

Sulfite in Winter AIRMoN Samples

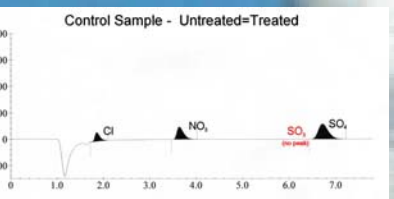
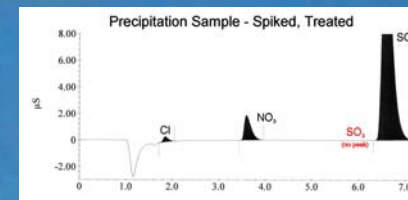
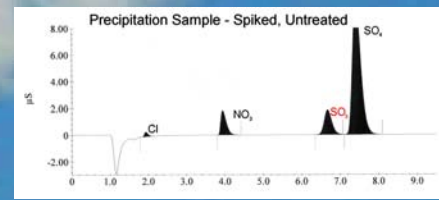
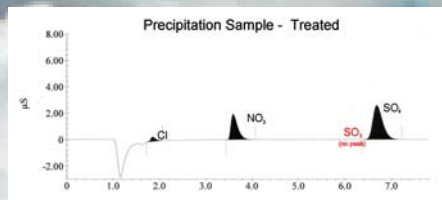
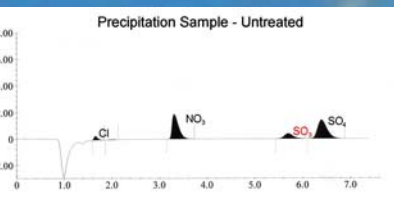
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Champaign, IL 61820

THIS IS WHAT THEY SAID....

When comparing concentrations, NTN measures 10 to 20 percent higher sulfate than AIRMoN in the field. This may be due to a more complete conversion of sulfite to sulfate, while the NTN samples are analyzed in the field."

Gilliland, Butler, & Likens. 2002. *Atmospheric Environment*. 36:5197-5206

THIS IS WHAT WE OBSERVED....

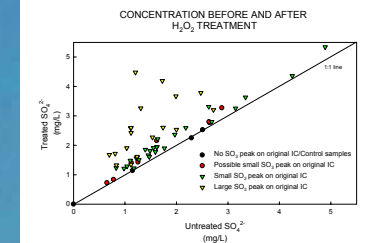


THIS IS WHAT THE NETWORKS TELL US...

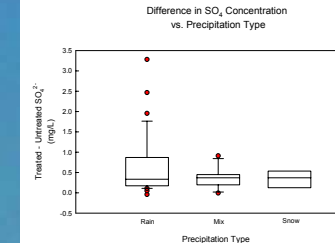
A Case Study

| Sample Dates | AIRMoN SO ₃ ²⁻ Deposition (µg) | Treated | NTN SO ₃ ²⁻ Deposition (µg) |
|--------------|--|---------|---|
| 10 - 11 Dec | 1502.9 | 3752.8 | |
| 11 - 12 Dec | 517.5 | 774.4 | |
| 12 - 14 Dec | 1027.2 | 2843.0 | |
| Total | 3047.6 | 7370.2 | 6468.1 |

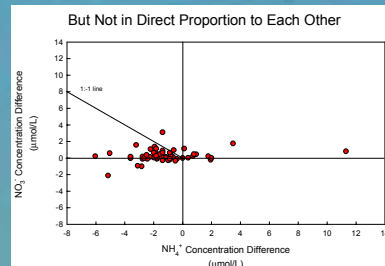
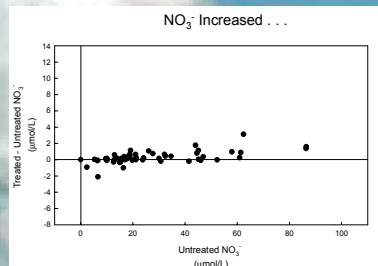
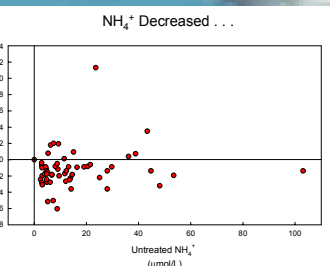
THIS IS WHAT THE SAMPLES TELL US...



THIS IS WHAT THE PRECIPITATION TELLS US...



THESE ARE THE SIDE EFFECTS WE FOUND....



THIS IS WHAT WE CONCLUDE....

There were specific patterns in the samples containing SO₃²⁻

- FL18 was the only AIRMoN site to have no samples with SO₃²⁻
- 30% of the samples collected at TN00 contained SO₃²⁻
- Colder sites, such as VT99, had very few samples with SO₃²⁻
- Few samples that contained frozen precipitation had SO₃²⁻
- The concentration differences ranged from 3-272%

The study did show some side effects in treating precipitation samples with hydrogen peroxide:

- Ammonium concentrations decreased in samples treated with hydrogen peroxide.
- Nitrate concentrations increased in samples treated with hydrogen peroxide.
- There was no direct correlation between the ammonium concentration decrease and the increase in nitrate concentration.

THESE ARE SOME OF OUR OPTIO

- Do Nothing
- Sites send refrigerated samples to the CAL
 - Samples analyzed for SO₄²⁻ without analyzing SO₃²⁻
- Do Something
- Split samples at the CAL and treat split with H₂O₂
 - Treating samples at the CAL without splitting
 - Treat samples at the sites before shipping to the CAL
 - Measure SO₃²⁻ at the CAL with no stabilization or conversion
 - Split samples in the field and stabilize split for SO₃²⁻
 - Split samples in the field and treat split with H₂O₂