Measurements of Aerosol Optical Thickness from Ships, the AERONET, and SeaWiFS

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Activities

- develop and deploy Fast-Rotating Spectral Shadow-band Radiometer (FRSR)
- collect and analyze ship-board FRSR and Microtops data
- analyze AERONET and SeaWiFS match-up data
- use above to validate atmospheric correction algorithms

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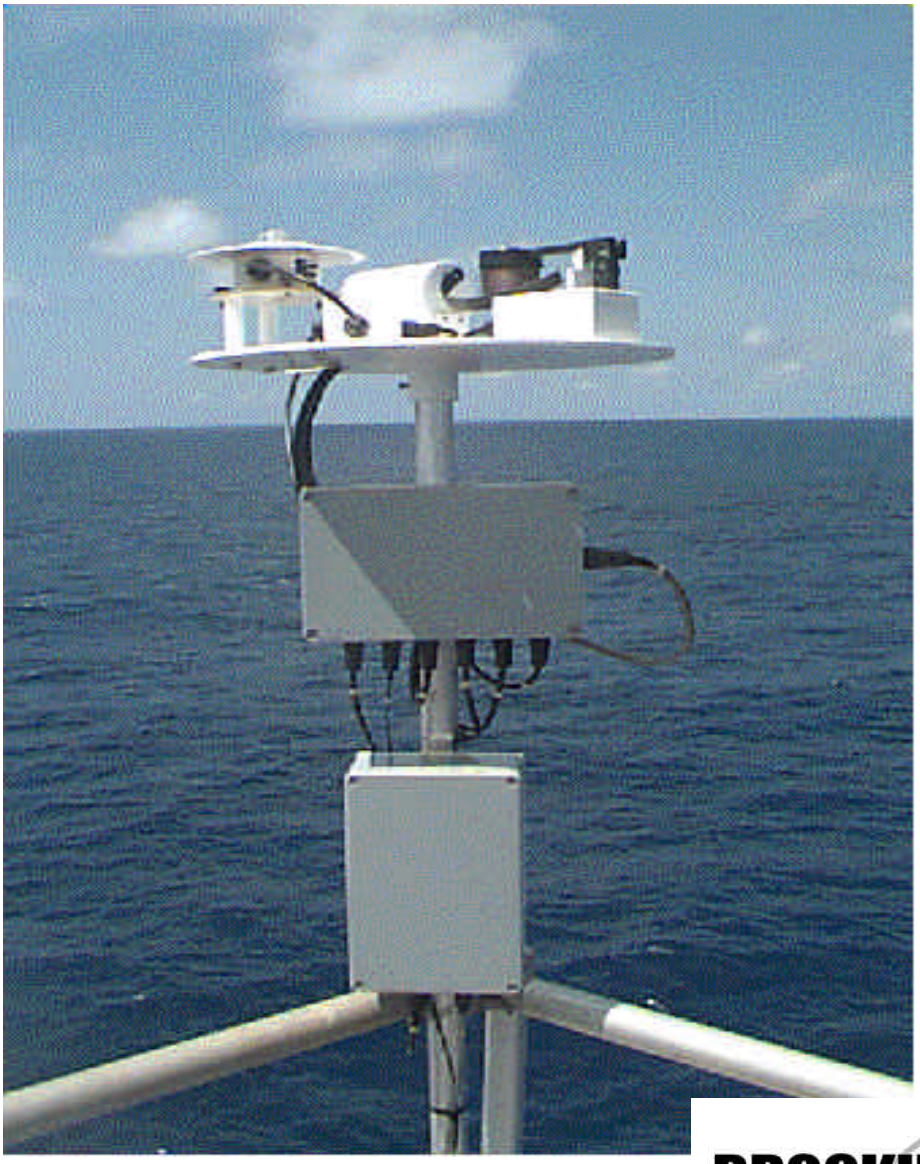
Fast-Rotating Spectral Shadow-band Radiometer (FRSR)



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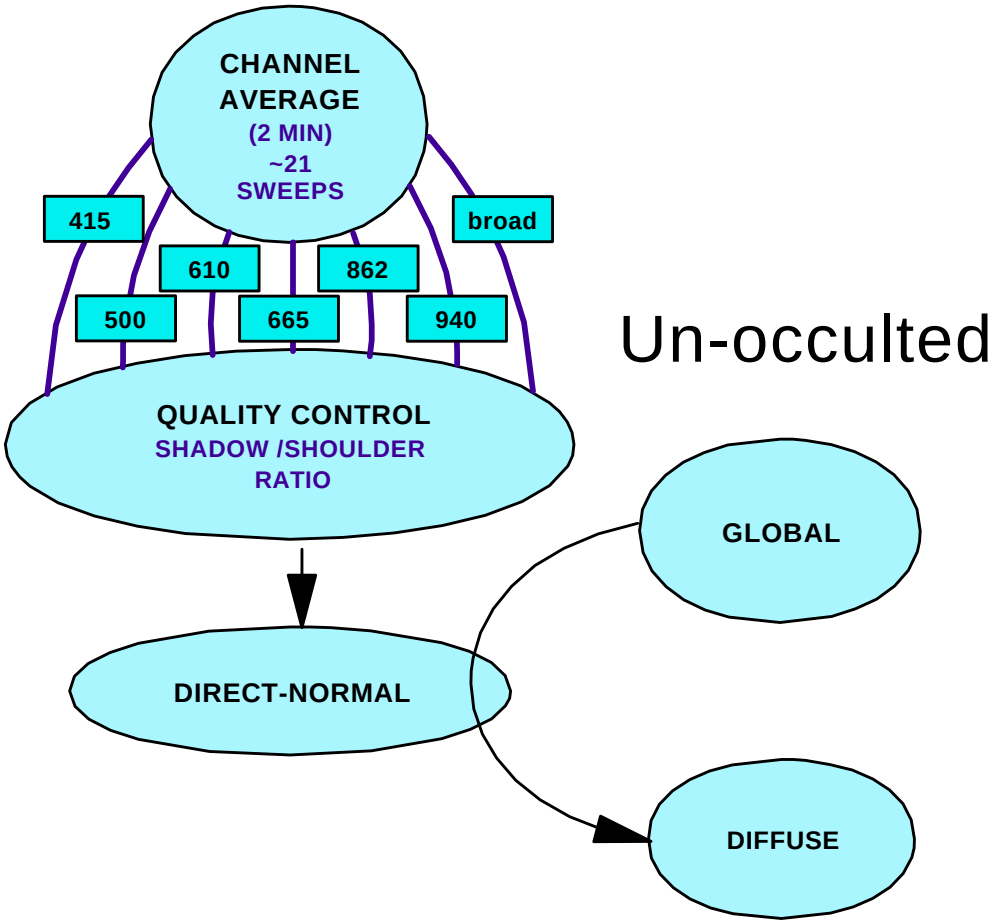
FRSR Signal Processing

Sweep over Detector



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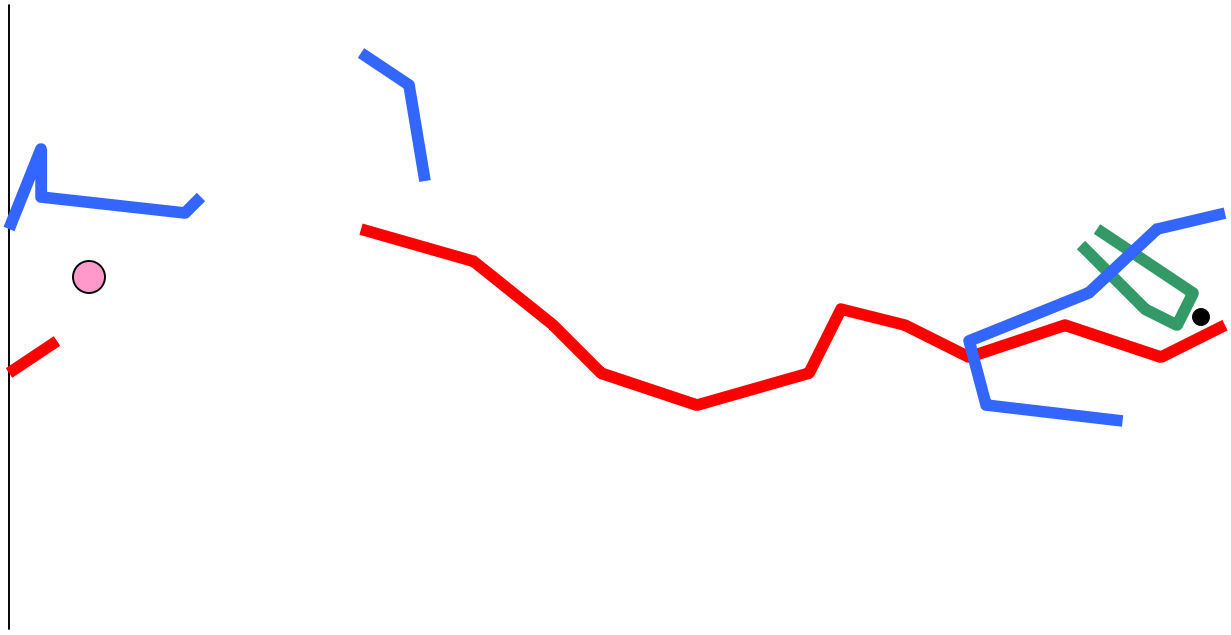
Ship Deployments of FRSR and Microtops



- AEROSOL / INDOEX
- NAURU-99 (3)
- U of Miami M-Aeri Cruises
- *18 weeks+ on Ron Brown*
- *6 weeks on Mirai (Japanese)*
- *10 weeks on USCGC Polar Sea*
- *8 weeks on Pierre Raddisson (Canadian)*
- *4 weeks on Island of Nauru*

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Mauna-Loa Calibration

- all four FRSRs
- *unit used during AEROSOL, INDOEX, JASMINE, AND NAURU-99 shown to be well calibrated through the period*
- 5 Microtops
- *SIMBIOS unit 3771 has held calibration*
- *pressure sensors are sporadic*
- motion-effects study

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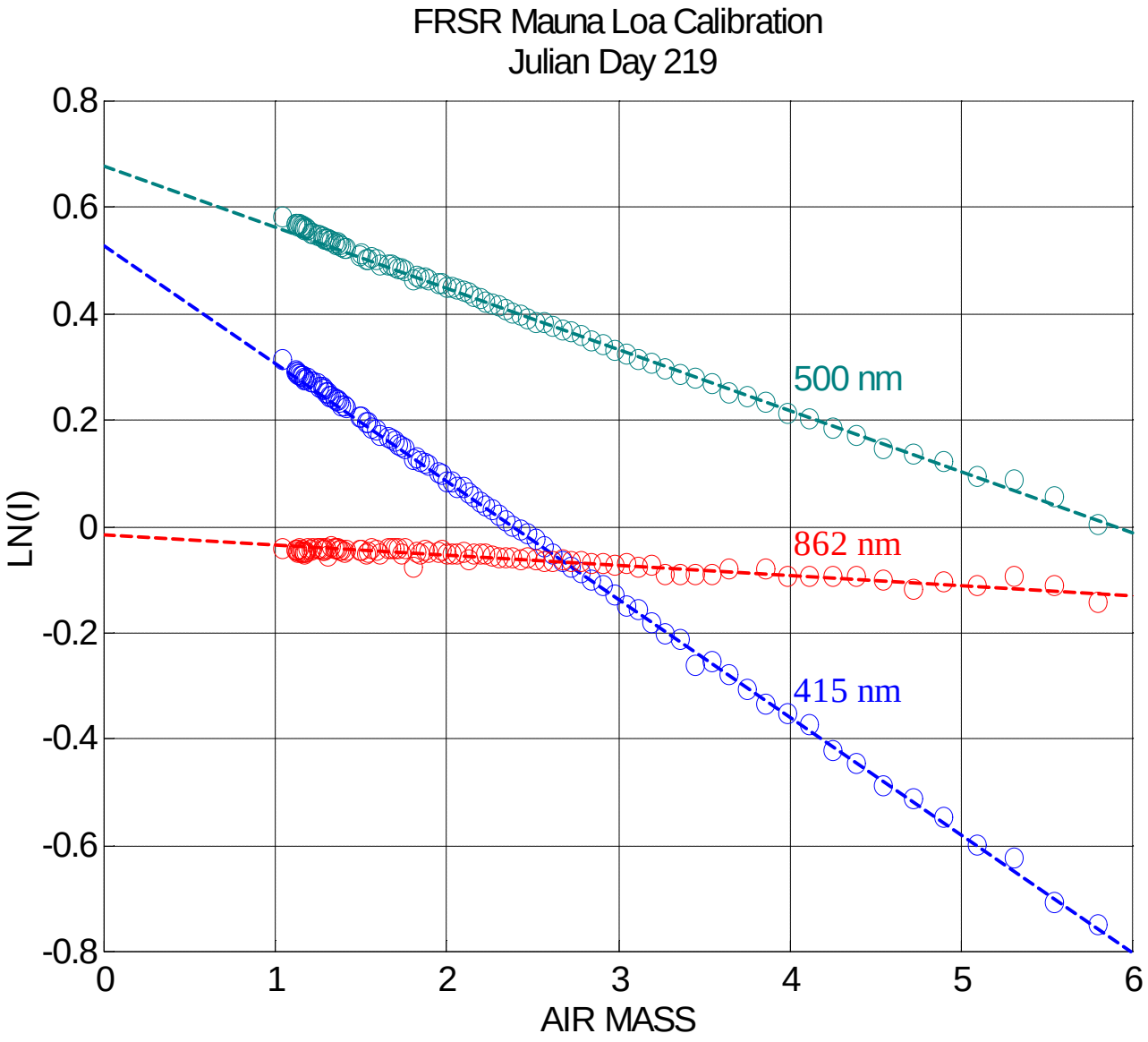

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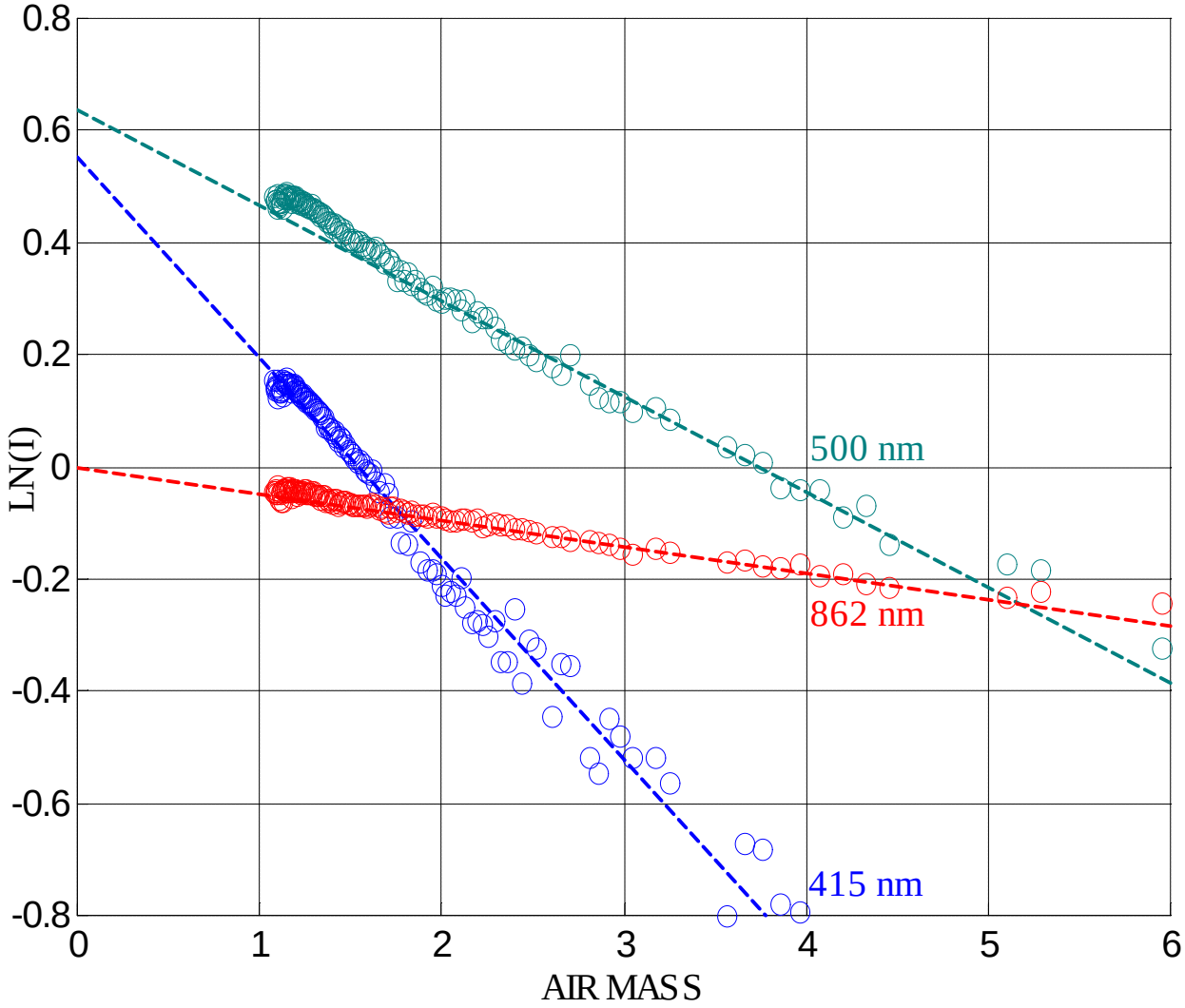
FRSR Cape Town South Africa Calibration
Julian Day 39



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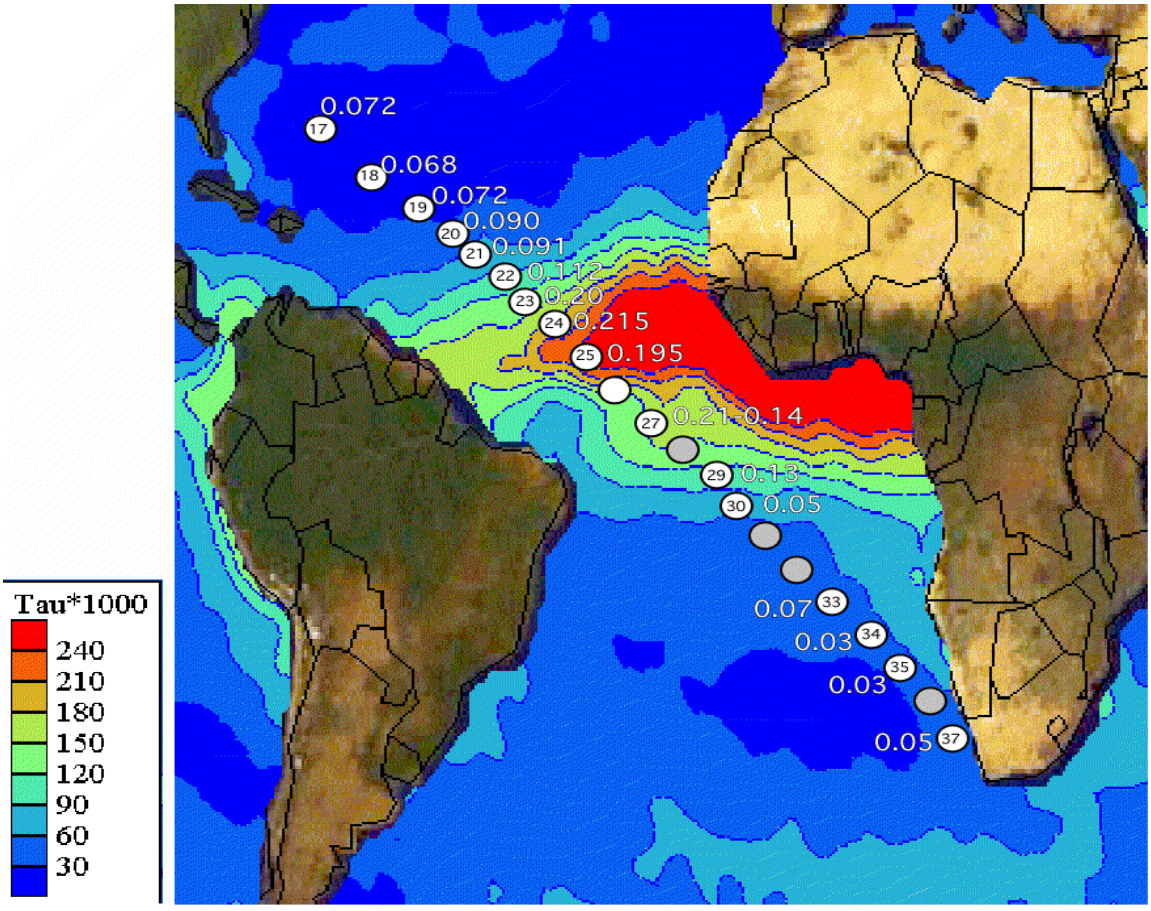
Data Quality: FRSR and Microtops Comparisons from AEROSOL



A map of estimated optical depth for Dec-Jan-Feb (Husar et al. , 1997, JGR vol 102, 16889--16909) for the Atlantic Ocean is shown with the cruise track of the RON BROWN during the Aerosol Cruise, 14 Jan to 7 Feb 1999. The white dots are located at the location of the ship at about noon on each day beginning with 1/17. The number adjacent to each dot is the PRP estimate of average aerosol optical depth at noon a for the 870 nm band. The aerosol plume from Africa is plainly visible in the data. A double peak from days 23-29 is corroborated by gas and aerosol data.

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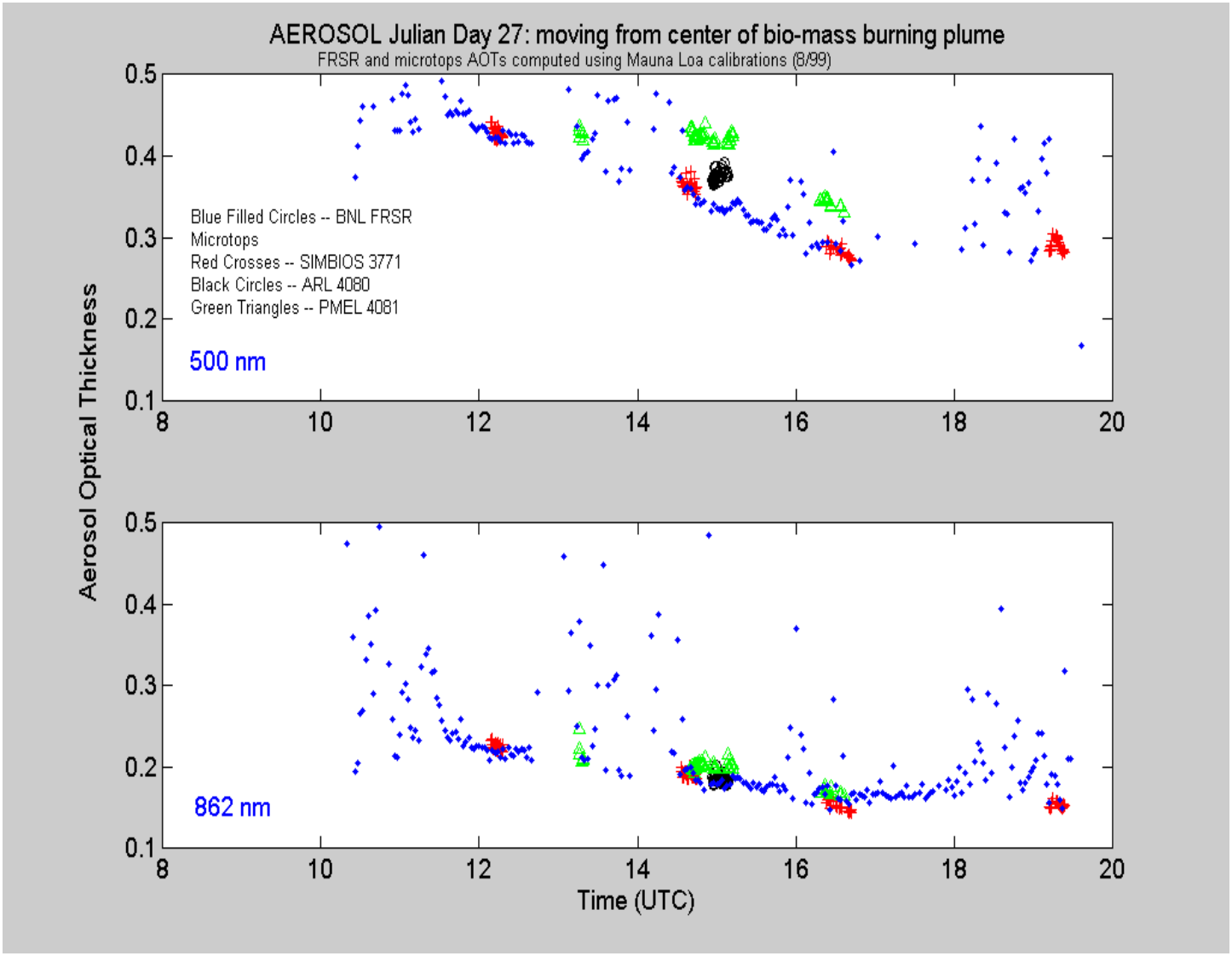

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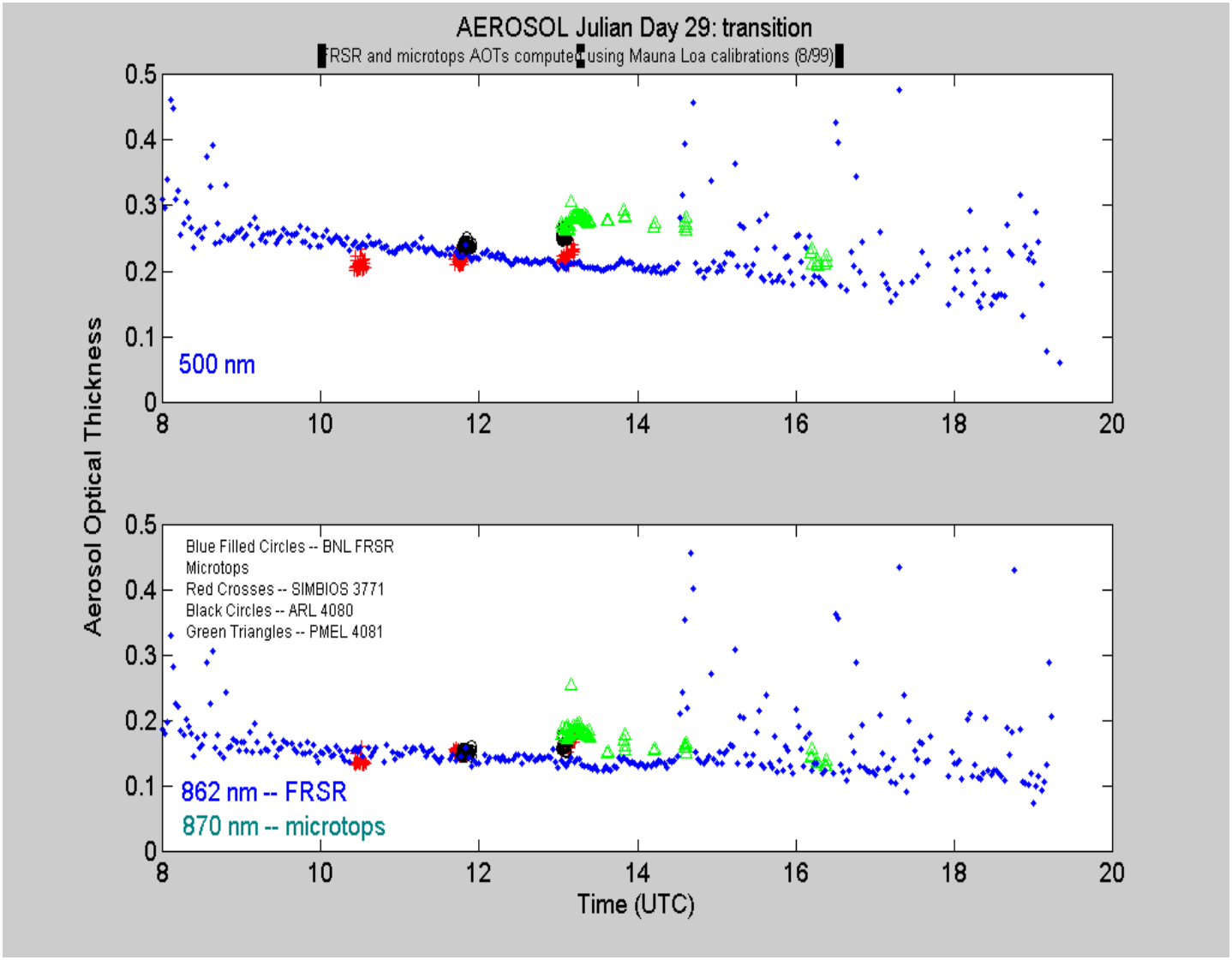

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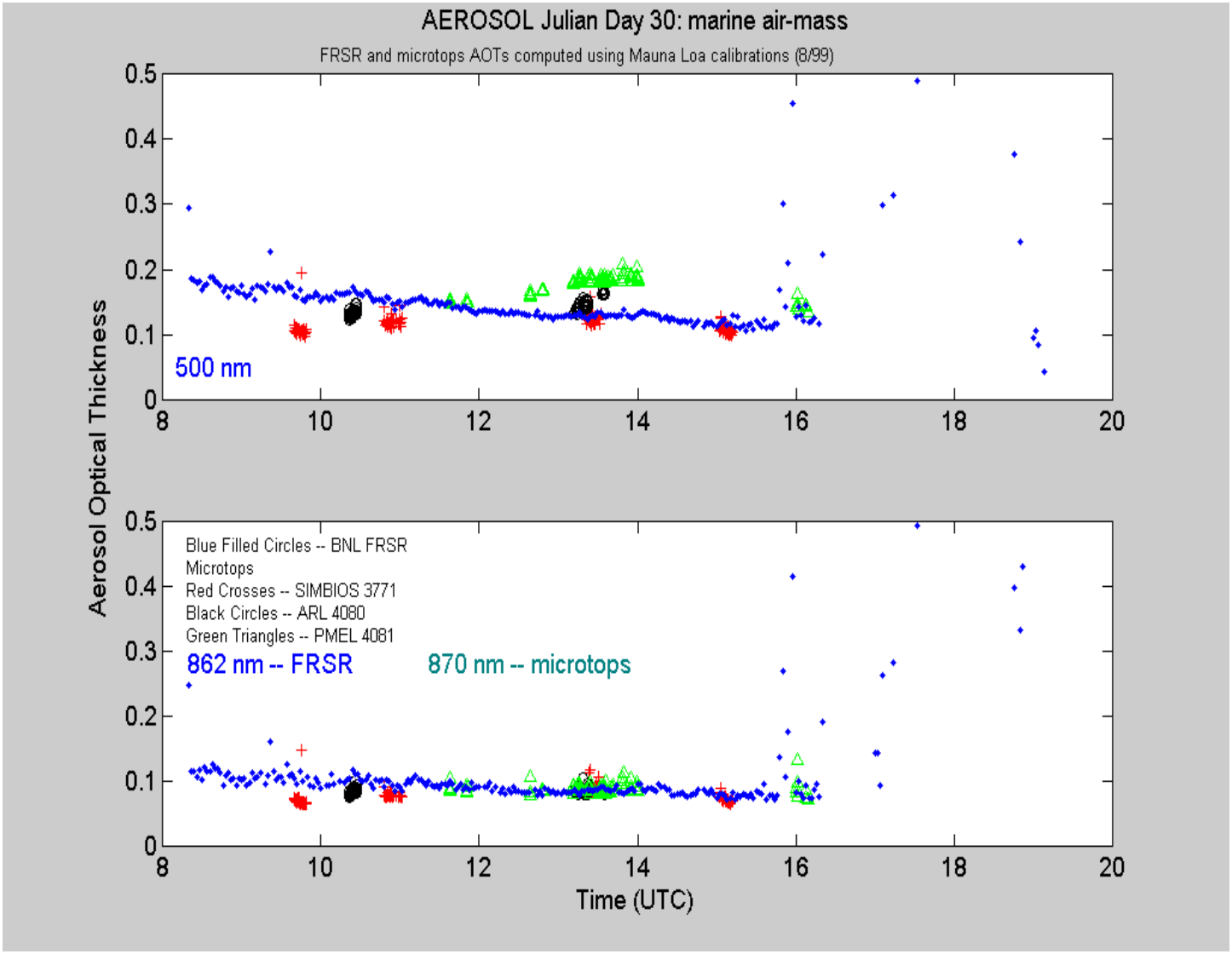

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SeaWiFS / AERONET Match-up Data

- obtained data from SIMBIOS (Sean Bailey)
- analyzed 5 match-up sites
- *Bermuda*
- *Lanai*
- *Bahrain*
- *Kaashidoo*
- *San Nicholas*
- **performed statistical analysis -- results unsatisfactory**
- followed-up with pixel-by-pixel analysis

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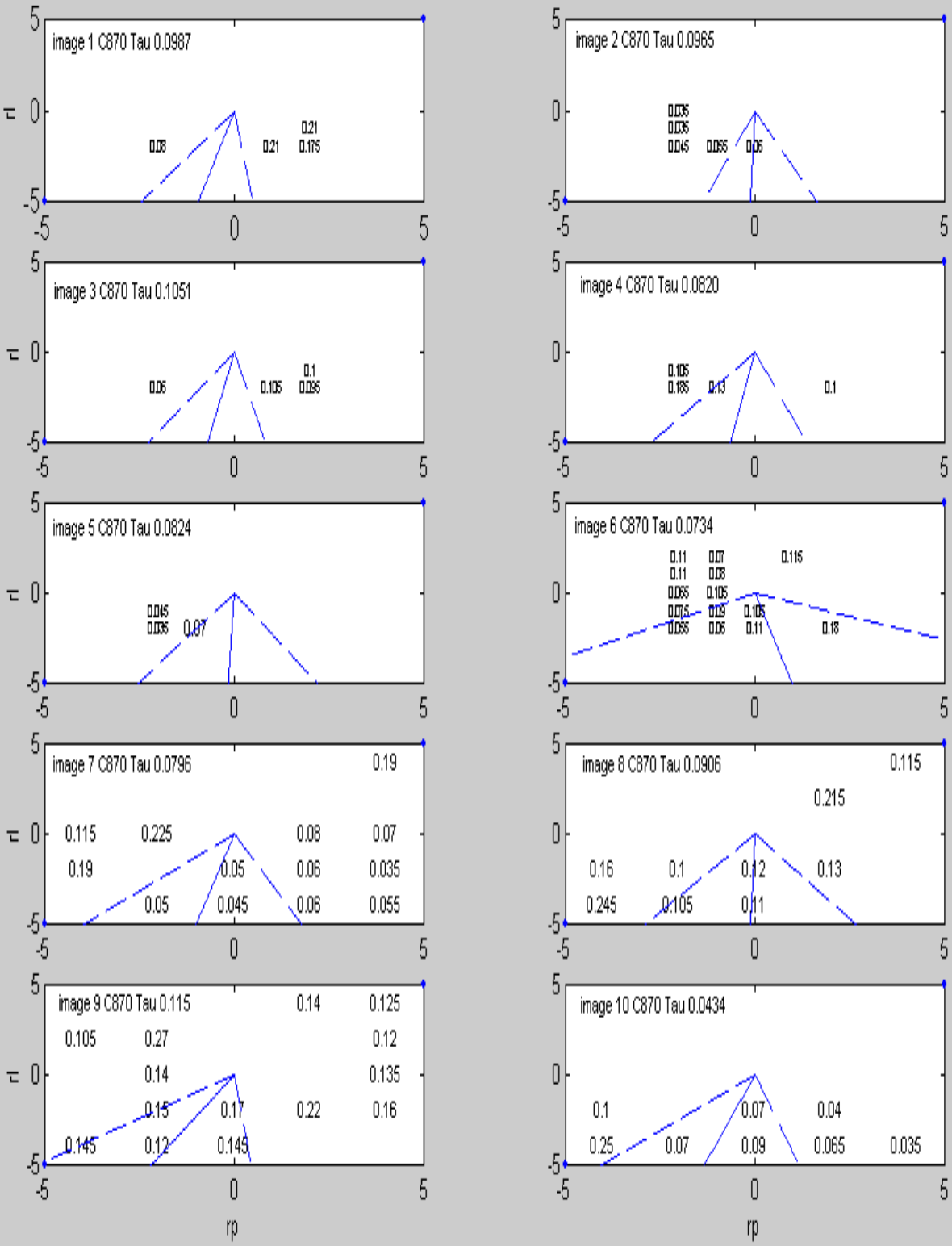
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image 2 C870 Tau 0.0965
image 3 C870 Tau 0.1051
image 4 C870 Tau 0.0820
image 5 C870 Tau 0.0824
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image 7 C870 Tau 0.0796
image 8 C870 Tau 0.0906
image 9 C870 Tau 0.115
image 10 C870 Tau 0.0434
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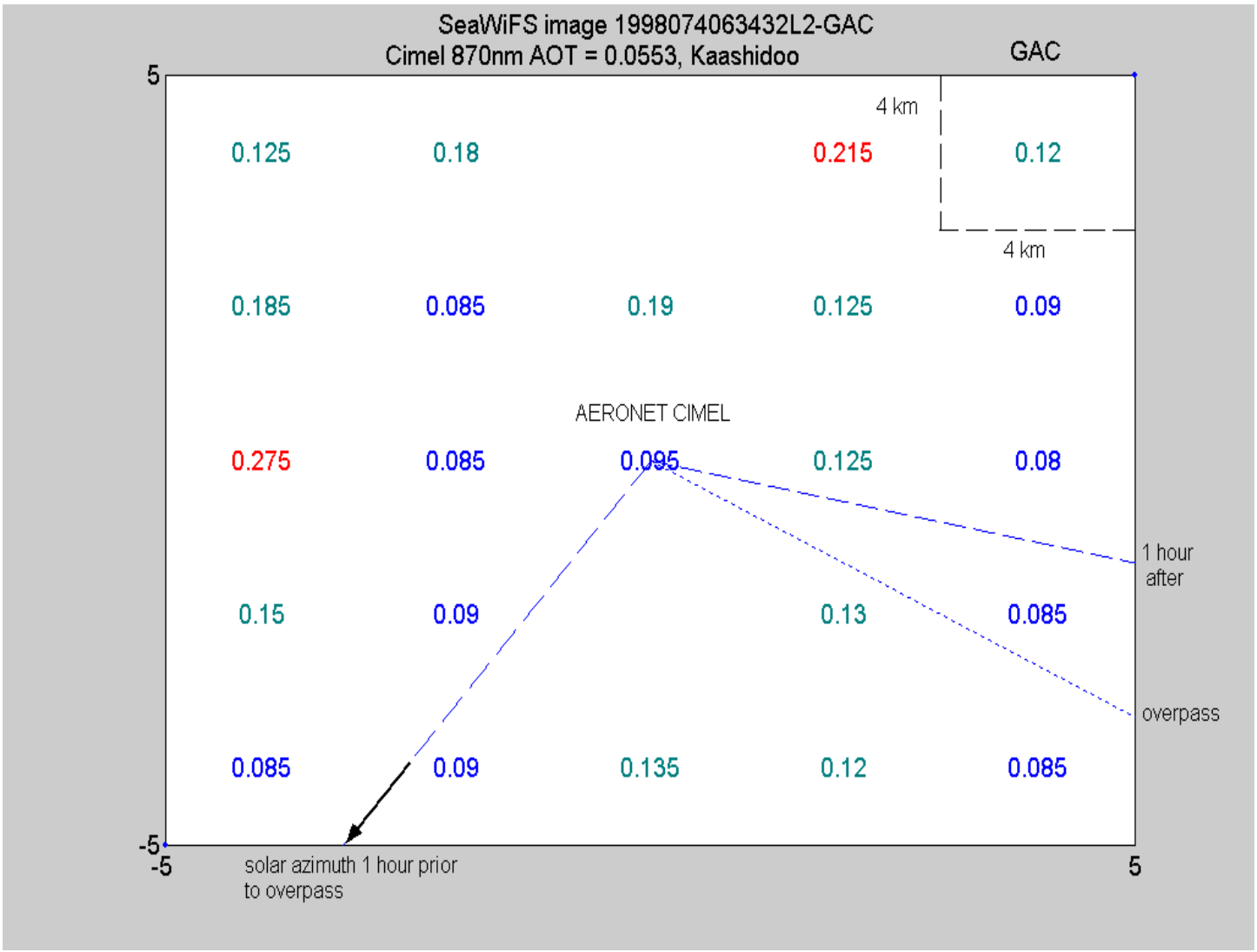
rp



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This year

- deploy FRSRs and microtops
- add cloud filtering to FRSR
- continue SeaWiFS/AERONET match-up analysis
- use FRSR ground truth data for regional atmospheric correction validations
- examine characteristics of diffuse irradiance in marine atmosphere

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