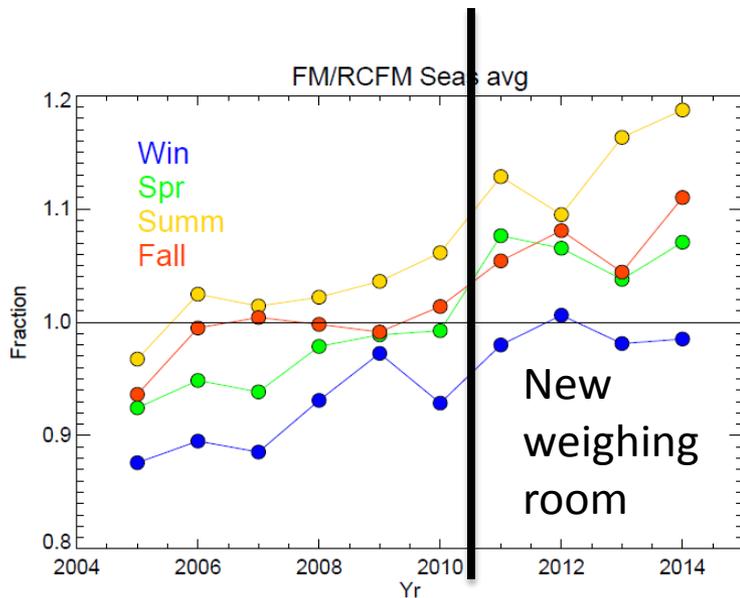# IMPROVE Research/Reporting Priorities

Recap: Problems in PM2.5 and Assumed Aerosol Components

FM/RCFM Seas avg

Win
Spr
Summ
Fall

New weighing room

- PM weighing room RH is high (>60%) during summer
- **Organic multiplier (Roc) maybe trending higher and likely seasonal**
- Soil equation is lower bound and its PM2.5 fraction is increasing

Implications:
1. Trending Roc would change the relative contributions of organic mass, impact estimated b_{ext} and implied source contributions (thus RHR)
2. Measured PM2.5 is not FRM and excess water complicates its use in data analyses

Recap: Problems Reconstructed b_{ext}

- Changing relationship between measured and reconstructed b_{ext} using IMPROVE Eq II

The tuning years
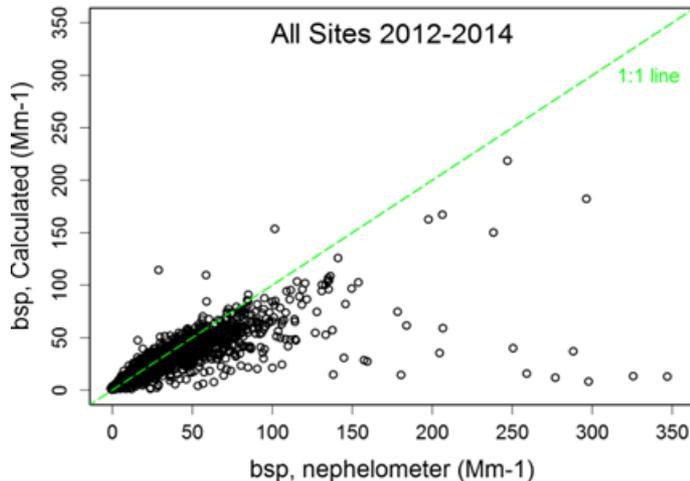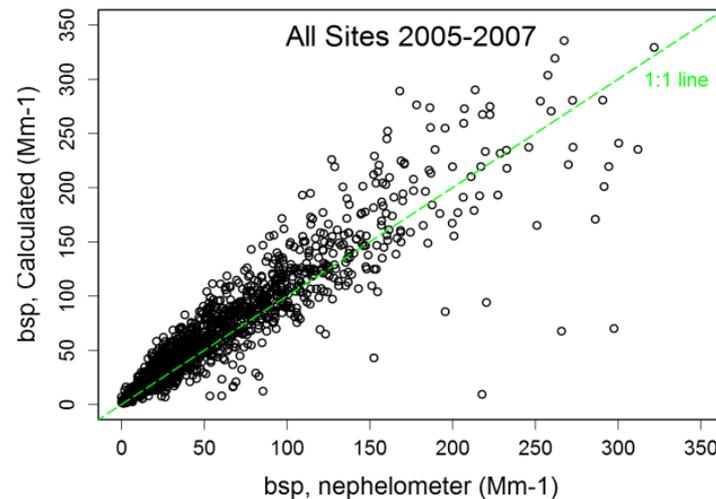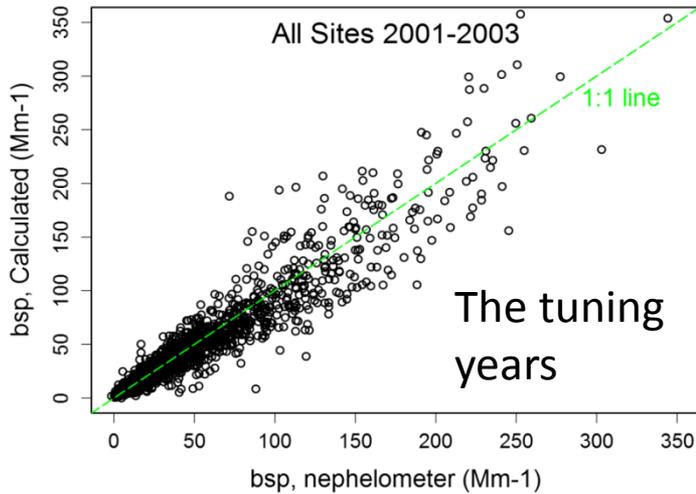
- Concentration dependent bext eff.
  - Demonstrated in a number of studies, but best fit recon. b_{ext} equations differ
- Roc factor, Organic hygroscopicity
- Soil equation

Implications

Great Smoky Mtn, ammonium sulfate
conc and bext - 20% Haziest days

The concentration dependent b_{ext} eff. results
in ammonium sulfate b_{ext} about 25% lower
than assuming constant bext efficiencies.
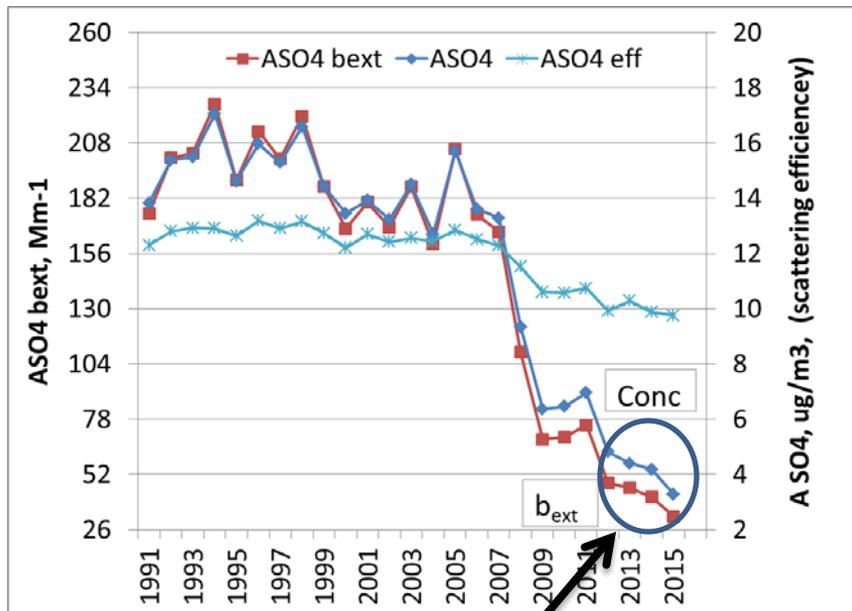
- Evidence suggests that the contributions of organics to b_{ext} are underestimated due to increased Roc and missing OM hygroscopicity

- The concentration dependent b_{ext} efficiencies may be leading to artificial decreases in reconstructed b_{ext} and changes in the b_{ext} budgets

Recap: Changes in RHR tracking metric

- Changing how we sort the IMPROVE data impacts:
  - Baseline haze
  - Current haze
  - 2064 target
  - Glide path

Impairment Metric at Sawtooth Wilderness
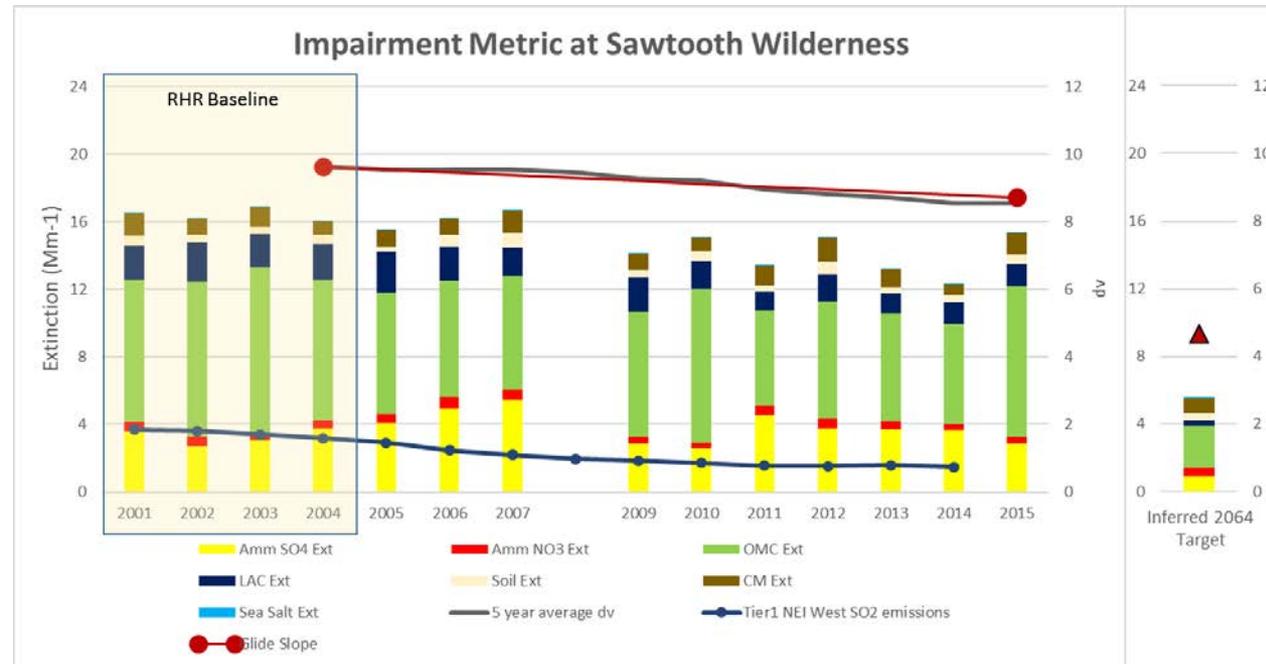
- In the west, this decreases the importance of carbonaceous and dust aerosols and increases the importance of sulfates and nitrates
- East is still sulfate dominated

Implications

- The relative contribution of sulfate, nitrate, organics, etc. potentially affects "long term strategies" and eventual progress

- Everything in the RHR tracking metrics is new. This provides a unique opportunity to change all aspects of progress tracking with minimal impact on State's SIPS and workload

- Tight timeframe - SIPS due in 2018 but likely extended to 2021.

Priorities – What to Focus on?

- 3rd IMPROVE Algorithm
  - We have potentially important biases….
  - Influences all aspect of RHR tracking metrics as well as development of long term strategies
- Average haze natural conditions III
  - Routine fraction of daily natural conditions
  - 2064 target value
- Automated data substitution for reconstructing b_{ext} with incomplete data
  - Salvage site-years with incomplete data
- Quantitative RHR metric uncertainty model

Priorities – Next IMPROVE Report

- Objective: Provide overview of latest IMPROVE data; new research results; regional haze rule metrics
  - Spatial and temporal patterns:
    - Speciated PM components
    - Contributions of PM components to haze
  - New research analyses using IMPROVE date
    - Sulfate and organic trend relationships
  - FTIR
  - TOR/TOT e.g. new analyzers and other advancements
  - Proposed/new RHR tracking metric spatial and temporal patterns and implications
  - New QA/QC activities
- A modified IMPROVE Eq could impact the content of the report

IMPROVE Eq III

- Needs/Issues:
  - 1) understand and quantify Roc in space and time
  - 2) new soil equation?
  - 3) new split component bext efficiency relationships
  - 4) organic f(RH) function

- Ultimately the reconstructed b_{ext} is generated empirically from regression analyses based on aerosol component concentrations.
  - Suggests that getting Roc right should be a top priority
  - Getting soil right is important but it's smaller fraction of bext relative to OM makes it less pressing

Focus on organic carbon Roc factor?

- J. Hand outline:
  - Is there really evidence for a changing Roc factor?
  - If so, is it analytical or atmospheric?
  - If atmospheric what is the new value and why?

- Cold store quartz filters?
- Cold store Teflon when ftir is done?