



Aerosol Remote Sensing

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Aerosols

BACKGROUND

Aerosols are solid or liquid particles suspended in the atmosphere. They are produced from both anthropogenic and natural sources. In order to truly understand global warming, it is crucial that we evaluate the role aerosols play in climate change. Aerosols are highly varied in size, composition, and lifetime and this makes it extremely hard to quantify their cooling effect, which is comparable in magnitude to the warming effect of greenhouse gases.

Various remote sensing instruments, like the polarimeter and sunphotometer retrieve information about aerosol properties—their refractive index (composition), radius (size), and tau (optical depth, concentration).



Aerosols

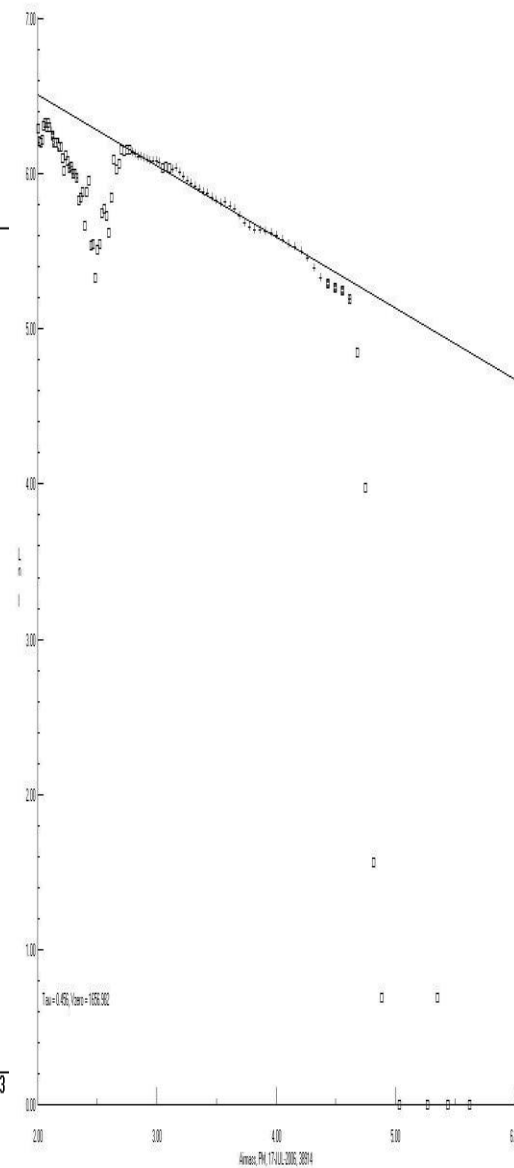
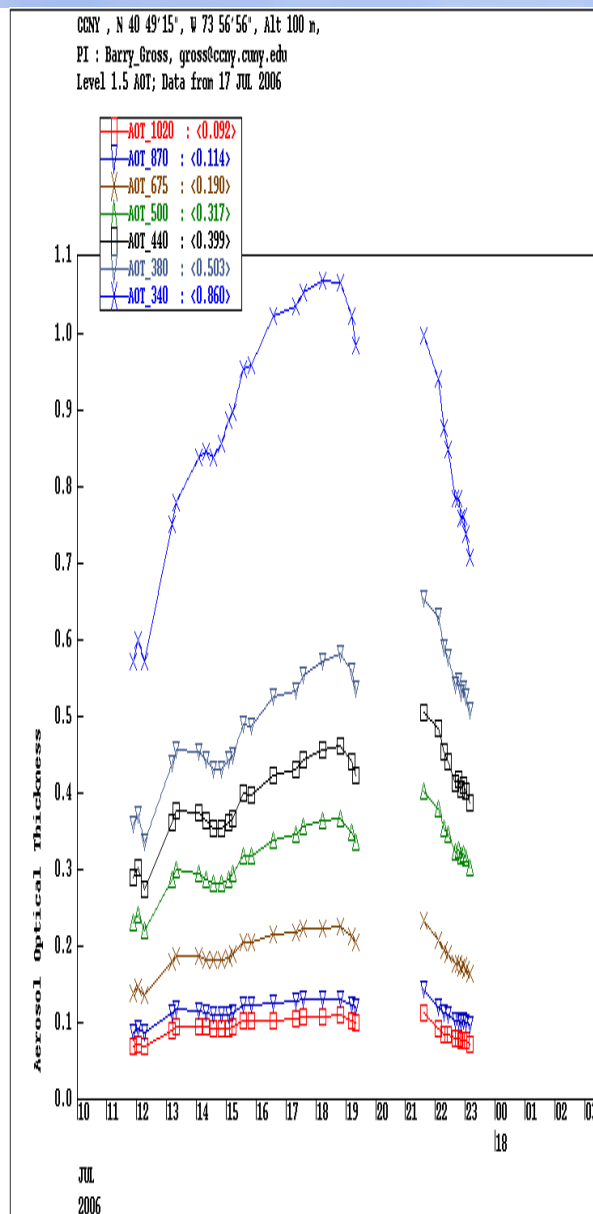
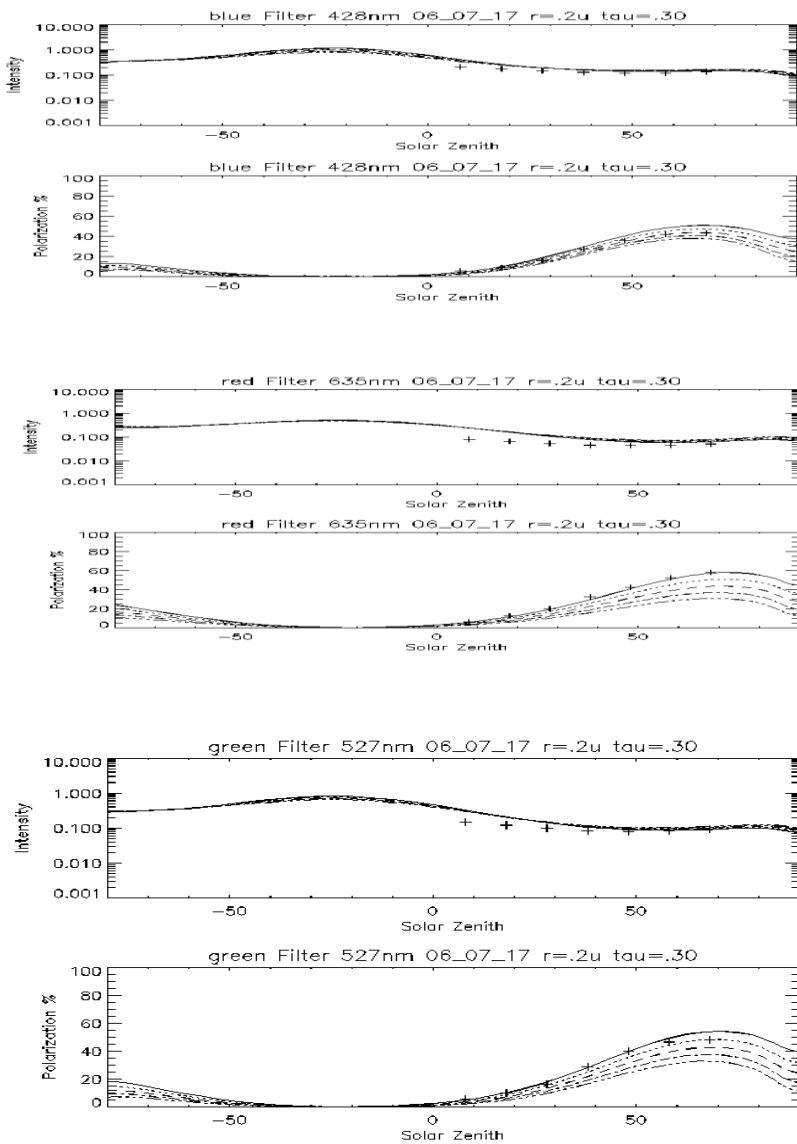
MY PROJECT

This project involves the use of a **hand-held polarimeter**, a **rotating shadowband radiometer**, and a **CIMEL sunphotometer**. By analyzing the data from all three ground instruments accurate values for the optical depth, the size, and refractive index of the aerosols can be obtained. Such information will be used by scientists to develop better computer models which make predictions about future climate change.



Data Analysis

Aerosols



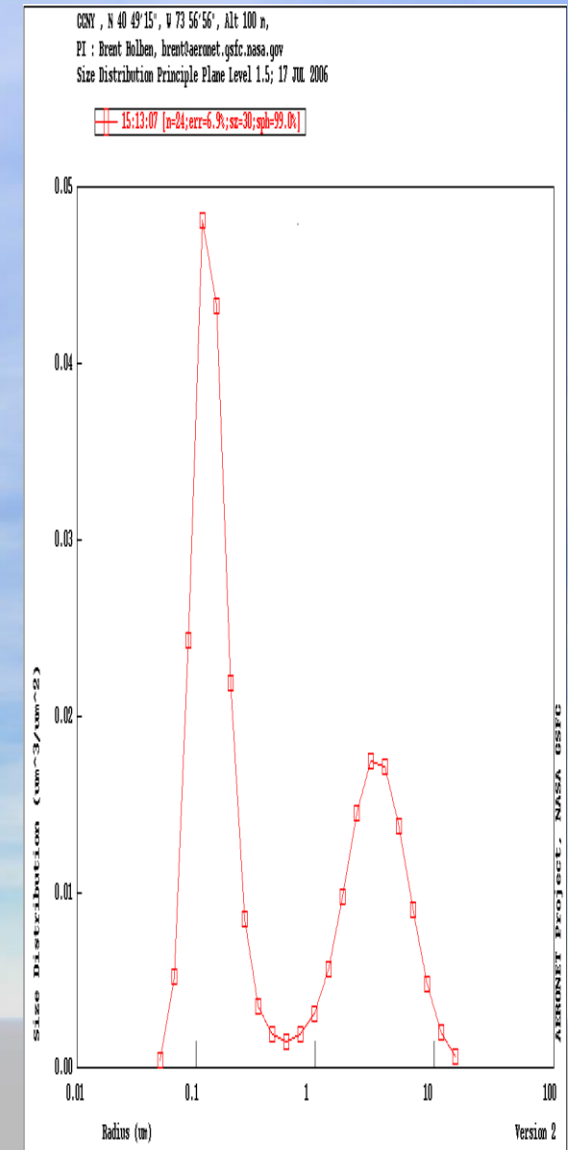
Aerosols

CONCLUSIONS

- Both the data from the LaGuardia Community College MFR and the hand-held polarimeter seem to confirm the data from the CIMEL at CCNY, since all instruments measured a tau near .30.
- On July 17, as shown by the CIMEL radius plot, most of the aerosols were comprised of either two sizes: .1 (fine) or 5 (coarse) microns. Since the polarimeter cannot account for these coarse aerosols due to its being monomodal, variations existed in the data for each of the color wavelengths. This is also why an exact refractive index could not be obtained but instead approximated at a range of 1.35-1.45.

FUTURE PROJECTS:

- Bimodal polarimeter data analysis program
- PDA (new Java program)
- GLORY Mission (comparing our data to the 2008 launched satellite)



References and Additional Acknowledgements

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- Brian Cairns