IMPROVE Data and RHR Metrics

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Scott Copeland
Colorado State University/USDA Forest Service
scott.copeland@colostate.edu
IMPROVE Data and Network

- Latest IMPROVE data delivered is December 2021. Expect 2021 sample year to be complete and RHR metrics delivered in December.
- First meeting of data analysis workgroup convened 3/3/2022
- Still a number of FS sites that are offline for a various reasons, no operator, inaccessible location, etc.
Regional Haze Maps and Metrics

- Impairment metrics here: 
  https://drive.google.com/drive/folders/0Bxfj1vyyXeDYWVpeUo4NEYtTU0?resourcekey=0-d0Bn5HHHEkgbiHZvIQWaLQ&usp=sharing

- Haziest Day metrics here: 
  https://drive.google.com/drive/folders/0Bxfj1vyyXeDYTjNLelIwUUx0TTg?resourcekey=0-yt0EY9maDLhRmcE8s5tC6A&usp=sharing

- History of RHR metric changes since 10/2019. 
  https://docs.google.com/presentation/d/1dxFgURBPRUXYq_hkKKpQtdleCW7OWamo/edit?usp=sharing&ouid=116534812255078445612&rtpof=true&sd=true
Signal to Noise
Components of an Impairment-based Approach

1) Split each day of IMPROVE data into natural and anthropogenic extinction components

2) Sort: Several visibility indicators to identify the “worst” days:
   a) Current Approach = Total haze
   b) Perceptible Anthrop. Impairment Approach = dy/Total - dy/Part

3) Select the 20% most impaired days

From Brett Gantt EPA OAQPS
• Our inference of human caused pollution is analogous to determining the weight of groceries from weighing the bag with the groceries in it.
• When the bag is full such that contents well outweigh the bag itself, then this results in small error. (high signal, low noise)
• When the bag weighs as much or more than the contents, then resulting uncertainties can be large. (low signal, high noise)
Bag weighs more than contents...
Algorithmically Split Aerosol Extinction - IMPROVE Sites

2019 Non Rayleigh 20% Most Impaired Days

[Map of the United States showing aerosol extinction data with circles proportional to area indicating human and non-human caused aerosol extinction.]
Algorithmically Split Aerosol Extinction - IMPROVE Sites
2019 Non Rayleigh 20% Most Impaired Days

2028OTBa2 Average Light Extinction by Sources - Most Impaired Days
AmmSO4, AmmNO3, OMC, EC, CM, Soil, SeaSalt - Maroon Bells-Snowmass W, West Elk W, Eagles Nest W, Flat Tops W (WHRI1)

Total Non Rayleigh Extinction is Proportional to Area of Circles

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Algorithmically Split Aerosol Extinction - IMPROVE Sites

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Total Non Rayleigh Extinction is Proportional to Area of Circles

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Clearest Days
Algorithmically Split Aerosol Extinction - IMPROVE Sites
2019 Non Rayleigh 20% Clearest Days

Map of the United States showing IMPROVE sites with circles indicating aerosol extinction levels. The size of the circle is proportional to the area, representing the total non-Rayleigh extinction, and the color indicates human-caused or non-human-caused aerosol extinction. The legend is as follows:
- 21 Mm⁻¹
- Non Human Caused Aerosol Extinction
- Human Caused Aerosol Extinction

Total Non Rayleigh Extinction is Proportional to Area of Circles.

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Uniform Rate of Progress
Uncertainty in this default endpoint is significant but is often dwarfed by international and prescribed fire.