

Size Distribution Measurements of Seeding Nuclei

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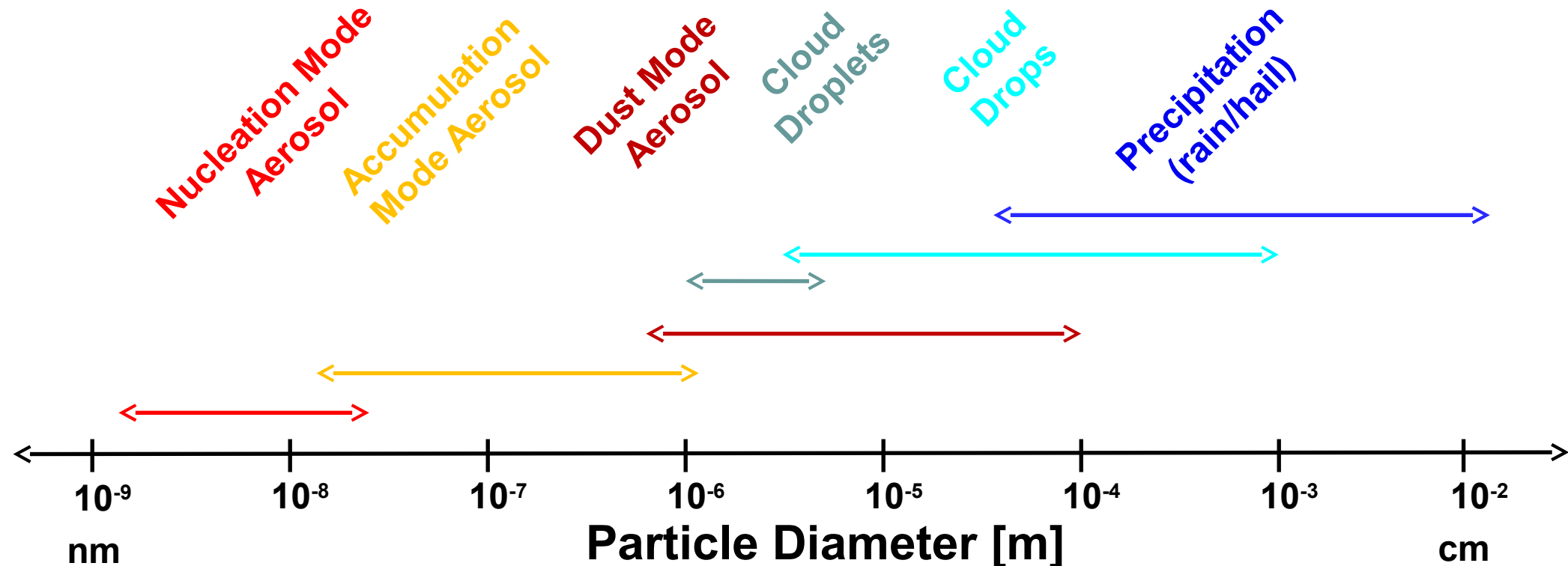
²Weather Modification Inc.

Atmospheric Particle Background

Atmosphere contains particles of all sizes.

Suspended particles (aerosols) move with the average flow of gas molecules (atmospheric wind).

Large particles (dust/drops/rain) have sufficient inertia to move independently of the wind.



Objectives

- Evaluated the latest sampling instruments.
- Determine the peaks in the size distribution measurement of seeding nuclei.



Particle Sampling

Shared
Inlet

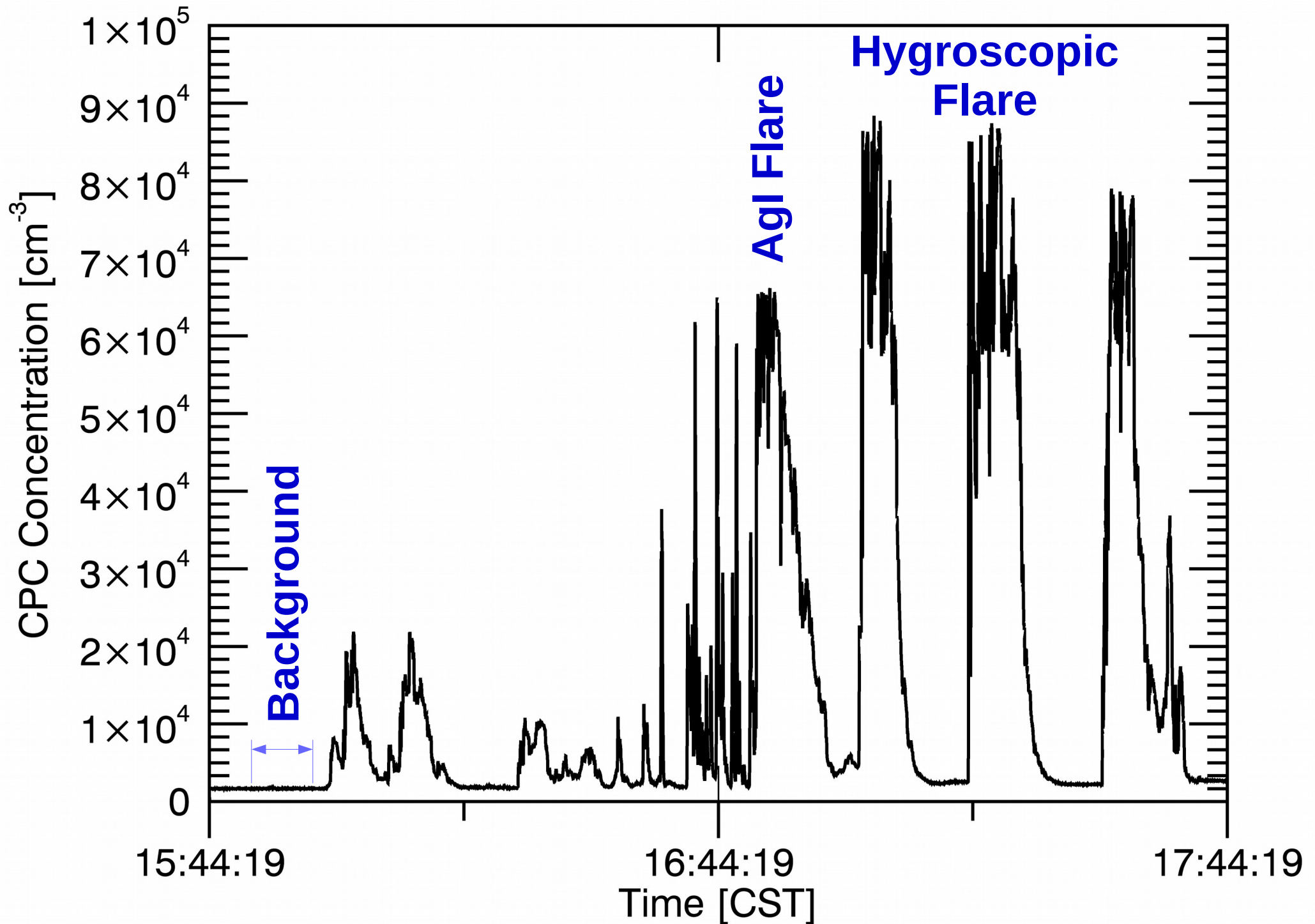
APS
(0.5-20 μm)

SMPS
(10-500 nm)

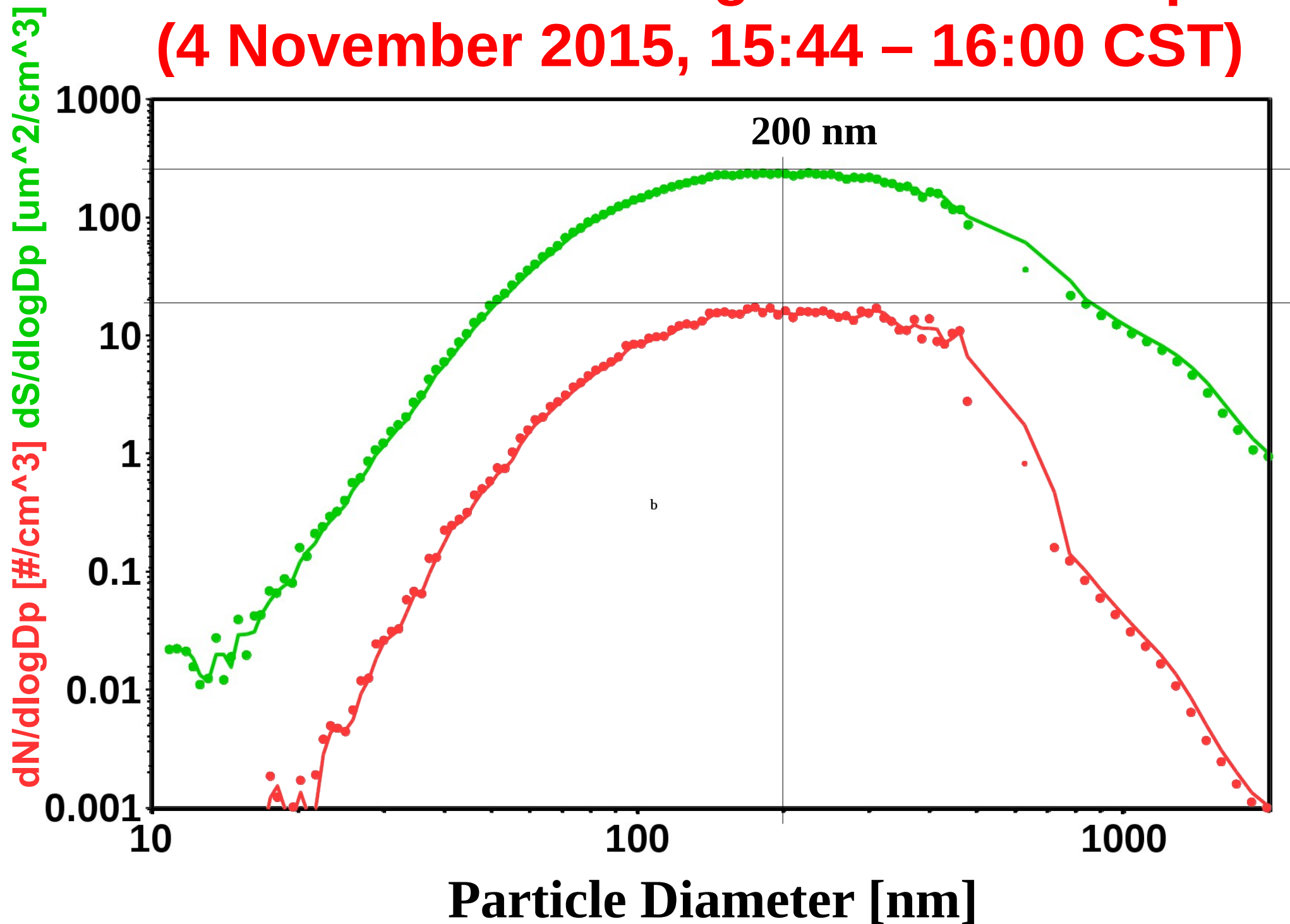
CPC
(> 10 nm)



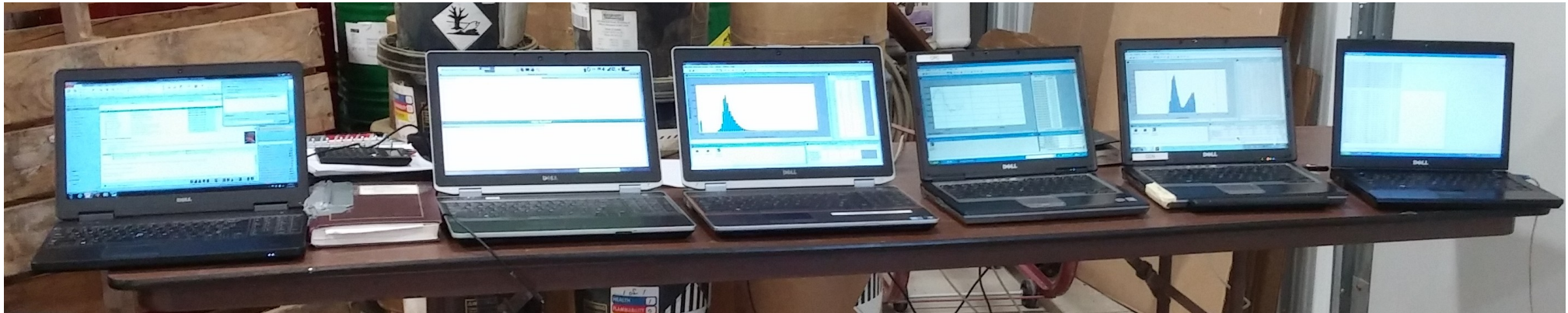
CPC Time Series: 4 November 2015



North Dakota Background Air Sample (4 November 2015, 15:44 – 16:00 CST)

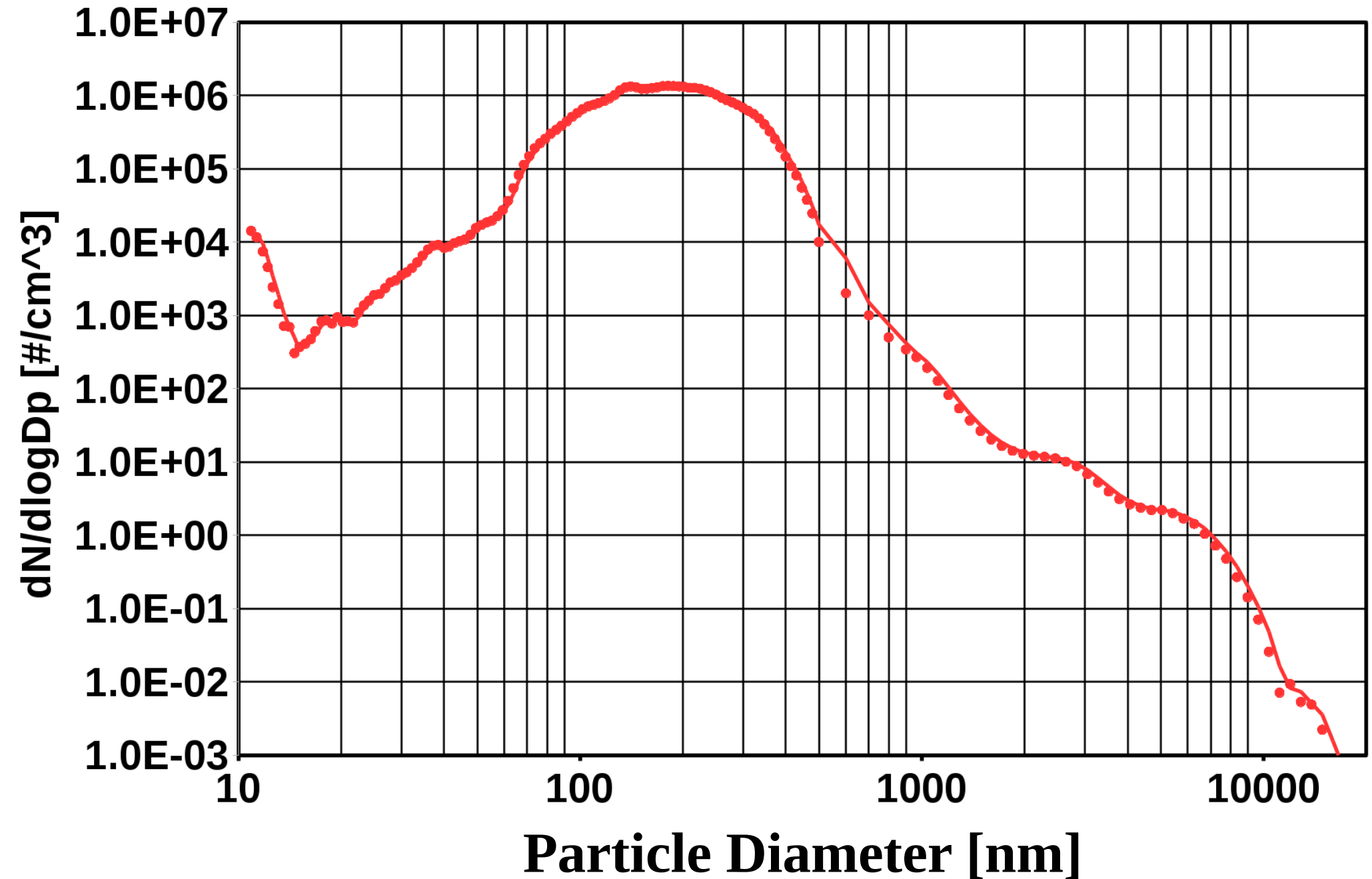


Particle Measurements



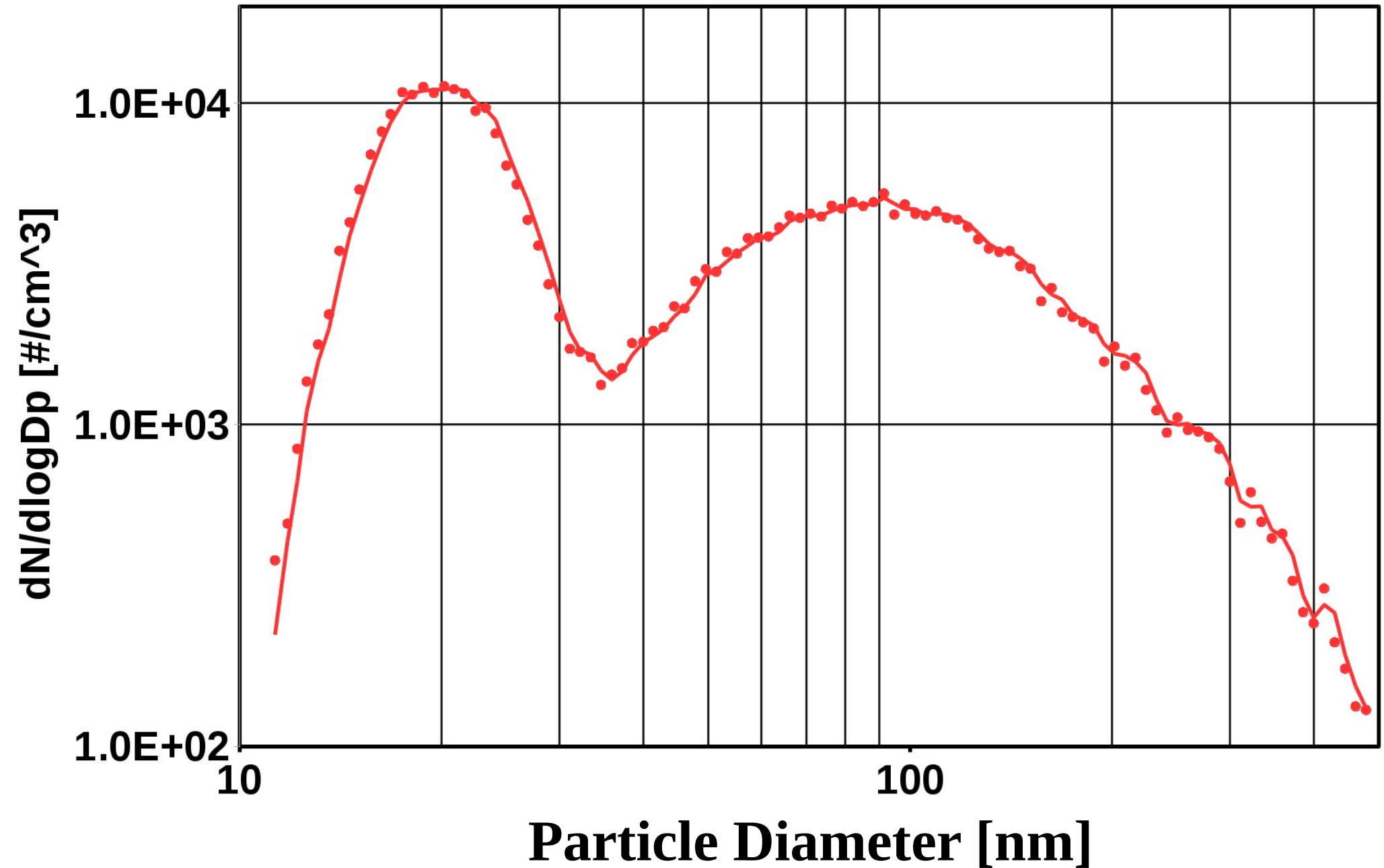
Hygroscopic Flares

(4 November 2015, 17:15:48 – 17:18:03 CST)



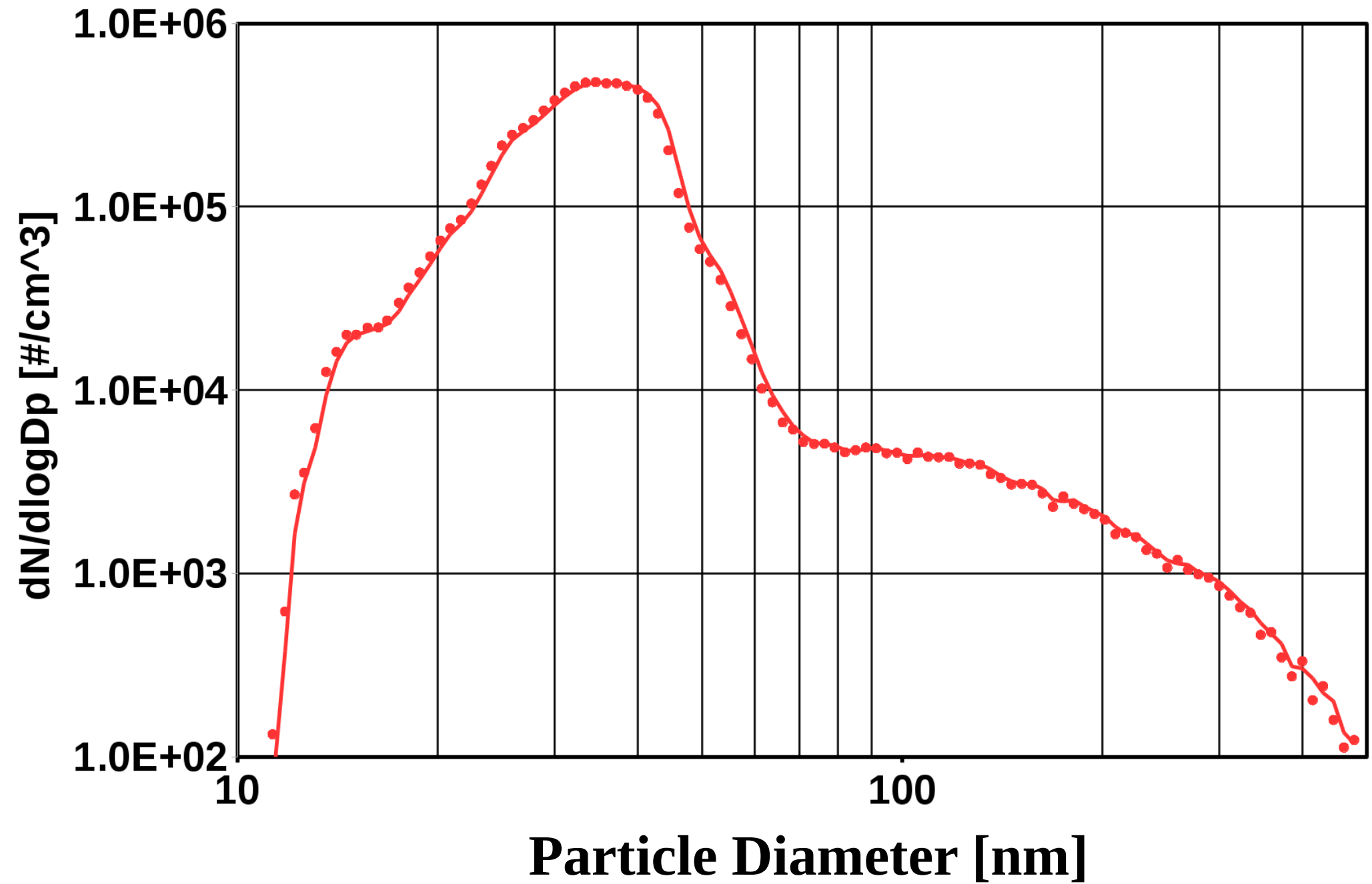
Ground Generator

(4 November 2015, 13:53:40 – 13:54:59 CST)



Agl Flare

(4 November 2015, 16:48:48 – 16:51:05 CST)



Conclusion

- Only accumulation mode aerosols are evident in November North Dakota size spectrum.
- Hygroscopic flare size spectrum are difficult to measure because of the large size range of particles.
- Ground generator size spectrum peak is at 20 nm.
- AgI flare size spectrum peak is at 35 nm.

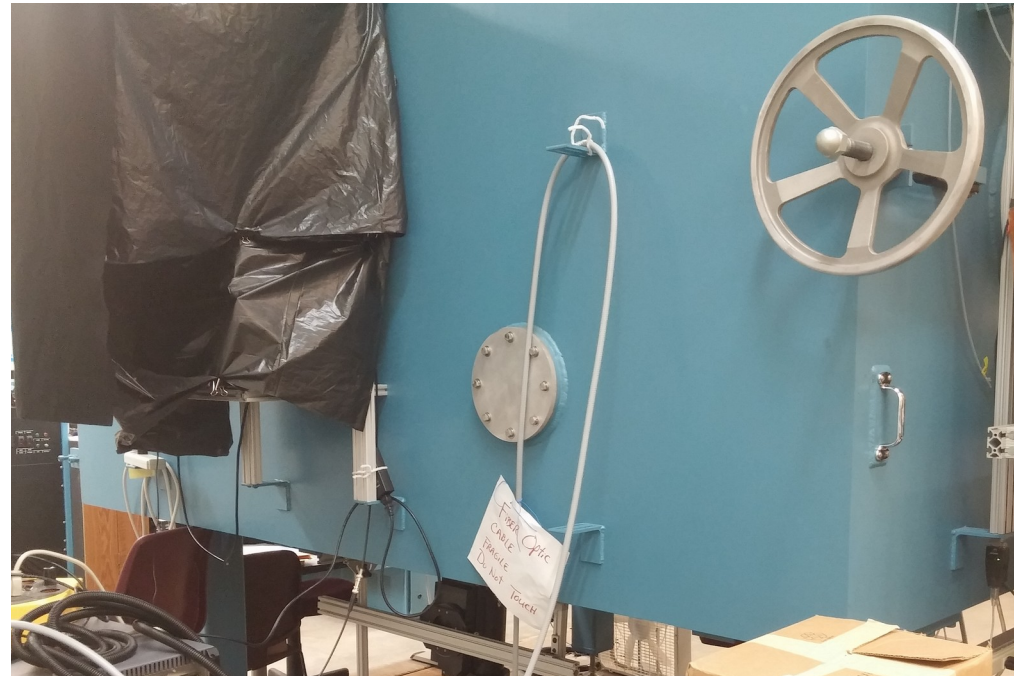


Future Work

- Controlled Tests of Particle Size & Composition
- Effects of Particles
 - Changes in Particles with Time
 - Effects on Clouds



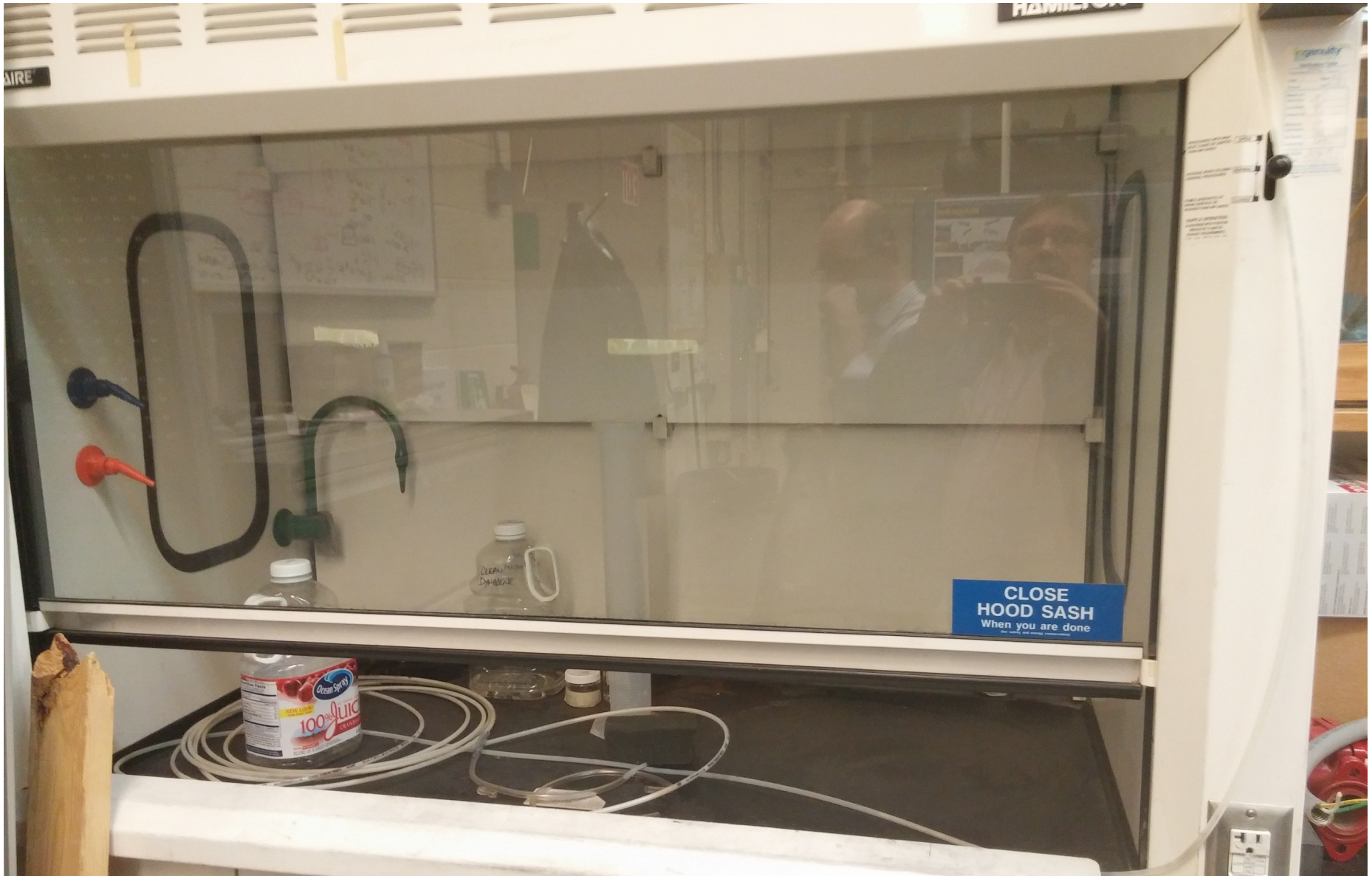
UND Aerosol Chamber



MTU Cloud Chamber

Burning Flares in Fume Hood

Ducted fume hoods has air drawn in the front side of the cabinet and vented outside the building.



Outside

- Long Samples Lines
- Need to Reserve Space
- People Asking, What is going on?



Flare Burning System With Particle Dilution

