NIR vcal, role of aerosol measurements

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Absolute vicarious calibration?

Work from 2007!!!

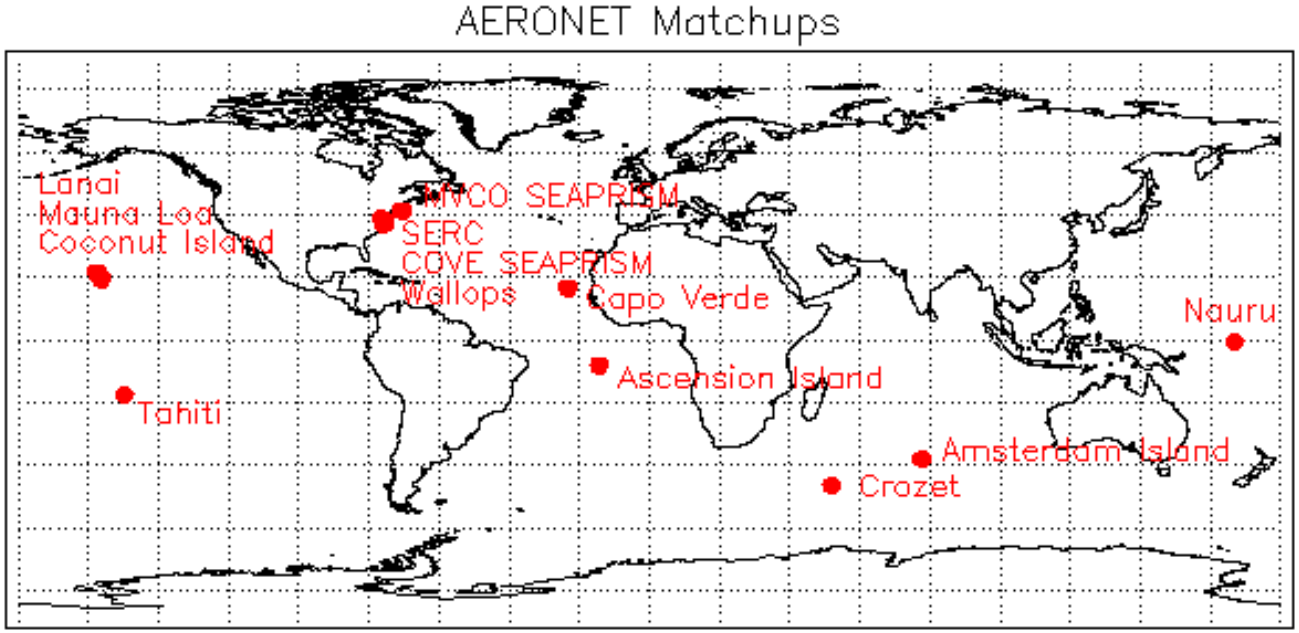
Attempt to derive absolute vicarious calibration based on AERONET and AERONET-OC measurements

Motivation: independent evaluation of long-term trends in NIR band calibration

Vicarious calibration of NIR and VIS bands

AERONET stations used in the analyses

island and coastal locations



Methodology

For vicarious calibration

- Extract time series of matchups over AERONET sites
- Apply AERONET AOT to define aerosol slope and contribution
- In case of AERONET-OC, apply nLw to define surface contribution, including BRDF
- Derive TOA radiances for the matchup pixels
- Use the derived TOA radiances to obtain vicarious gains

Matchup criteria

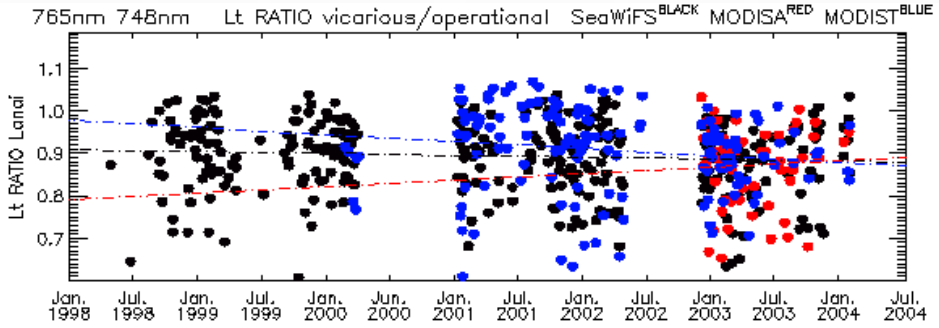
- Maximum 1 hour apart
- Strict satellite data masking: including MODGLINT HISATZEN HISOLZEN
- Coastal sites within 3km radius from the *in situ* point
- Open ocean sites within 10km radius from the *in situ* point
- Spatial variability criteria

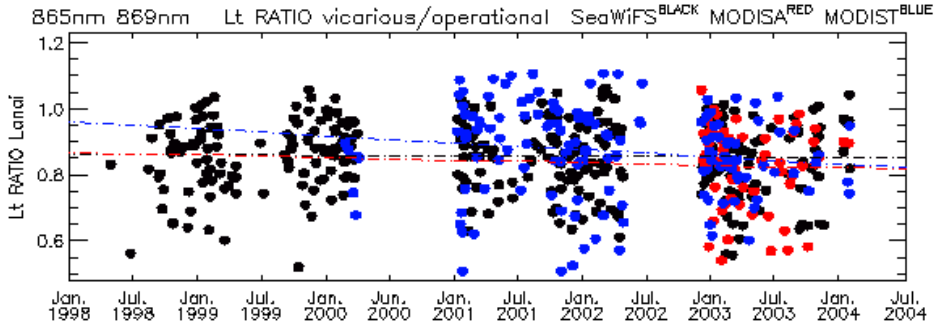
NIR vicarious gains for best cases (CIMEL)

SeaWiFS
MODIS Aqua
MODIS Terra

Lanai
TOA radiance ratio vicarious / operational
AERONET AOT average at 870 nm = 0.05 (±0.01)
AERONET Angstrom (440,870) = 0.68 (±0.08)

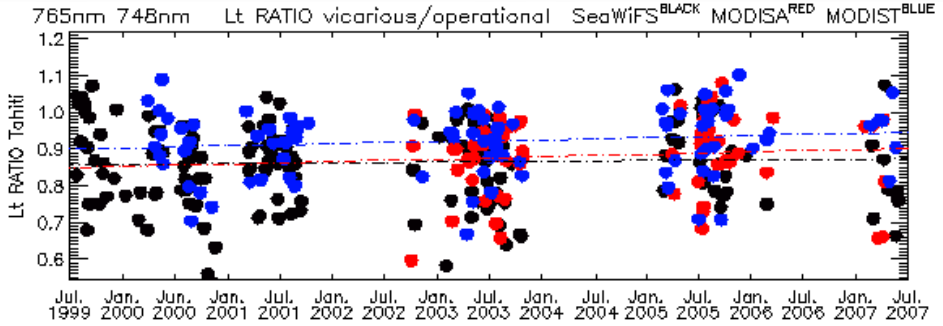
Tahiti
TOA radiance ratio vicarious / operational
AERONET AOT average at 870 nm = 0.05 (±0.01)
AERONET Angstrom (440,870) = 0.69 (±0.06)

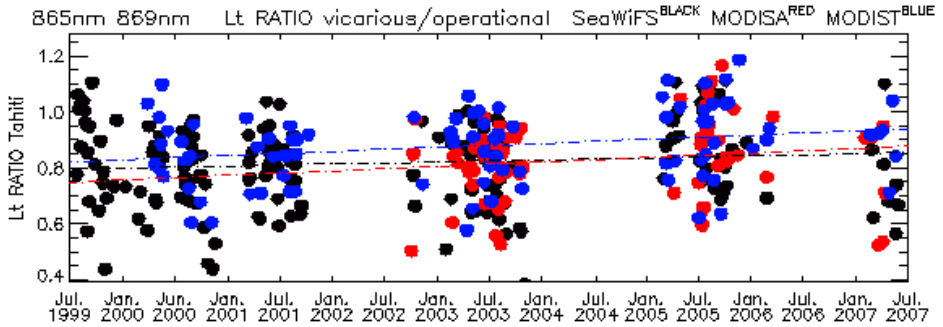




40%

40%





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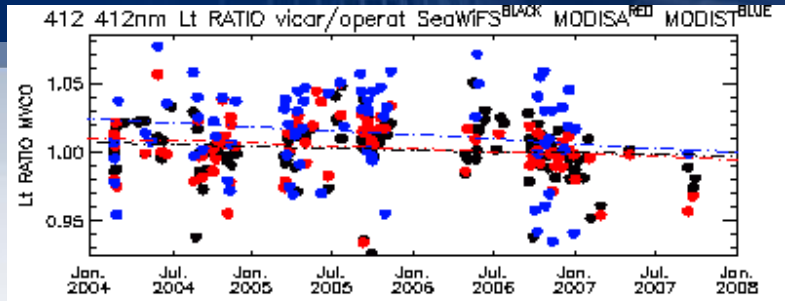
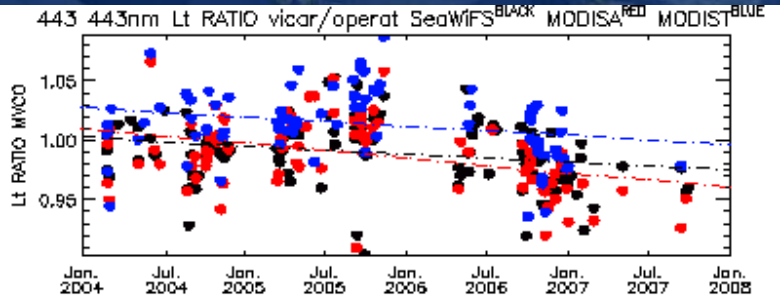
VIS and NIR vicarious gains for best cases (SeaPRISM)

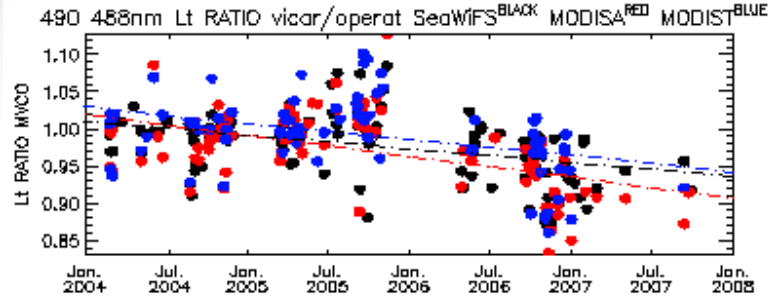
10 %

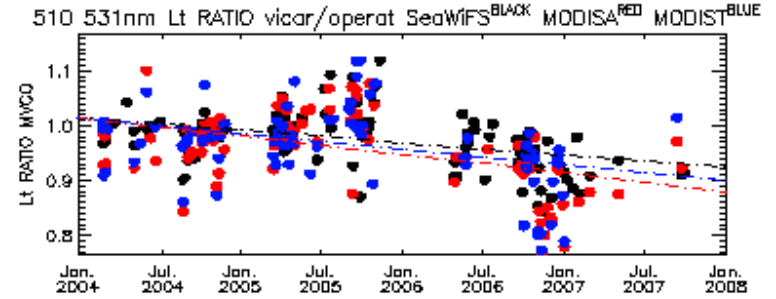
MVCO
TOA radiance ratio
vicarious / operational

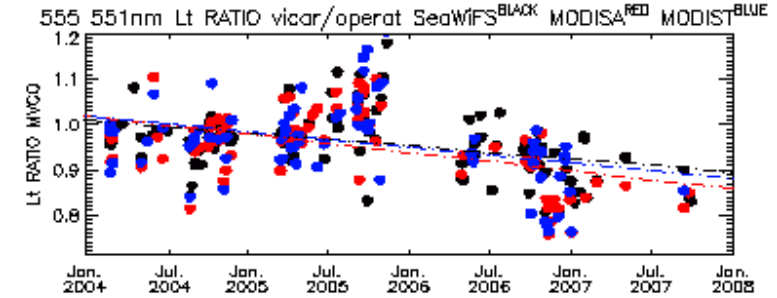
SeaWiFS
MODIS Aqua
MODIS Terra

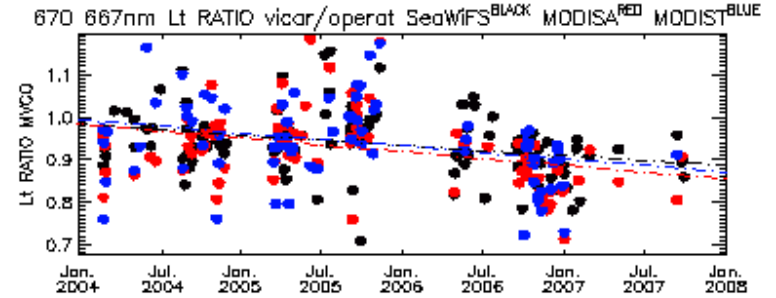


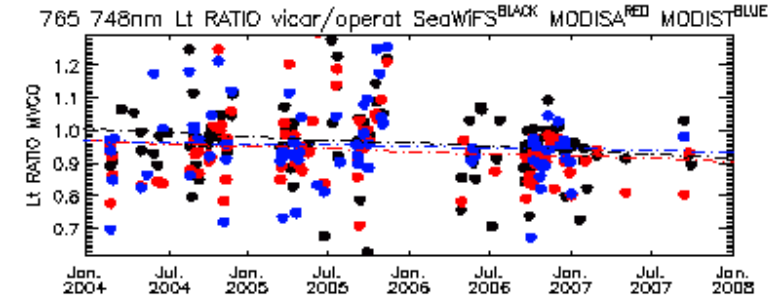


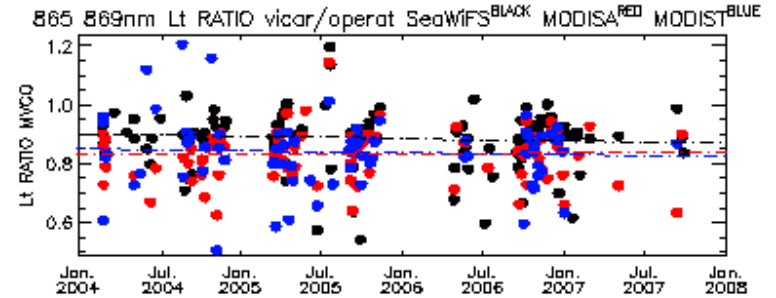












Conclusions

Uncertainties in the NIR vicarious gains are very large > ± 10%

Uncertainties in the VIS vicarious gains are also large > ± 5%

Technique could be revised and improved

More accurate measurements could be employed (aerosol & surface)

How significantly could the uncertainties go down?

Use *in situ* AOT measurements for characterization of the sites

Do not use AOT measurements directly for vicarious calibration