

Protocol of the intercomparison at the University of Rome “La Sapienza”, Italy on June 03 to 06, 2008 with the travelling reference spectroradiometer QASUME[†] from PMOD/WRC

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The purpose of the visit was the comparison of global solar irradiance measurements between the spectroradiometer operated by the University of Rome (ITR) and the travel reference spectroradiometer QASUME. The measurement site is located at the University of Rome; Latitude 41.90 N, Longitude 12.52 E and altitude 70 m.a.s.l..

The horizon of the measurement site is free down to at least 85° solar zenith angle (SZA). Measurements between 4:30 UT and 18:00 UT have been analysed.

QASUME arrived at the University in the morning of June 03, 2008. The spectroradiometer was installed in line to the ITR instrument with the entrance optic of QASUME within 2 m of the Br #067. The spectroradiometer in use at ITR is a Brewer single monochromator (Br #067). The intercomparison between QASUME and the ITR spectroradiometer lasted three days, from noon of June 03 to noon of June 06.

QASUME was calibrated several times during the intercomparison period using a portable calibration system. Three lamps (T61251, T68522 and T68523) were used to obtain an absolute spectral irradiance calibration traceable to the primary reference held at PMOD/WRC, which is traceable to PTB. The daily mean responsivity of the instrument based on these calibrations varied by less than 1 % during the intercomparison period. The internal temperature of QASUME was 29.9 ± 0.2 °C. The diffuser head was heated to a temperature of 26.8 ± 1.4 °C.

The wavelength shifts relative to an extraterrestrial spectrum as retrieved from the SHICRivm analysis were between ± 50 pm in the spectral range 290 to 400 nm.

[†] The QASUME spectroradiometer B5503 is made available by the Physical and Chemical Exposure Unit of the Joint Research Centre of the European Commission, Ispra, Italy through a collaboration agreement with PMOD/WRC.

Protocol:

The measurement protocol was to measure one solar irradiance spectrum every 30 minutes from 290 to 325 nm, every 0.5 nm, and 3 seconds between each wavelength increment.

June 03 (155) Tuesday:

QASUME was installed on the measurement site at 7:45 UT. Synchronised measurements are available from 12:30 UT when the internal temperature of QASUME reached its nominal temperature. Weather conditions were a mix of sun and clouds.

QASUME was calibrated at 13:44 and 14:15 UT between the scans.

June 04 (156) Wednesday:

Synchronised measurements are available from 6:00 to 18:00 UT. Weather conditions were a clear sky in the morning with a few cirrus clouds and a mix of sun and clouds in the afternoon. The scans at 8:30 and 10:00 UT are disturbed by fast moving clouds.

QASUME was calibrated at 7:40 and 15:40 UT between the scans.

June 05 (157) Thursday:

Synchronised scans are available from 4:30 to 18:00 UT. The weather condition was mostly overcast sky with one rain shower in the morning. The scan at 8:30 is affected by rain.

QASUME was calibrated at 13:10 UT.

June 06 (158) Friday:

Synchronised scans are available from 4:30 to 11:30 UT. The weather conditions were a mix of sun and clouds.

QASUME was calibrated at 9:10, 9:40 and 10:10 UT.

End of the campaign: after the 11:30 UT scan.

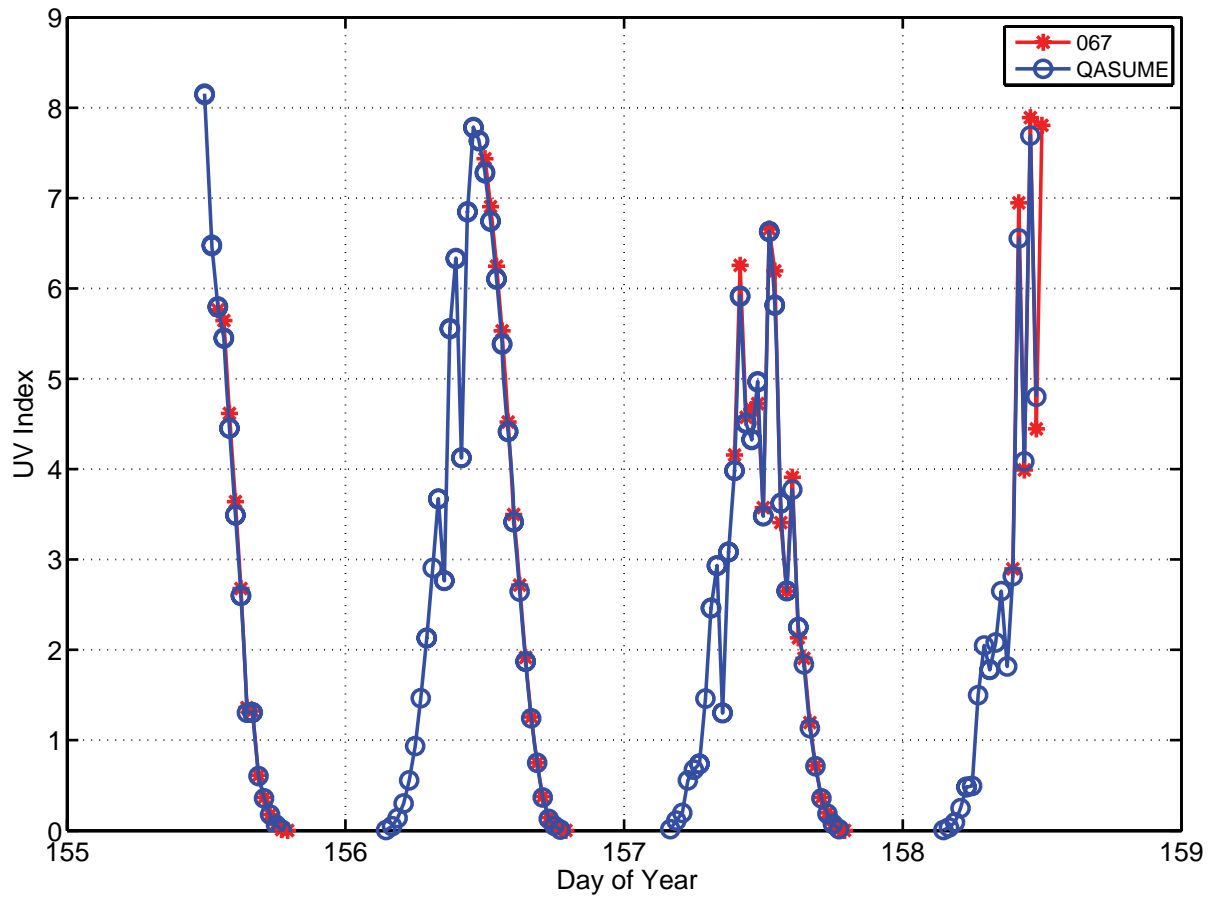
Results:

In total 80 synchronised simultaneous spectra from QASUME and ITR (Brewer #067) are available from the measurement period. Measurements between 4:30 and 18:00 UT have been analysed (SZA smaller than 85°).

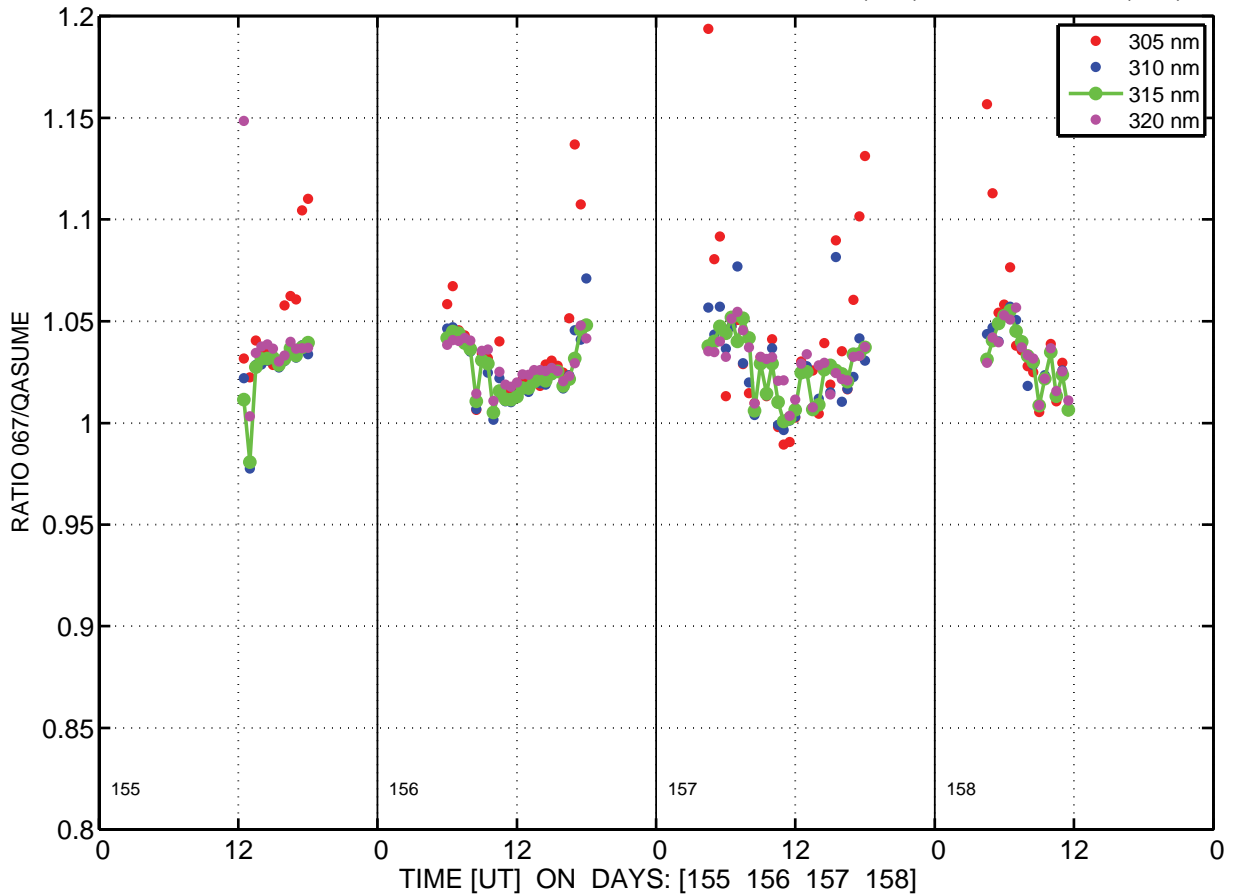
Remarks:

1. The responsivity file *uvr10807.067* is based on a calibration performed by IOS in 2007.
2. The single Brewer #067 shows an enhanced signal due to straylight below approx. 305 nm.
3. For all solar scans the wavelength shifts of the Brewer #067 are between -50 and +10 pm.
4. During the intercomparison period a few spikes could be observed in the data: day 155 at 12:30 UT; day 157 at 7:00 and 15:30 UT.
5. The diurnal variability of the ratios is lower than observed during the intercomparison of in 2006. This can be attributed to the cosine correction applied to the Brewer data.
6. The mean ratio of Brewer to Qasume has been studied with and without the cosine correction of the Brewer data. The ratio is around -5 % without and +3% with the cosine correction. The difference of around 8 % is consistent with the estimated directional response error (see also: report of the intercomparison in September 2003).

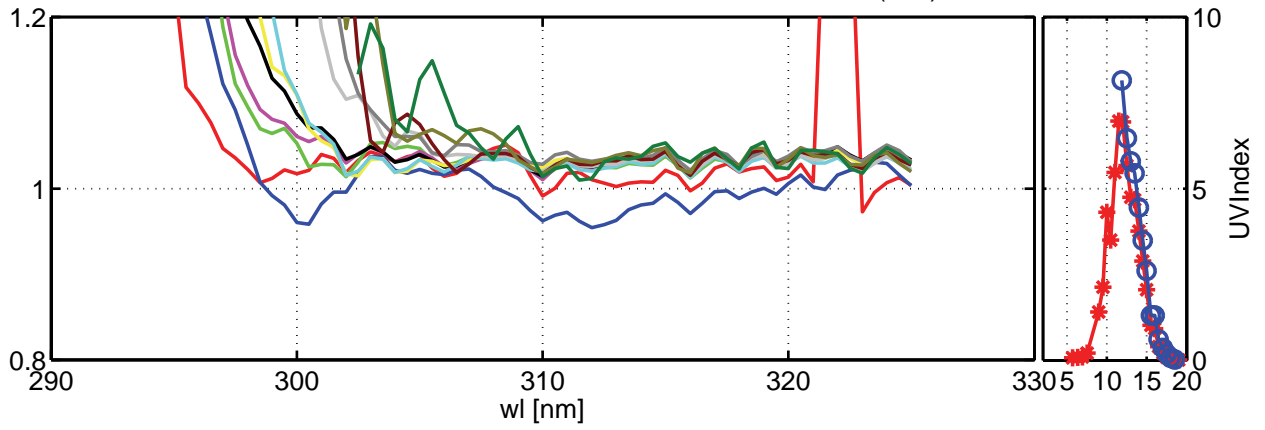
UV Index Roma, June 2008



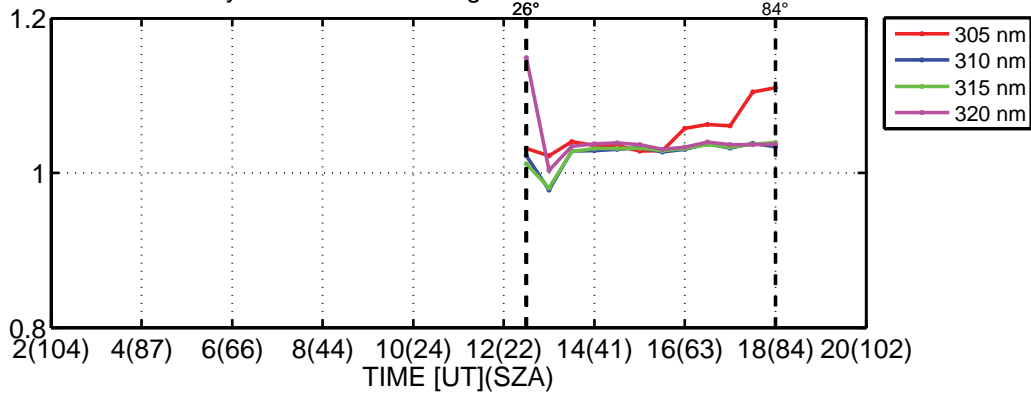
Global irradiance ratios 067/QASUME at Roma:03-Jun-2008(155) to 06-Jun-2008(158)



Global irradiance ratios 067/QASUME at Roma:03-Jun-2008(155)

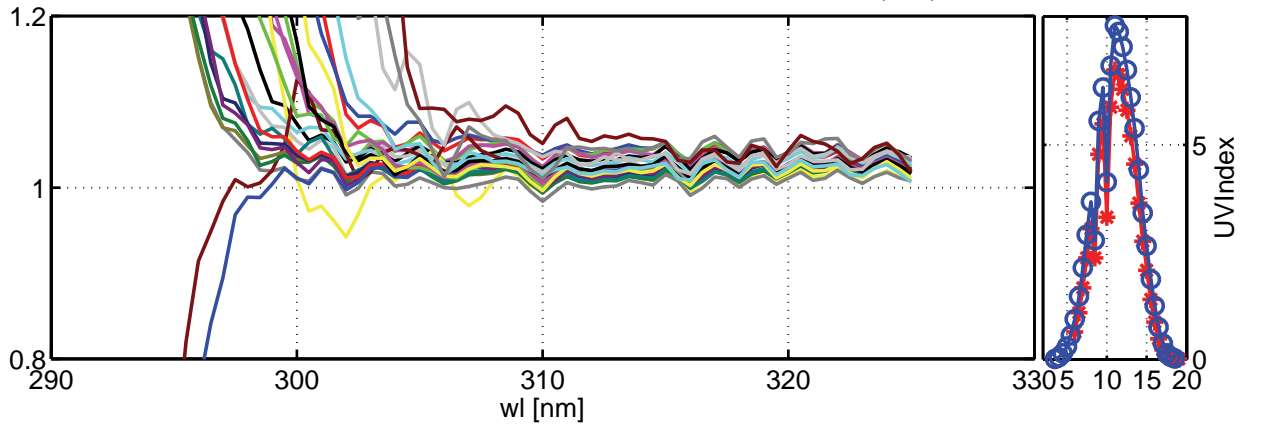


Daily variation. Wavelength bands are ± 2.5 nm

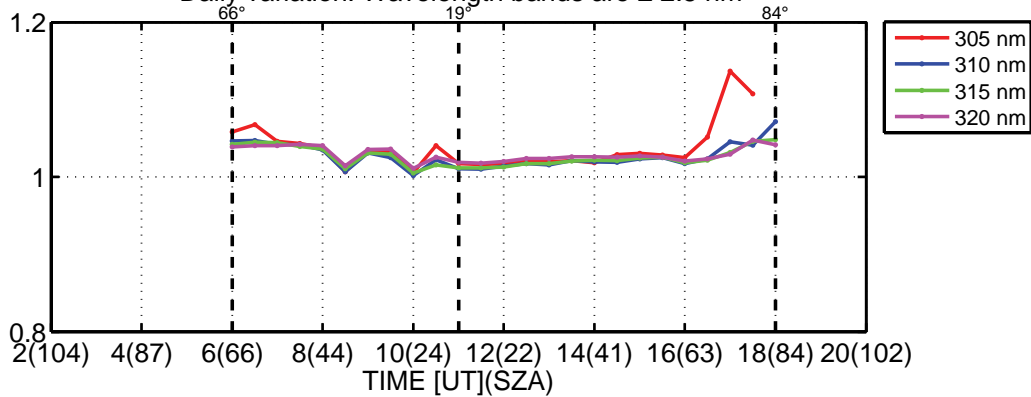


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Global irradiance ratios 067/QASUME at Roma:04-Jun-2008(156)

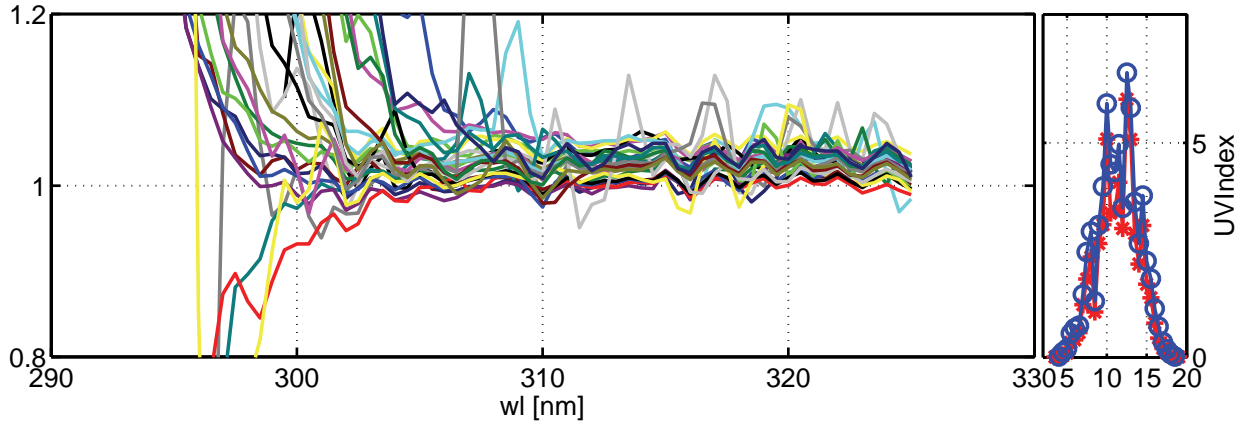


Daily variation. Wavelength bands are ± 2.5 nm

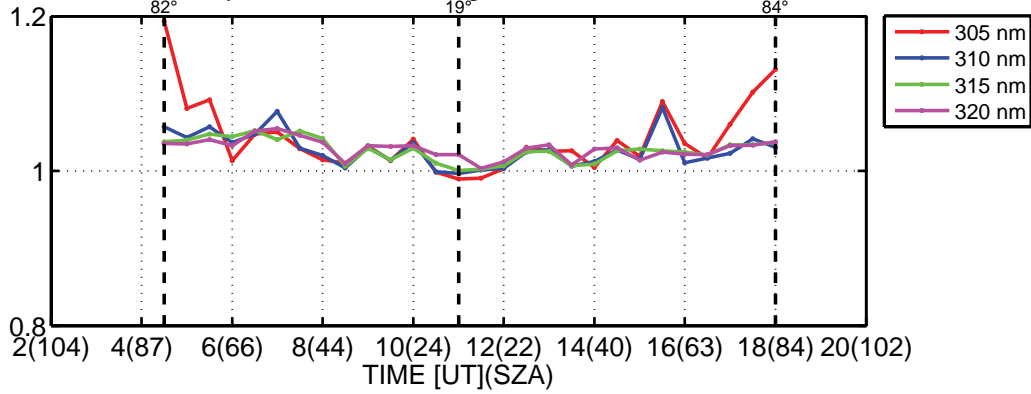


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Global irradiance ratios 067/QASUME at Roma:05-Jun-2008(157)

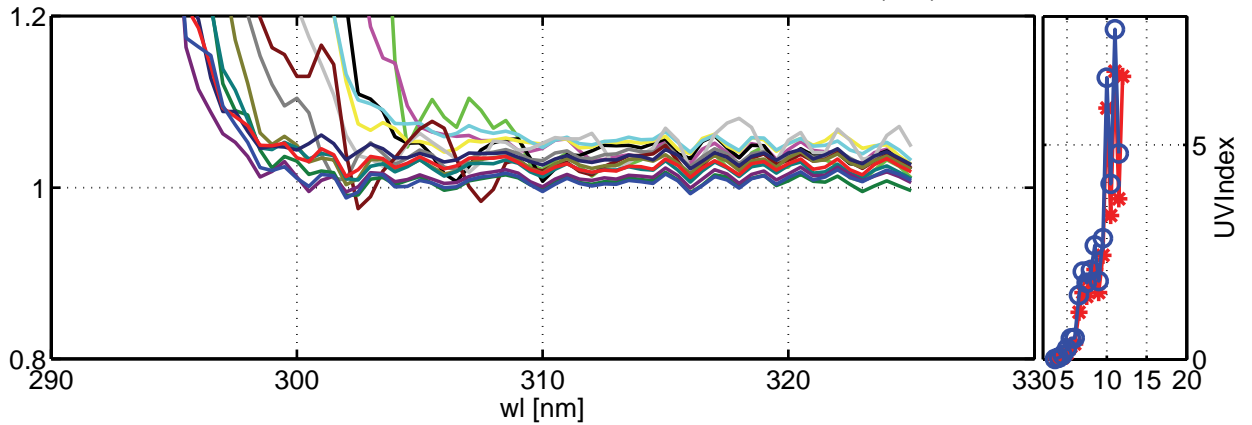


Daily variation. Wavelength bands are ± 2.5 nm

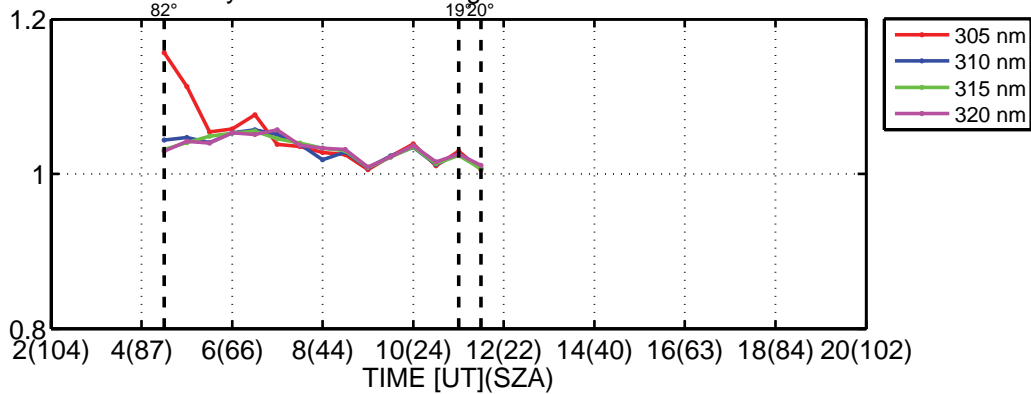


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Global irradiance ratios 067/QASUME at Roma:06-Jun-2008(158)

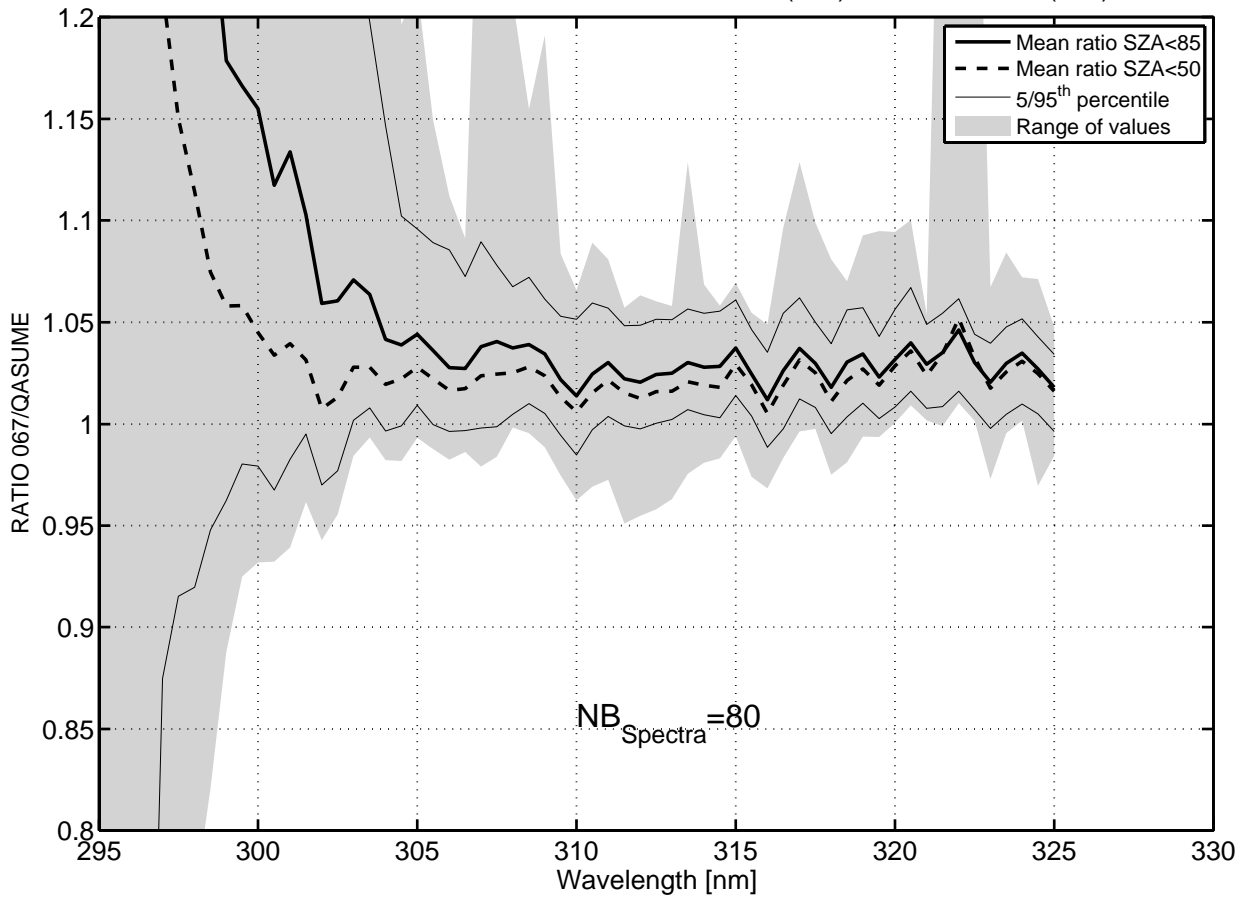


Daily variation. Wavelength bands are ± 2.5 nm



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Mean ratio 067/QASUME at Roma:03-Jun-2008(155) to 06-Jun-2008(158)



ROMA, 067, June 2008

