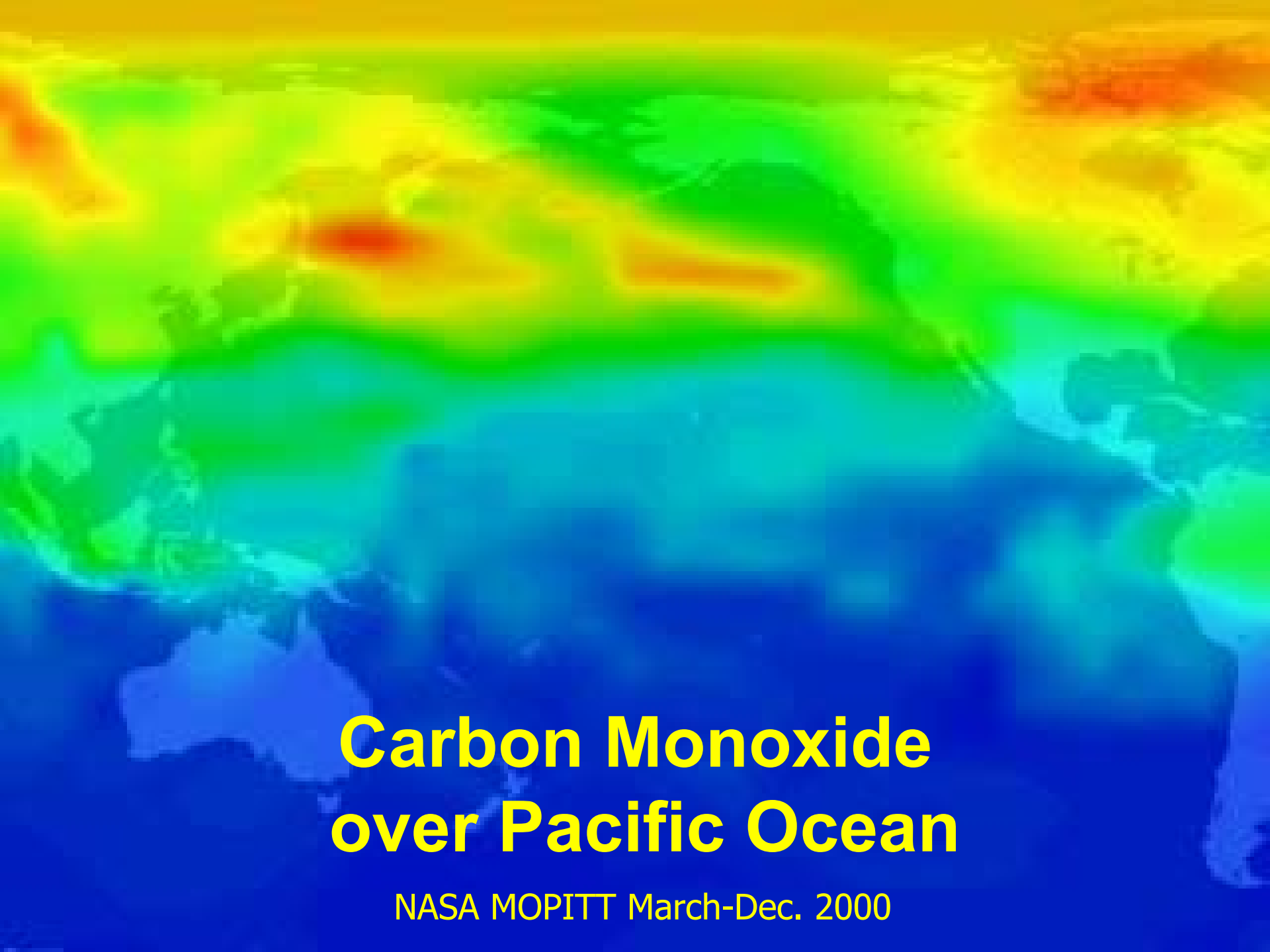
The Asian Continental Aerosol Plume: Impacts on California

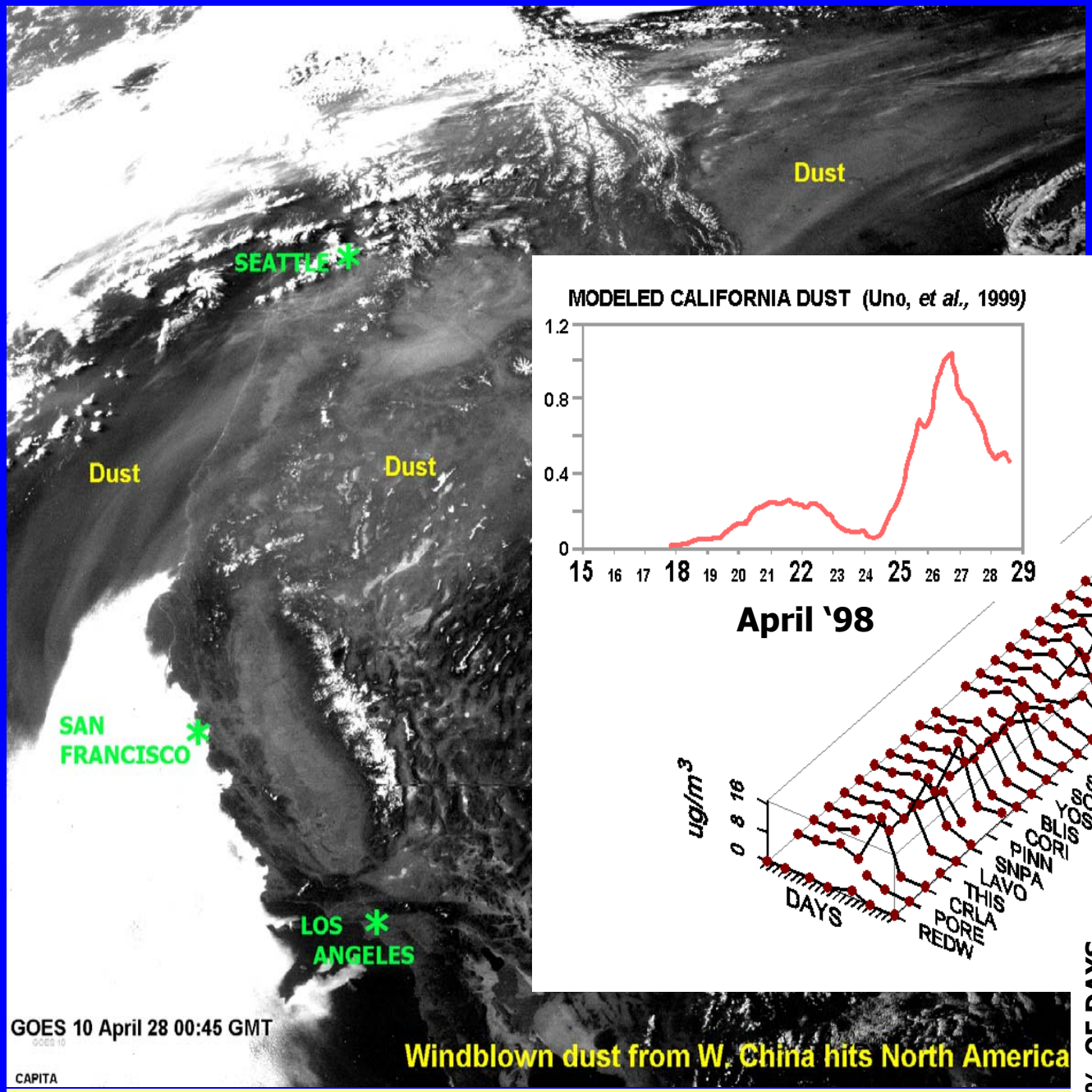
Richard VanCuren, Ph.D.

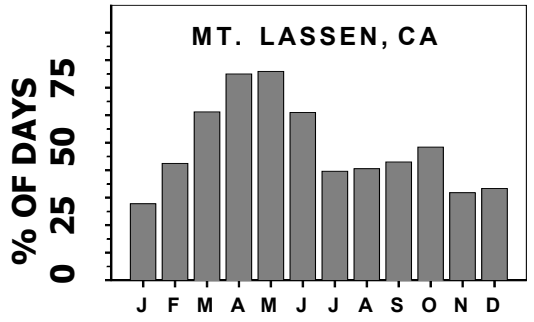
ARB Research

January 22, 2004


Carbon Monoxide
over Pacific Ocean
NASA MOPITT March-Dec. 2000

Recognizing Asian Dust Transport

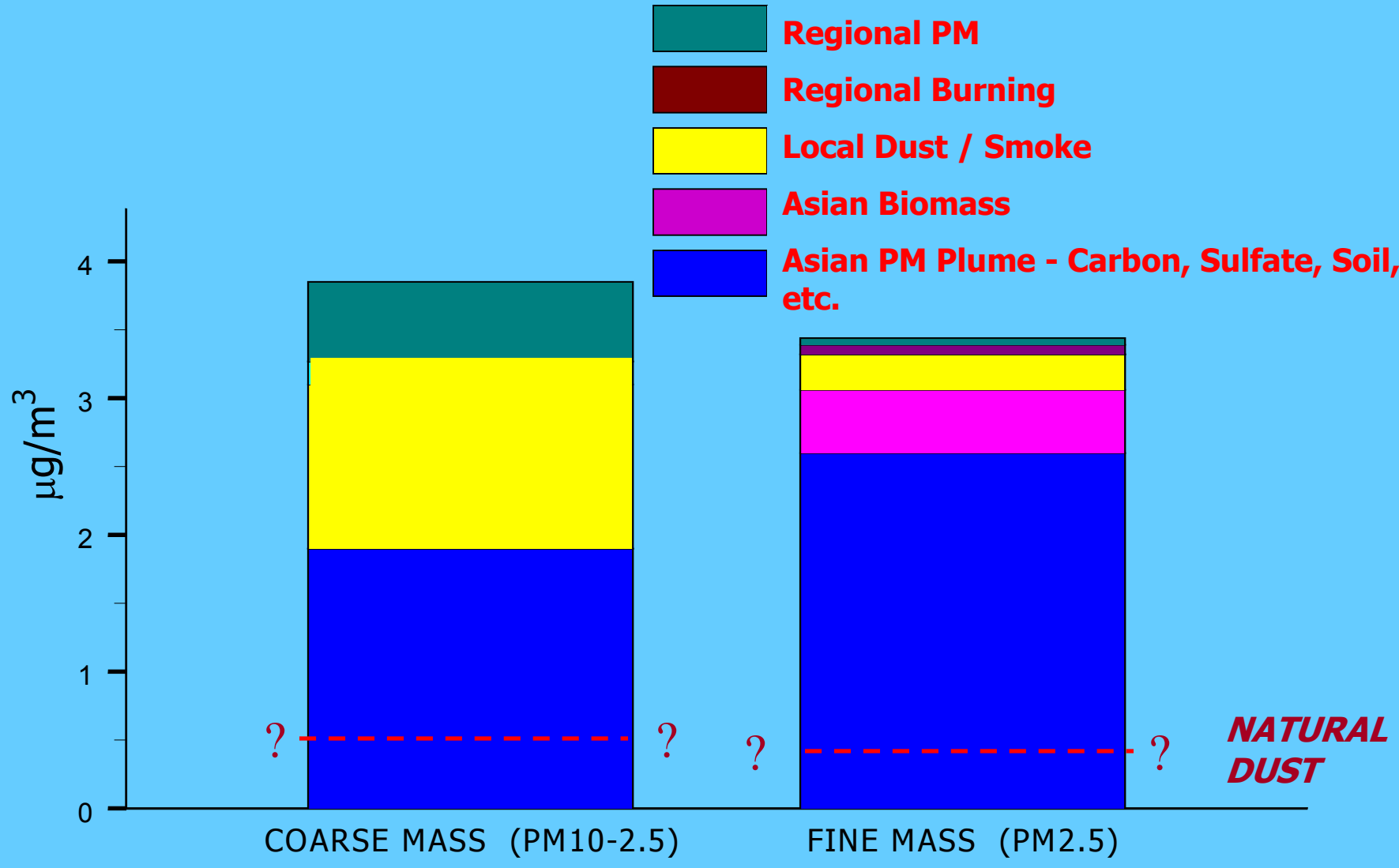




VanCuren, R., and T. Cahill, *J. Geophys. Res.* 107, December, 2002.

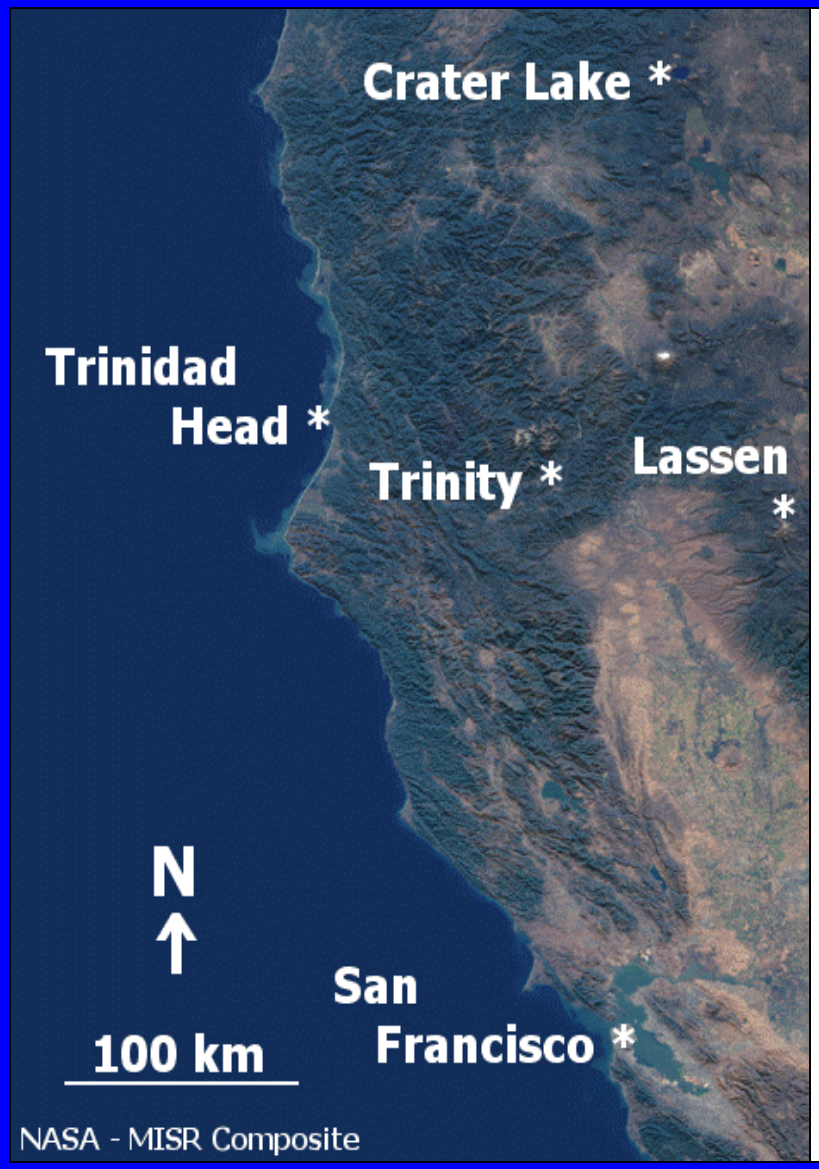
Mean Aerosol Composition

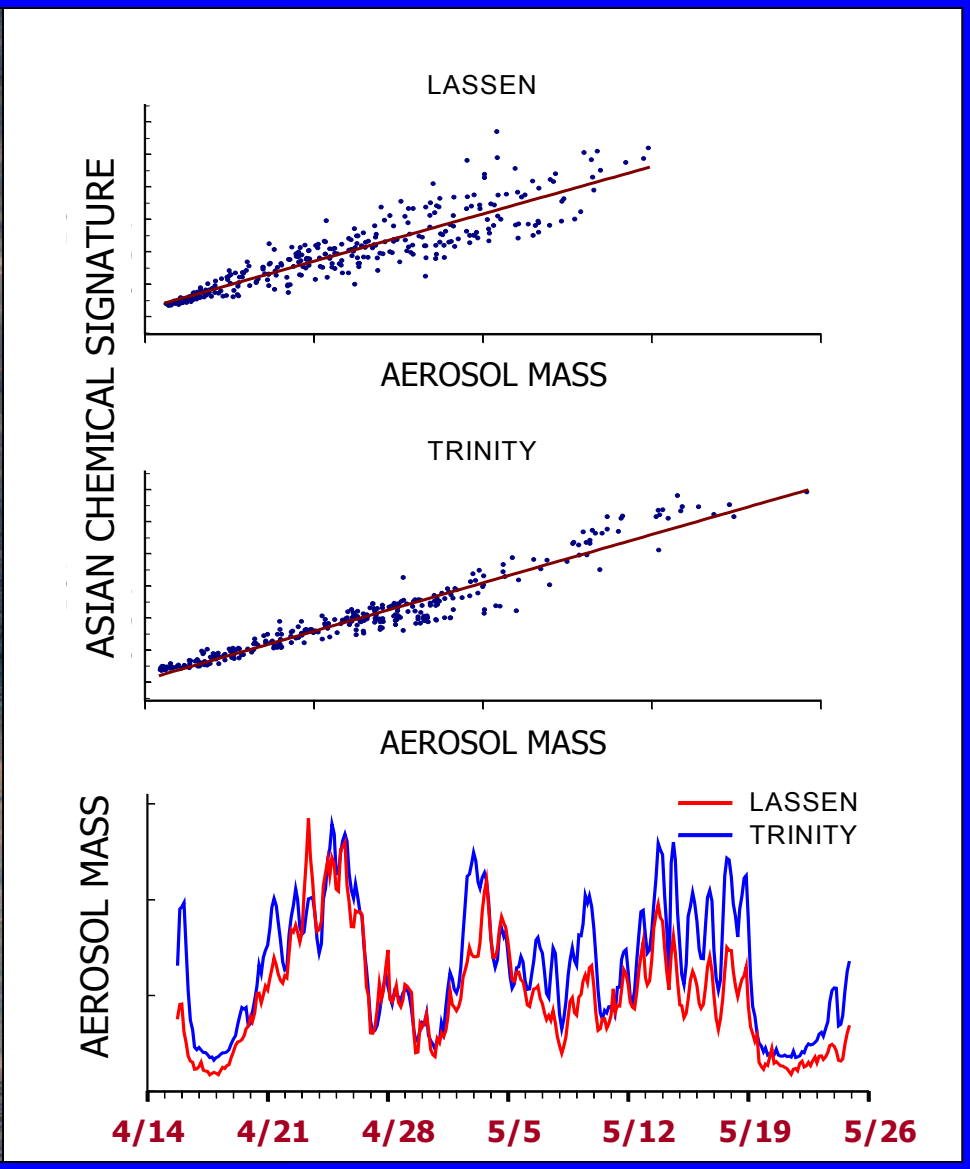
March - October 1989-1999 at Crater Lake and Mt. Lassen



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

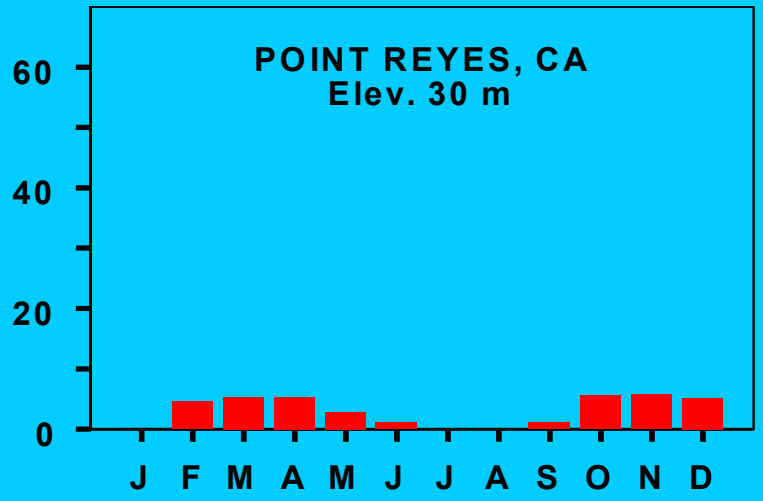
ITCT-2K2 Confirms Asian Influence

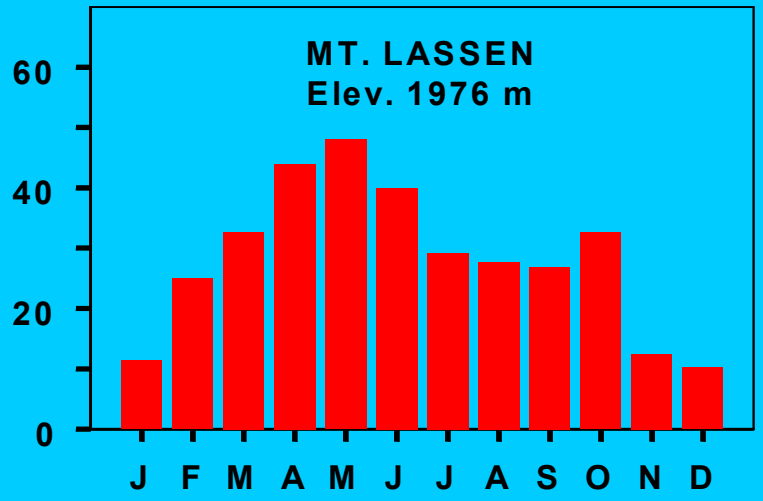


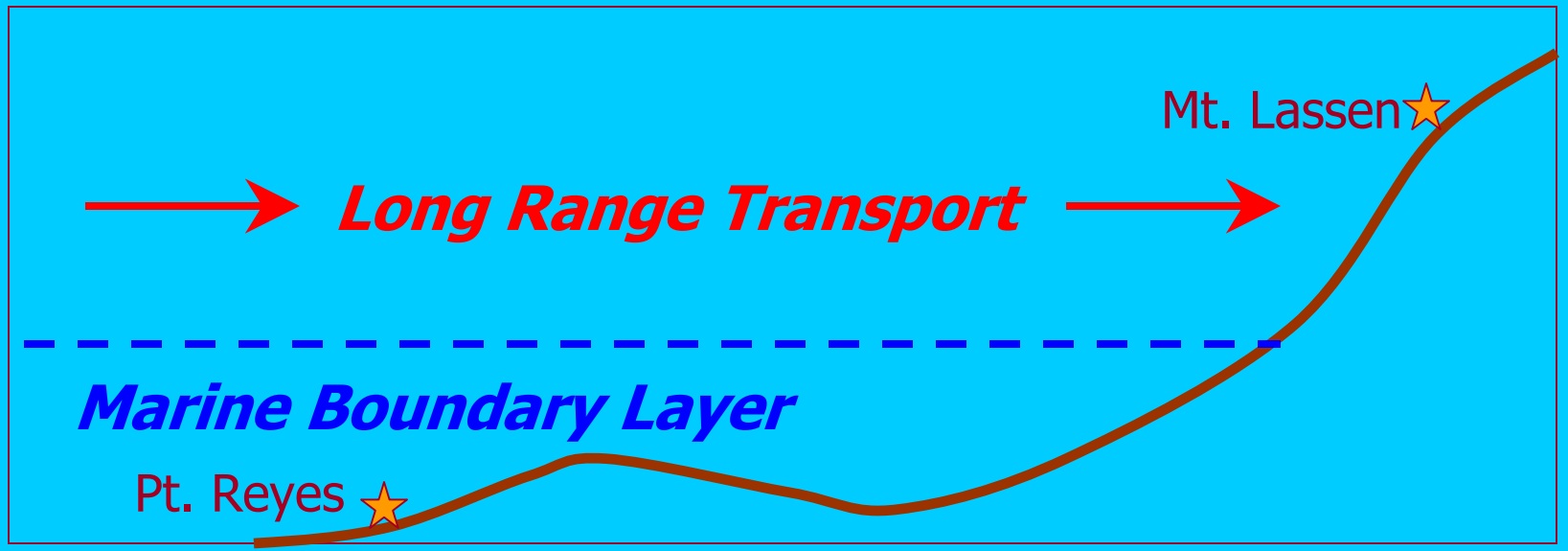


Mountain vs. Coastal Impact

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 or 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