

Clark County Department of Air Quality Management (DAQM)

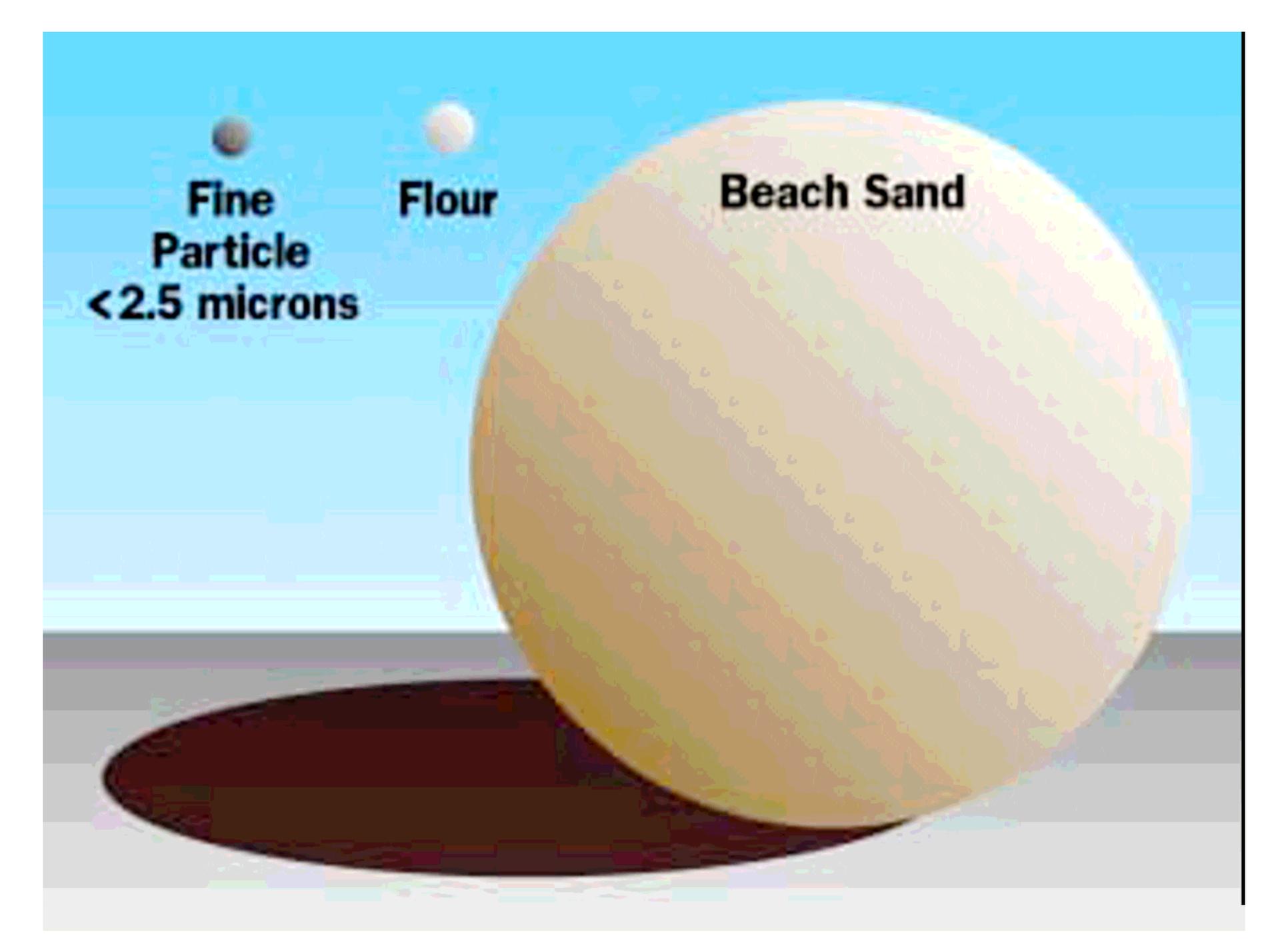


Urban Haze

- **Haze Overview**
 - **What is Haze?**
 - **Visibility Trends**
- **Past and Current Haze Studies**
 - **What We Learned**
 - **What We Expect to Learn**

What Causes Haze?

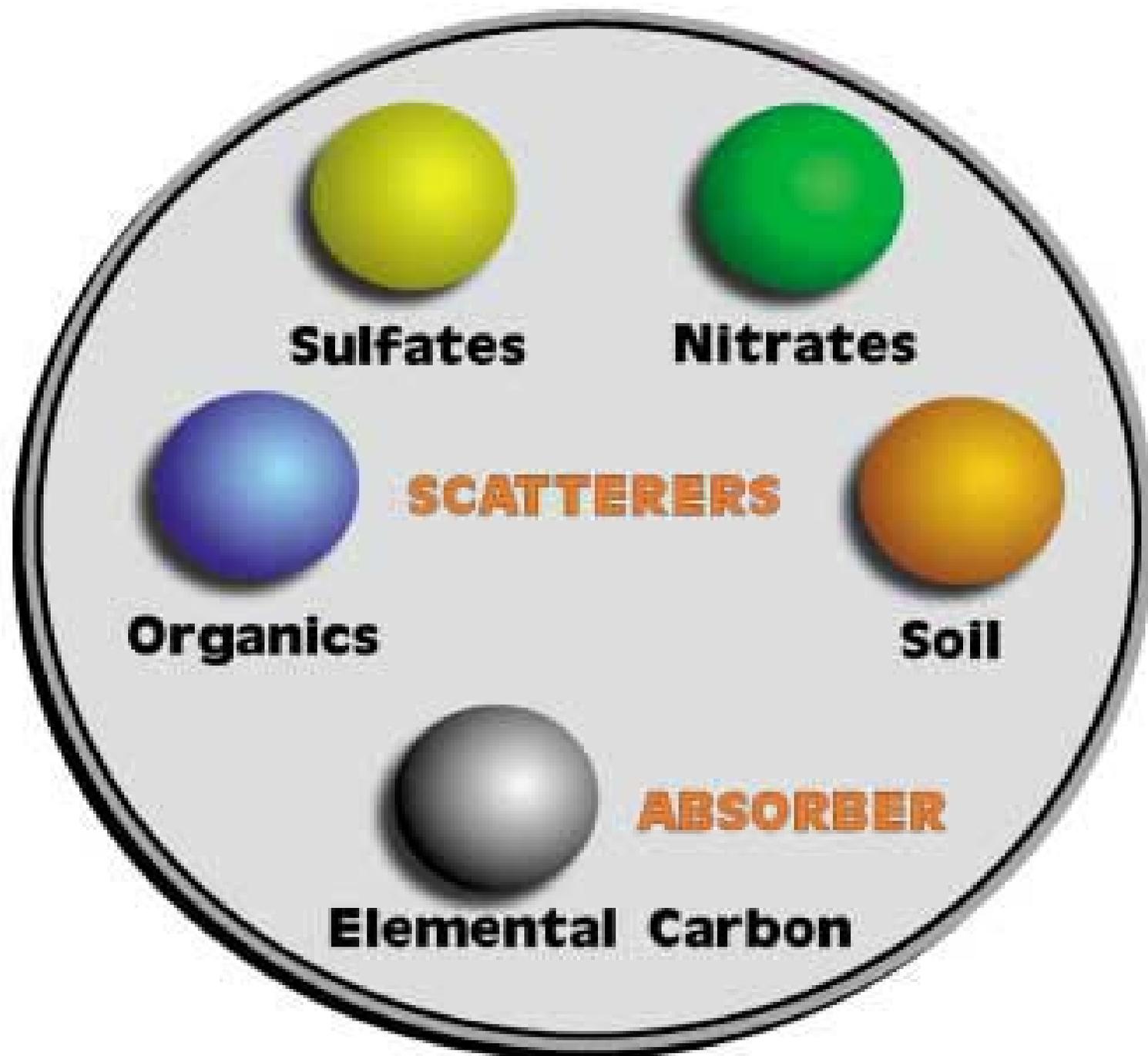
- **Scattering and absorption of light by particles and gases in the atmosphere**
 - **“Raleigh” scattering, natural scattering of light by air molecules. Causes blue sky.**
 - **Absorption of light by certain compounds like soot and nitrogen dioxide gas (NO₂).**
 - **Particle light scattering – usually the main component of haze**



**Fine
Particle
< 2.5 microns**

Flour

Beach Sand





Hydrogen

Oxygen

Nitrogen

Carbon

Sulfur



Sulfur Dioxide



Ammonium Sulfate



Nitrogen Dioxide



Ammonium Nitrate



Oxygen



Ozone



Oxygen



Carbon Hydrogen



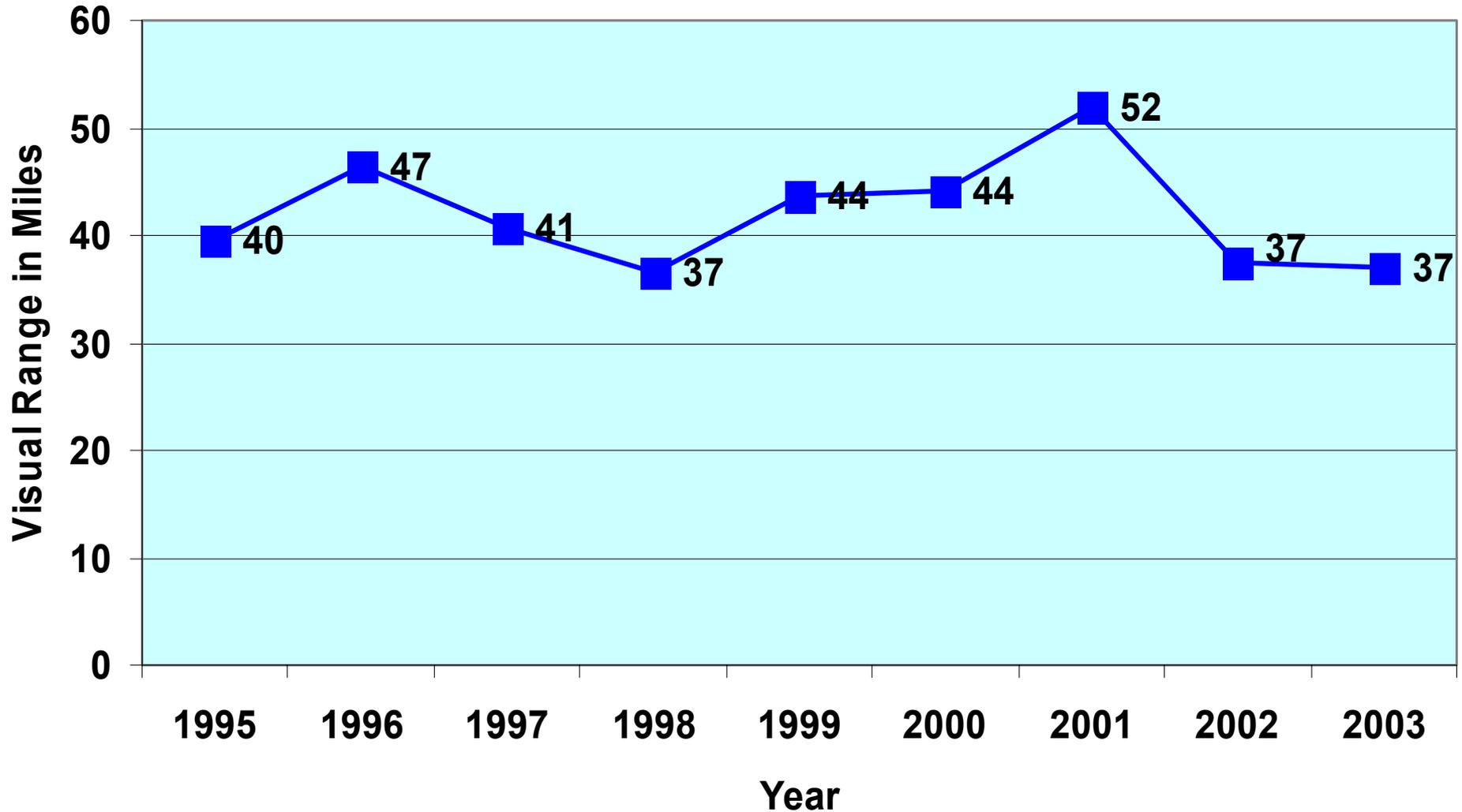
Hydrocarbons

?-?-?-

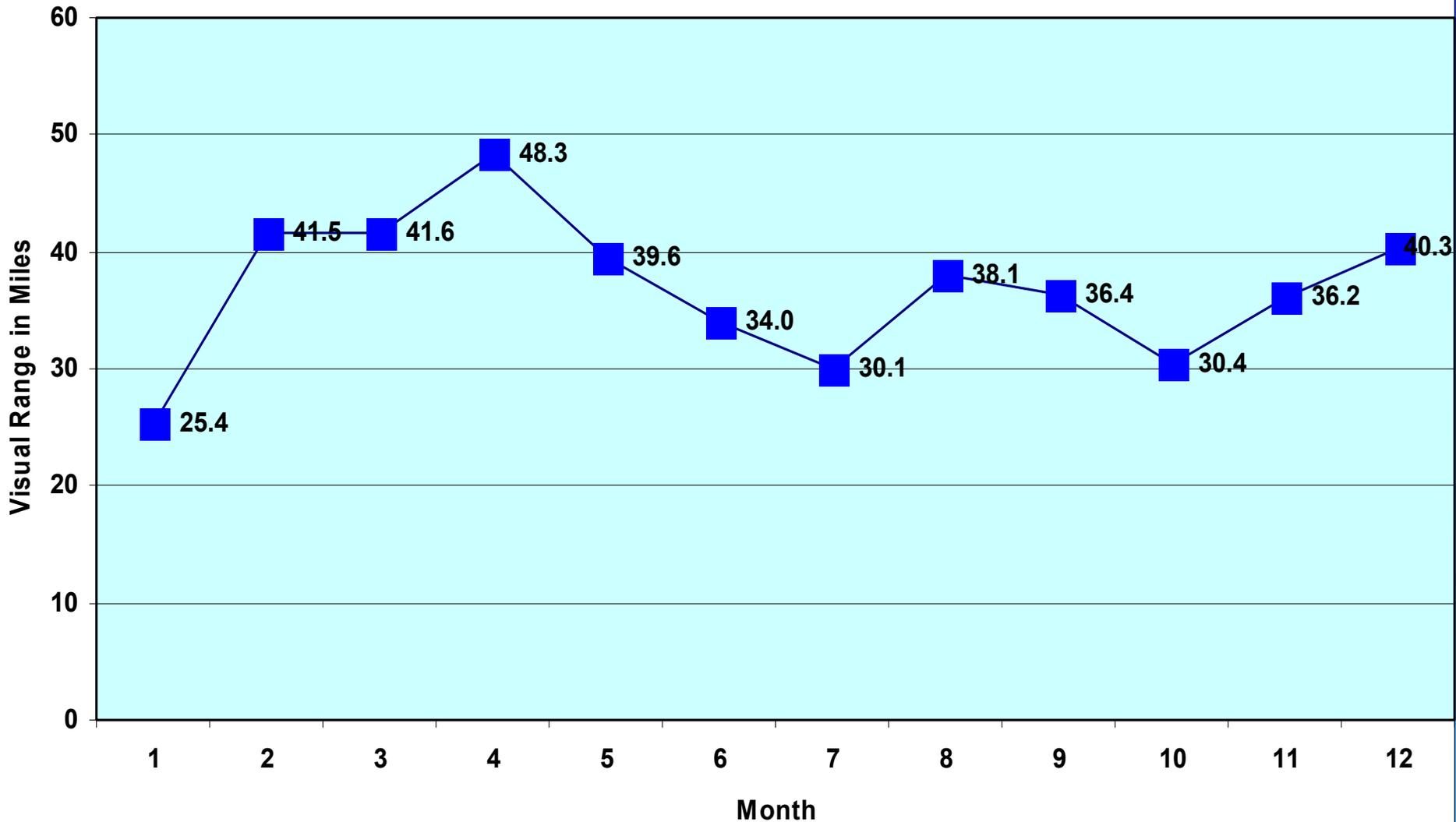




Annual Average Visibility

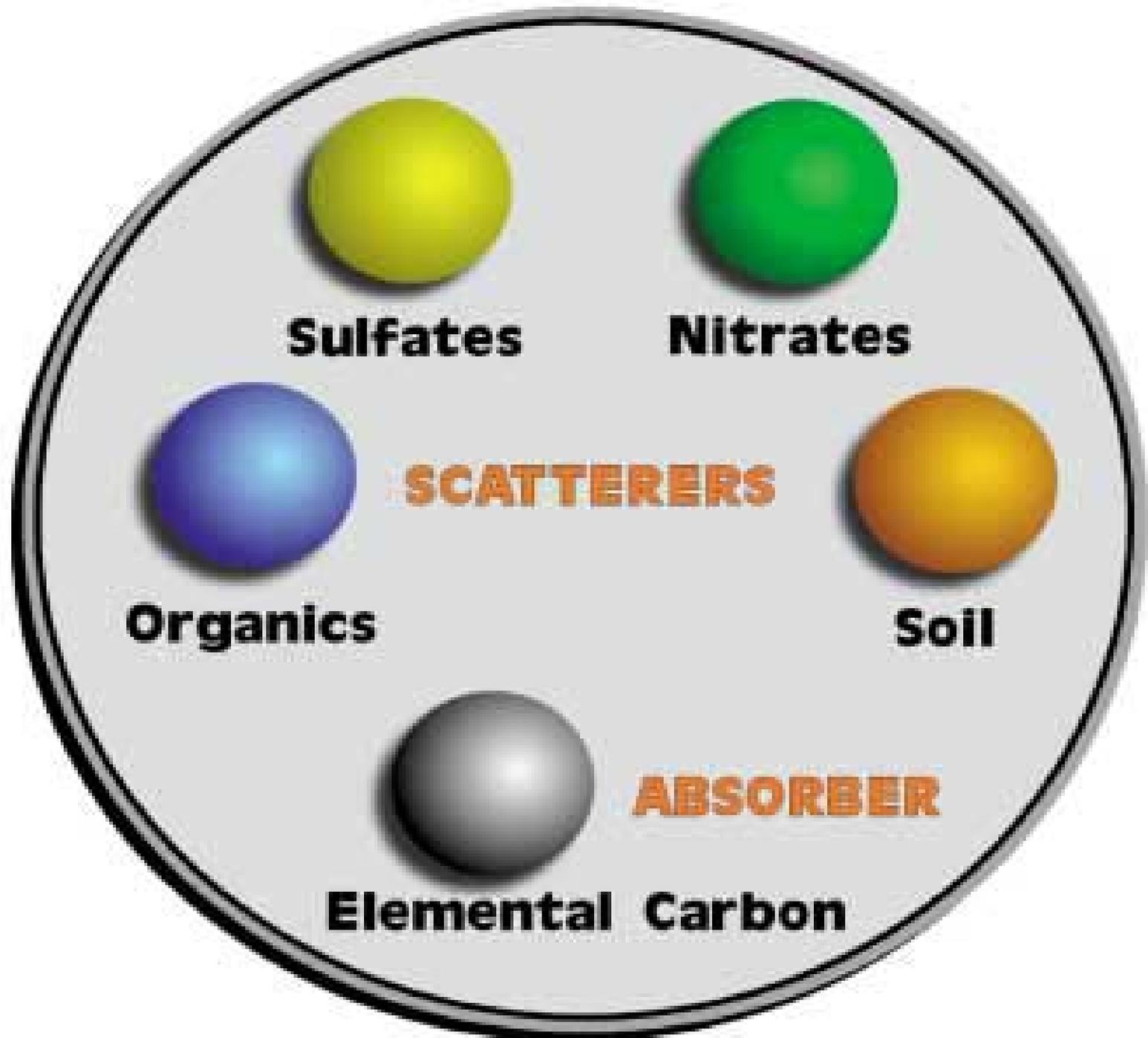


Monthly Visibility - 2003

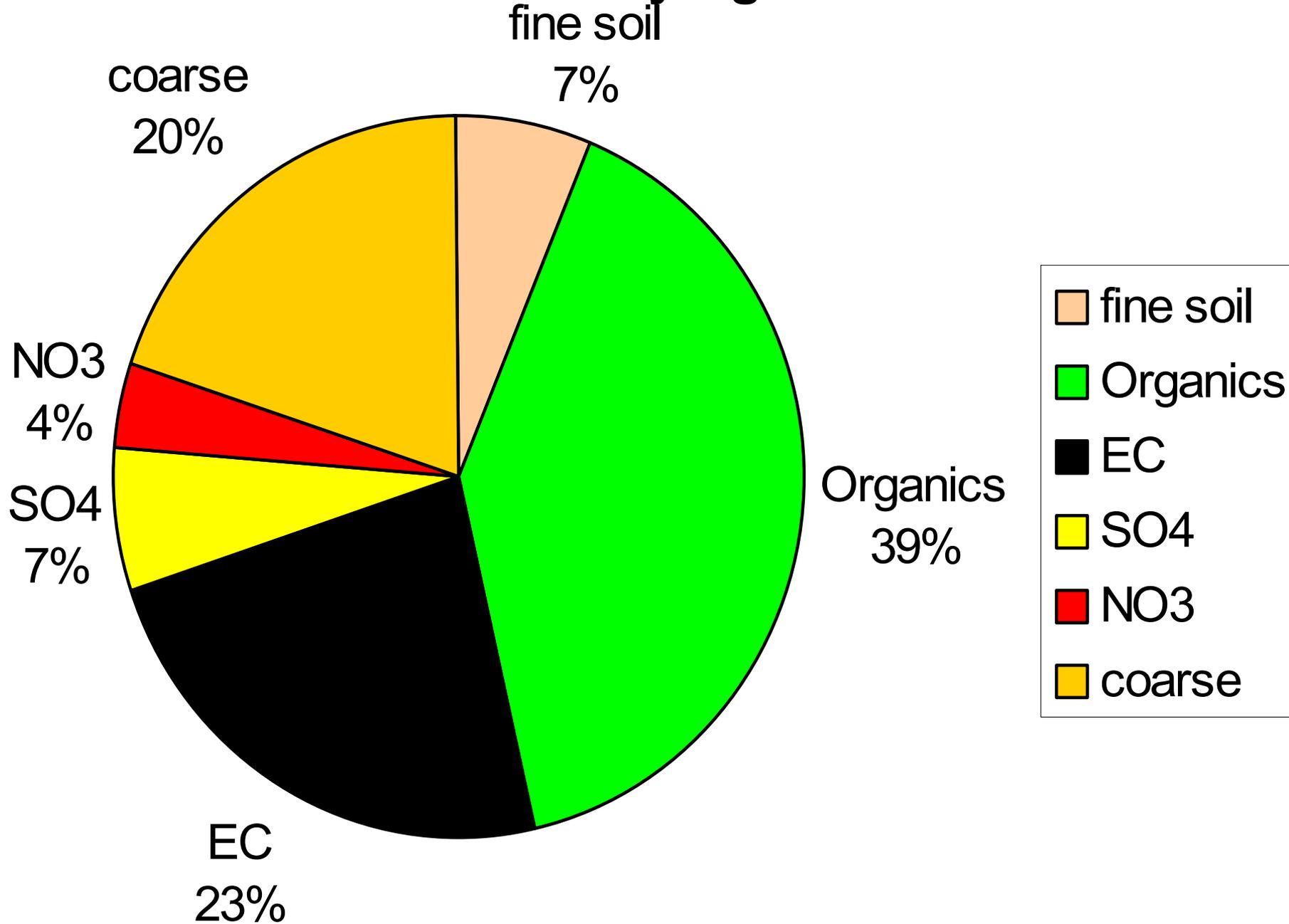


Initial Study Objectives

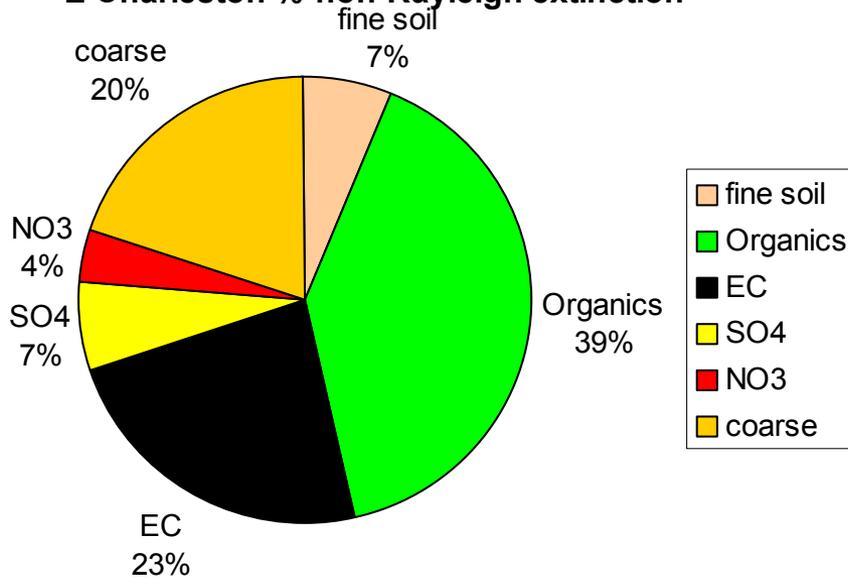
- **Determine Contribution of Chemical Components to Haze in the LVV**
- **Determine Local and Transported Contributions**
- **Reduce Uncertainties of Dust, Mobile Sources, Regional Sources**



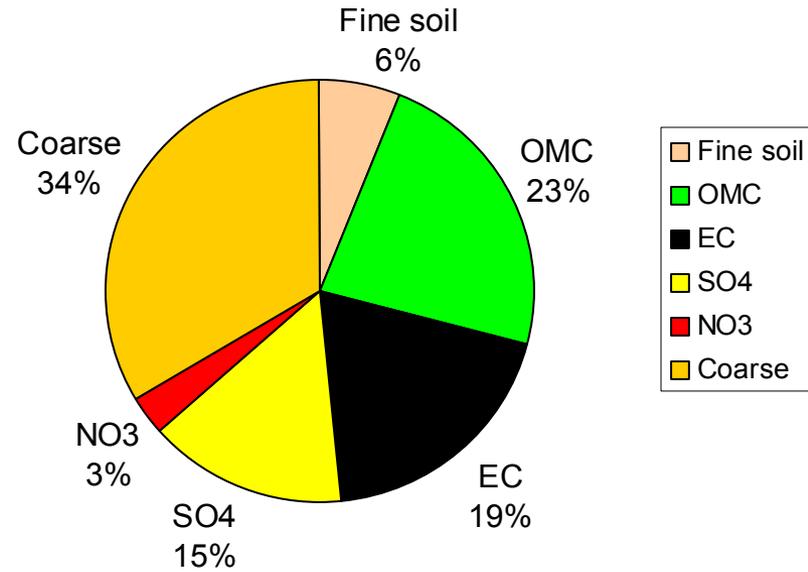
E Charleston % non-Rayleigh extinction



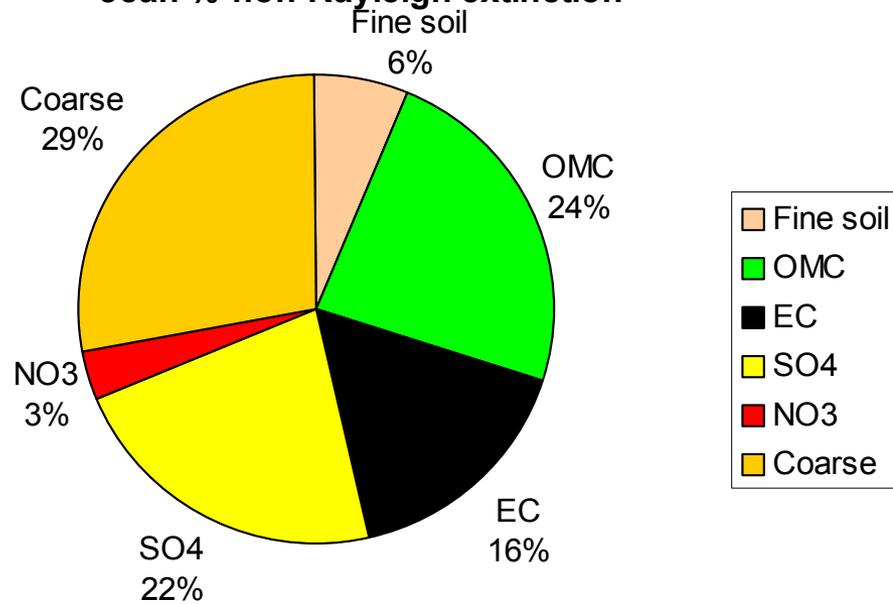
E Charleston % non-Rayleigh extinction



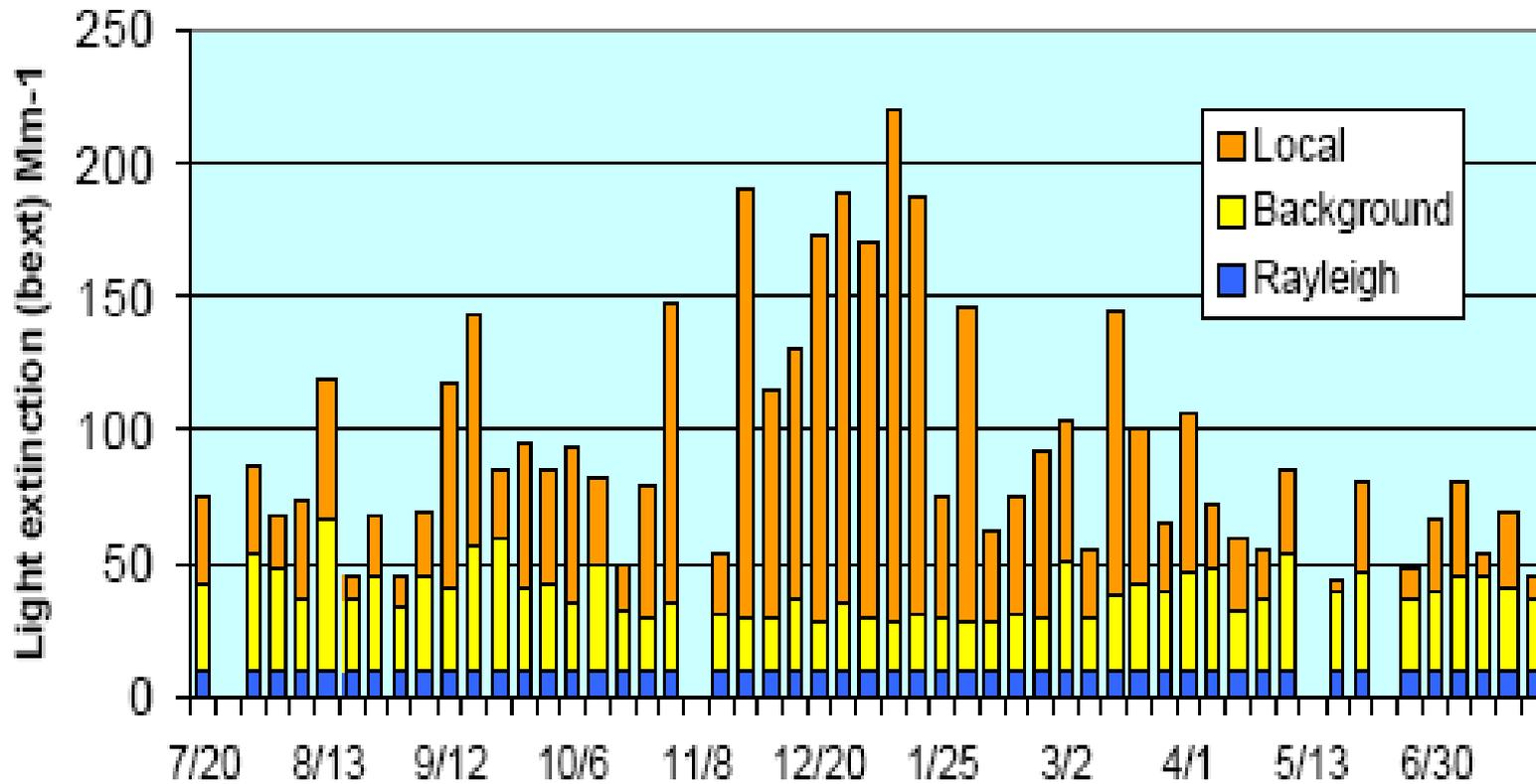
Palo Verde % non-Rayleigh extinction



Jean % non-Rayleigh extinction



Daily Contributions to Haze at East Charleston





Initial Study Results

- **40-75% of haze locally generated**
- **Local haze dominated by crustal material and organics**
- **Crustal sources well known**
- **Additional work needed to attribute carbon to sources – e.g. cars, trucks, cooking, burning**

Current Study

- **Expanding Work in Initial Study**
- **Quantifying Carbon Source Contributions**
 - **Gasoline Vehicles**
 - **On/Off-Road Diesel Vehicles**
 - **Cooking, Fires, Other**

Study Status

- **Data Collection Complete**
- **Chemical/Data Analysis in Final Review**
- **Final Report – July 2004**

Information Sources

- **Las Vegas Valley Visibility and PM2.5 Study (DRI, Green/Chow, et al, May 2002)**

www.co.clark.nv.us/air_quality/studies.htm

- **Introduction to Visibility (William C. Malm, Nat'l Park Service, May 1999)**

www.epa.gov/air/visibility/introvis.pdf

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