



Air Quality Monitoring in Denali National Park & Preserve



Why monitor air quality in a park that is far removed from industrial and urban emission sources?

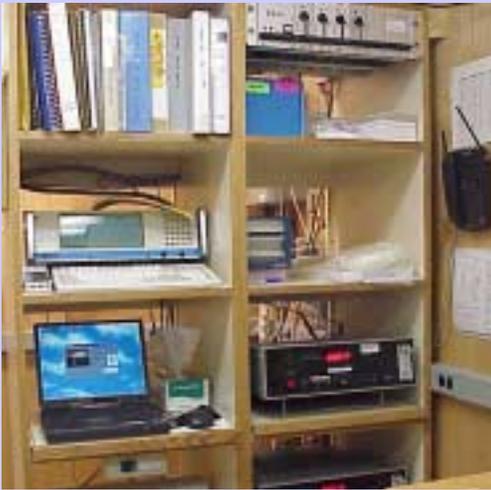


- NPS air quality monitoring is a nationwide program
- In the past, sample design has reflected regulatory objectives



Denali was selected as a monitoring site partly because it has Class I status under the Clean Air Act

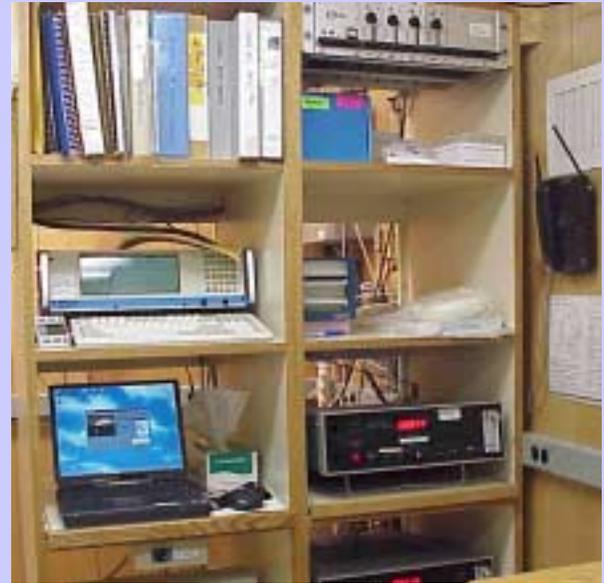
Air quality monitoring at Denali began in 1980



Monitoring Network Affiliations

- National Trends Network (NADP/NTN)
- Interagency Monitoring of Protected Visual Environments (IMPROVE)
- NPS ozone monitoring

- Clean Air Status and Trends Network (CASTNet)
- SHAW network
- PM 2.5 Federal Reference Method



- Network data is validated, archived, and summarized by network personnel
- Data summaries answer the following questions:
 - Does the site comply with the National Ambient Air Quality Standards?
 - How does this site rank among all sites in the network?

- What does this tell us about air quality in Denali?

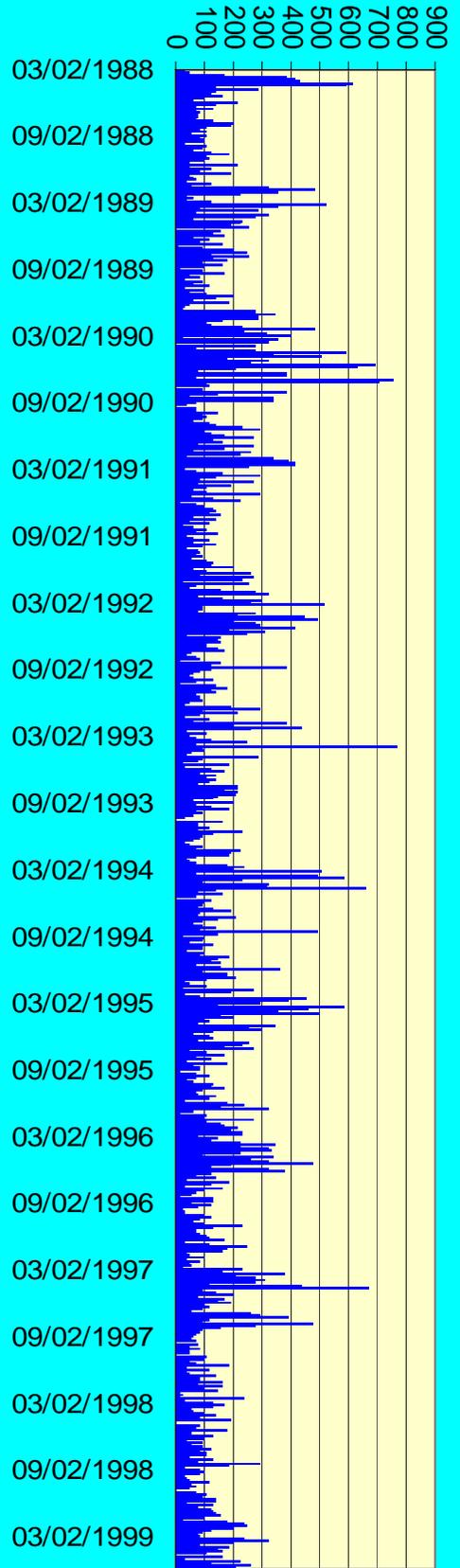
For those parameters monitored, Denali has exceptionally clean air

- What doesn't this tell us about Air Quality in Denali?

Why are there any human-caused pollutants at all, and where do they come from?

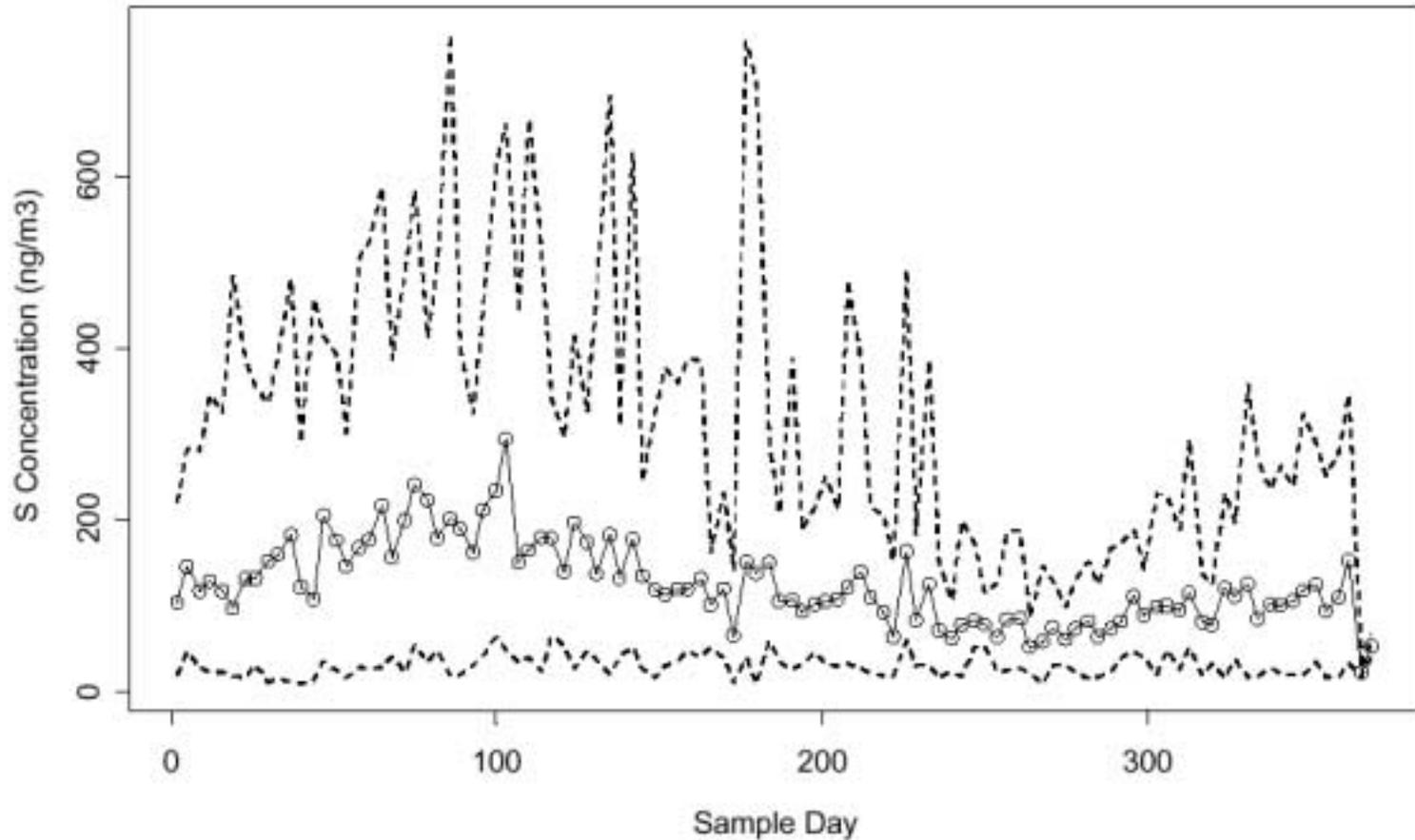
What about the airborne contaminants we aren't currently monitoring?

IMROVE sulfur data

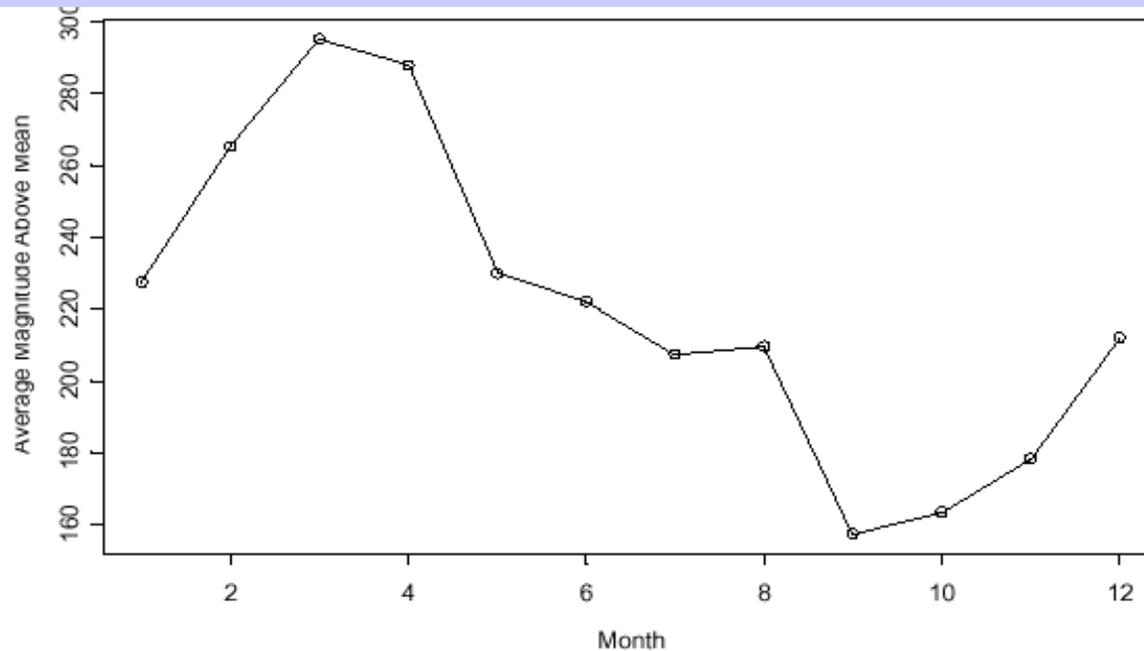
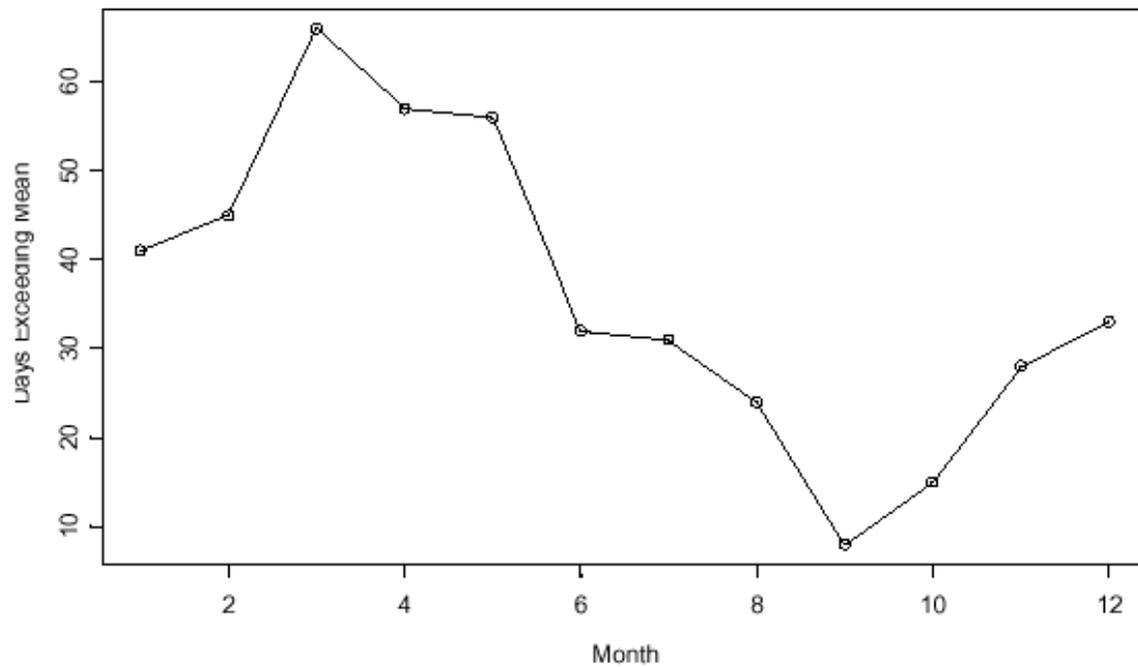


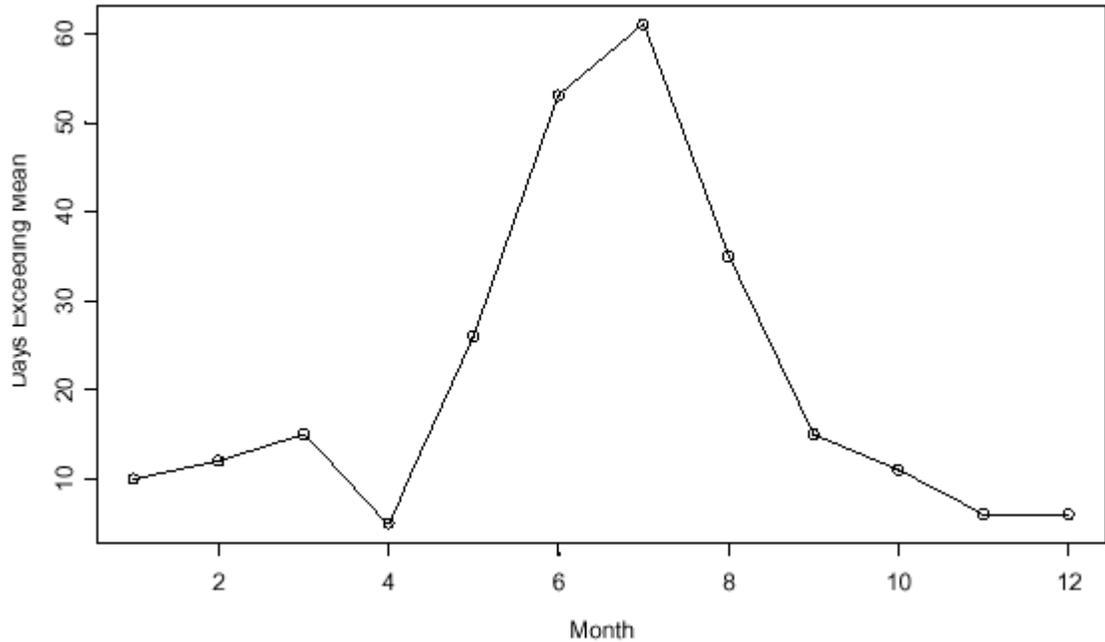
IMPROVE sulfur concentrations by day of the year (all years)

mean, maximum, and minimum values

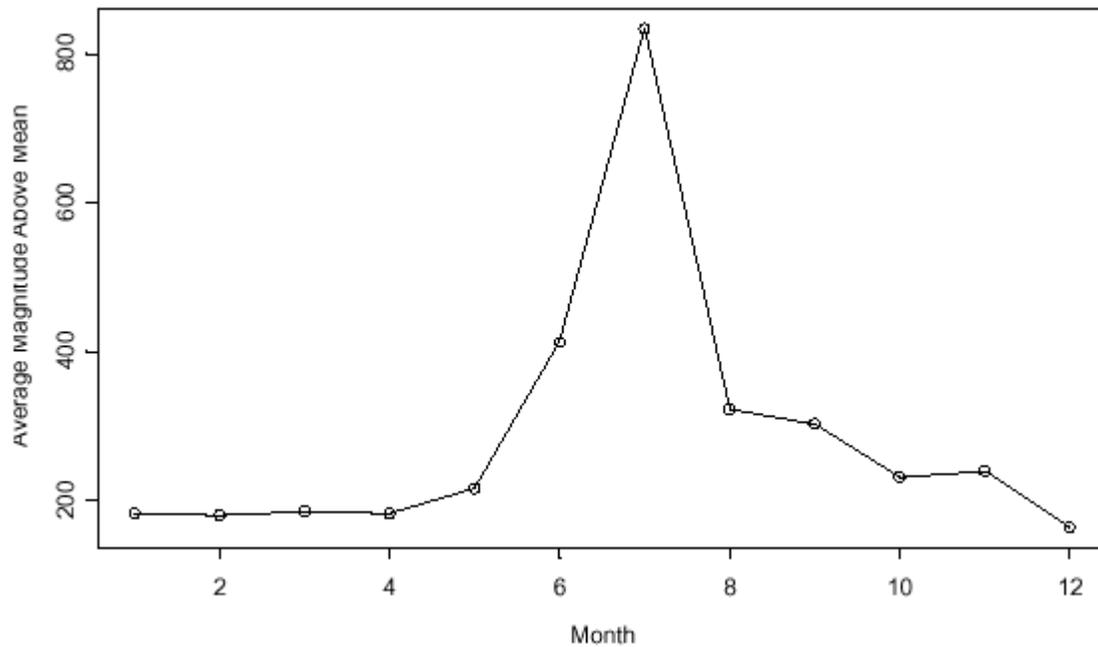


Sulfur shows a spring maximum

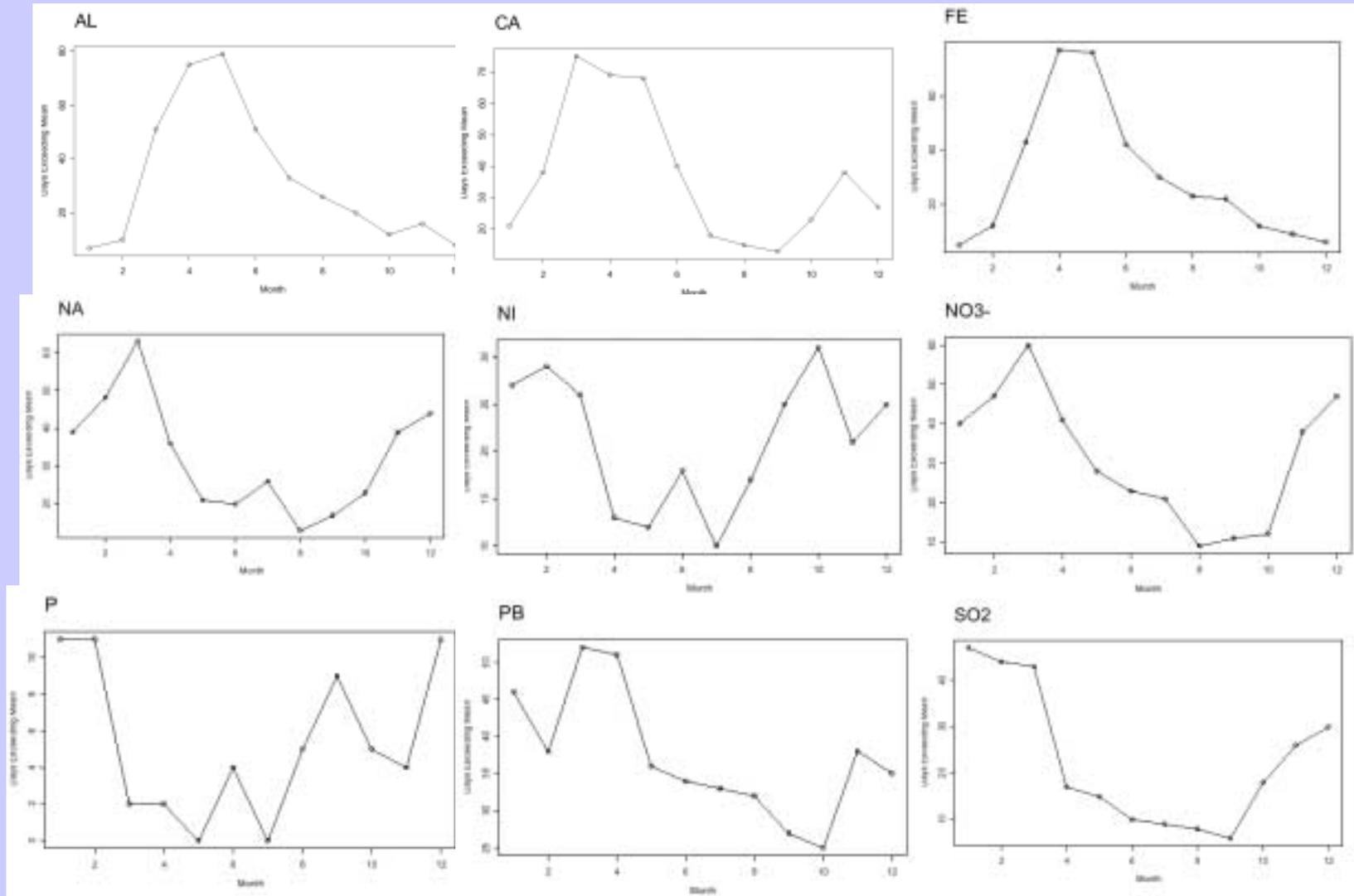




Carbon has
a summer
maximum



Many other parameters show peaks in the spring





- Seasonal patterns of industrial pollutant concentrations can be explained by well-studied long distance transport mechanisms such as Arctic Haze

- Arctic Haze and direct transport across the Pacific Ocean bring contaminants into arctic and subarctic ecosystems
- Industrial development in source areas will increase dramatically in the next several decades



Persistent organic pollutants (POPs)
are an emerging issue of concern for
arctic and subarctic ecosystems

POPs include:

- Pesticides such as DDT, chlordane, and toxaphene
- Industrial chemicals and byproducts such as PCBs, dioxins, and furans

Why POPs are so scary

- They bioaccumulate
- Arctic ecosystems are sink areas for POPs from mid latitudes
- PCBs can cause immune suppression, neurological and endocrine disorders, and probably cancer in humans and other mammals
- You already know why DDT is scary
- PCBs are passed to infant mammals through nursing



A little closer to home

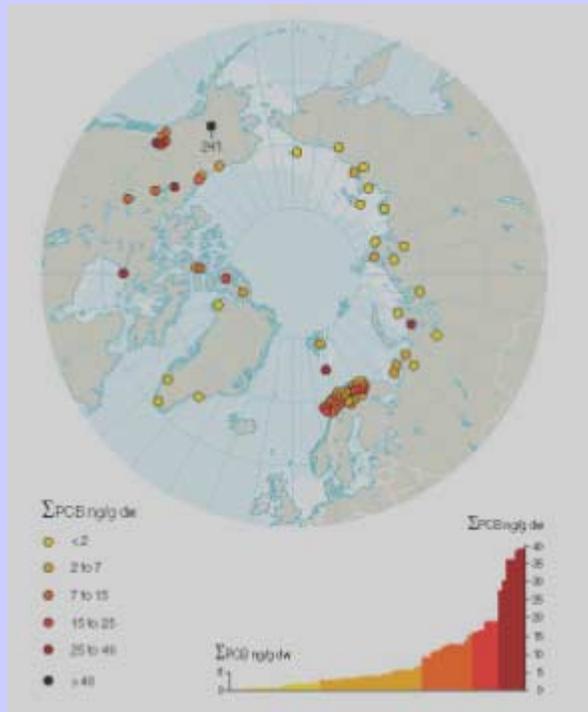


- DDT has been found in high concentrations in Aleutian bald eagles
- Orcas from southeast Alaska contain PCBs in higher than expected concentrations
- POPs are known to reach Alaska via atmospheric pathways
- Everyone in this room has measurable amounts of PCBs and DDT in their tissues

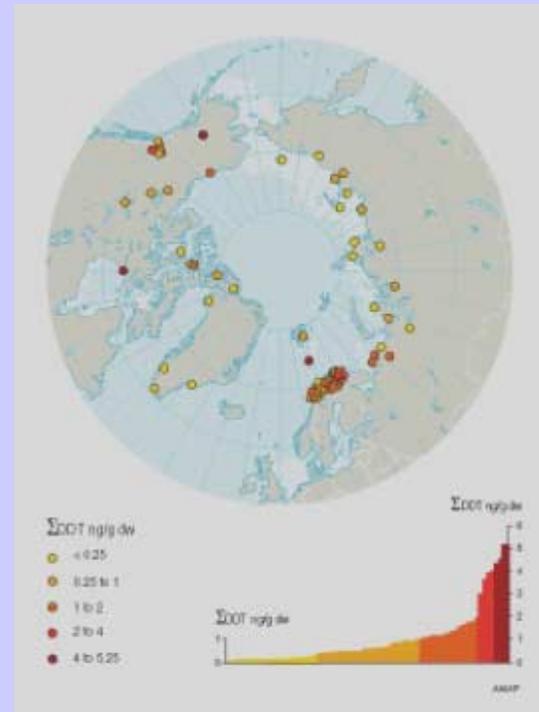
In a compilation of data from remote, high latitude lakes around the world, PCBs in Wonder Lake sediments were 6 times higher than any other lake (AMAP report, 1997)

DDT levels were also high, and could be attributable to atmospheric deposition alone

PCBs



DDT



A Vote for Optimism



- The Interior Department is at the table for international POPs treaty negotiations
- If POPs are added to the suite of parameters measured by the NPS, data from Denali and other Alaska parks can make a difference
- Interpretation and education get the public involved