

Protocol of the intercomparison at the University of Rome "La Sapienza", Italy on May 22 to 25, 2006 with the travelling standard spectroradiometer B5503 from PMOD/WRC within the project QASUME

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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 standard B5503. The measurement site is located at the University of Rome; Latitude 41.90 N, Longitude 12.52 E and altitude 60 m.a.s.l..

The horizon of the measurement site is free down to at least 75° solar zenith angle (SZA). Measurements between 5:30 UT and 17:00 UT have been analysed.

B5503 arrived at Rome in the afternoon of May 22, 2006. The spectroradiometer was installed in line to the ITR instrument with the entrance optic of B5503 within 2 m of the Br #067. The spectroradiometer in use at ITR is a Brewer single monochromator (Br #067). The intercomparison between B5503 and the ITR spectroradiometer lasted three days, from morning of May 23 to evening of May 25.

B5503 was calibrated several times during the intercomparison period using a portable calibration system. Two lamps (T68523 and T68524) 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 B5503 was 25.8 ± 0.4 °C. The diffuser head was heated to a temperature of 28.8 ± 3.3 °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.

Protocol:

The measurement protocol was to measure one solar irradiance spectrum every 30 minutes from 290 to 400 nm, every 0.5 nm, and 3 seconds between each wavelength increment.

May 22 (142):

B5503 was installed on the measurement site at 14:50 UT. A synchronised measurement is available at 18:00 UT when the internal temperature of B5503 reached its nominal temperature. Weather conditions were a mix of sun and clouds.

May 23 (143):

Synchronised measurements are available from 5:30 to 17:00 UT. Weather conditions were a mix of sun and clouds with occasionally a few drops of rain throughout the day.

B5503 was calibrated at 5:11, 10:15, 12:12 and 12:35 UT between the scans. The scan at 12:30 UT is missing because of calibration.

May 24 (144):

Synchronised scans are available from 5:30 to 17:00 UT. The weather conditions were a mix of sun and clouds.

B5503 was calibrated at 10:11 UT.

The scans at 13:30, 14:30 and 15:00 UT are missing because of a repair of the data acquisition system of the Br #067.

May 25 (145):

Synchronised scans are available from 6:00 to 17:30 UT. The weather conditions were sunny with a few clouds.

B5503 was calibrated at 7:40 and 16:11 UT.

End of the campaign: after the 17:30 UT scan.

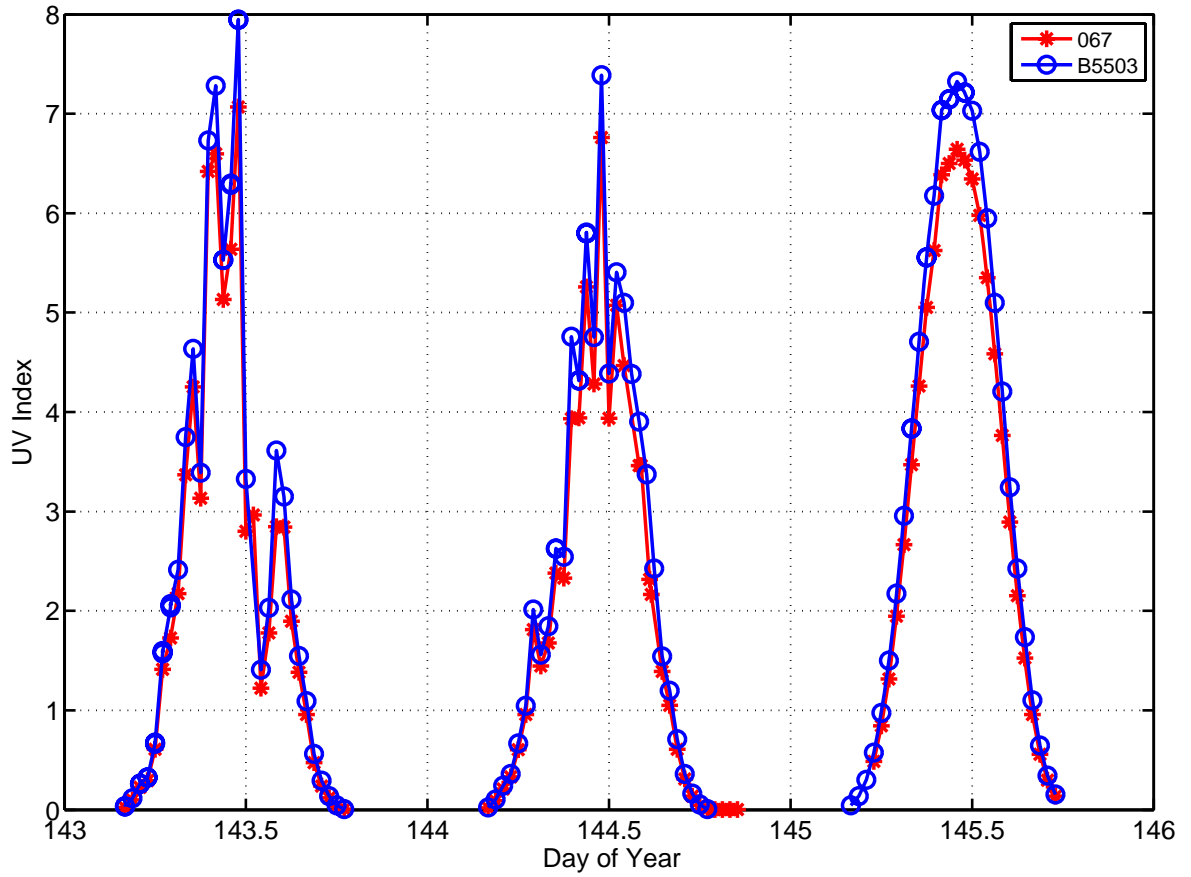
Results:

In total 79 synchronised simultaneous spectra from B5503 and ITR (Brewer #067) are available from the measurement period. Due to nearby obstructions by hutches which might affect the instruments differently only measurements between 5:30 and 17:30 UT have been analysed (SZA smaller than 75°).

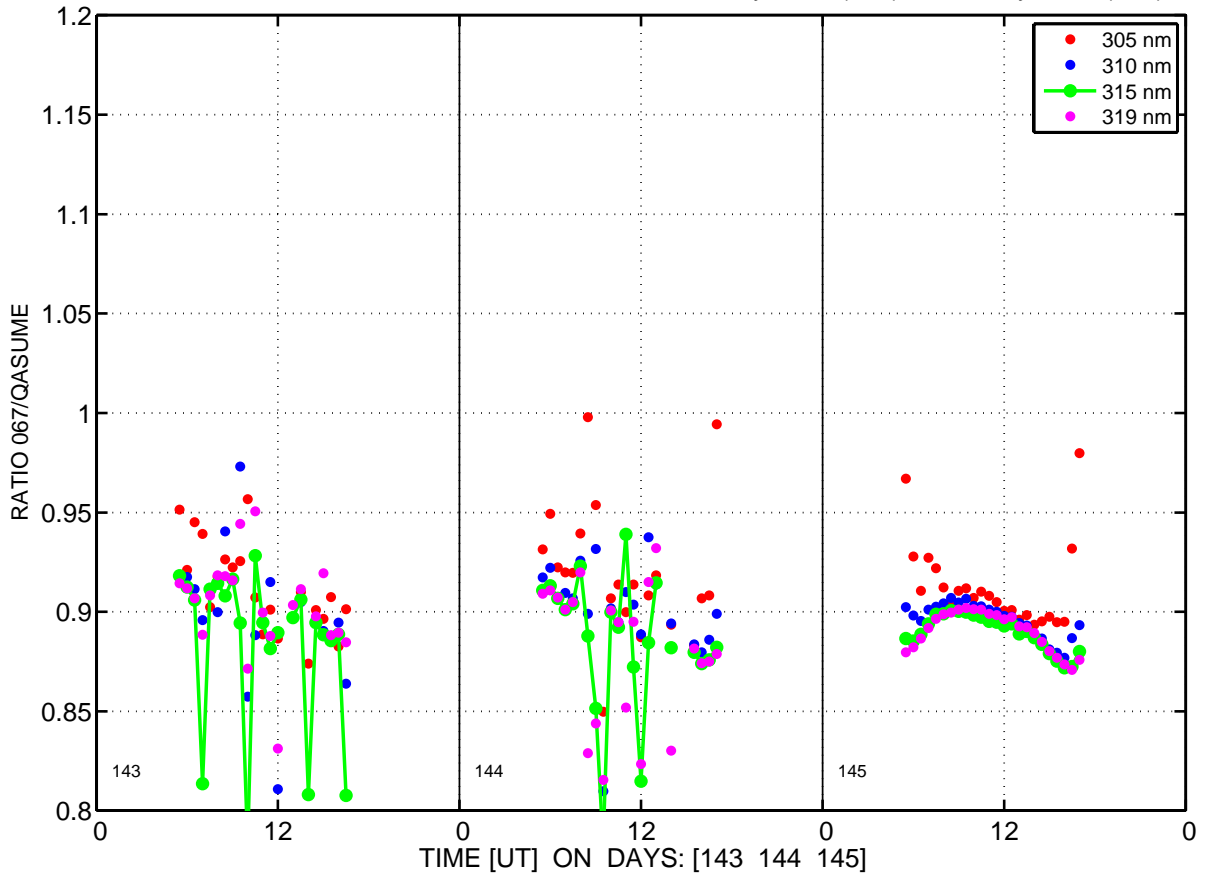
Remarks:

1. The responsivity file *uvr08606.067* is based on a calibration performed by IOS in 2006.
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 below ± 30 pm.
4. During the intercomparison period two different kinds of spikes could be observed in the data. Type 1 spikes result in a value too high to be reasonable whereas type 2 has a value of zero. The reason for the later was found in a serial connection error which has been solved by the replacement of the data acquisition computer at day 144, 15:30 UT.
 - Type 1 spikes: day 143 at 8:30, 9:30 and 10:00 UT; day 144 at 8:30 and 11:00 UT.
 - Type 2 spikes: day 143 at 7:00, 12:00, 14:00, 16:00, 16:30 and 17:00 UT; day 144 at 8:30, 9:00, 9:30, 12:00 and 14:00 UT.
5. The diurnal variability of the ratios on day 145 is likely caused by the deviation of the angular response from a cosine response. The magnitude is consistent with the estimated directional response error (see also: report of the last intercomparison, September 2003).

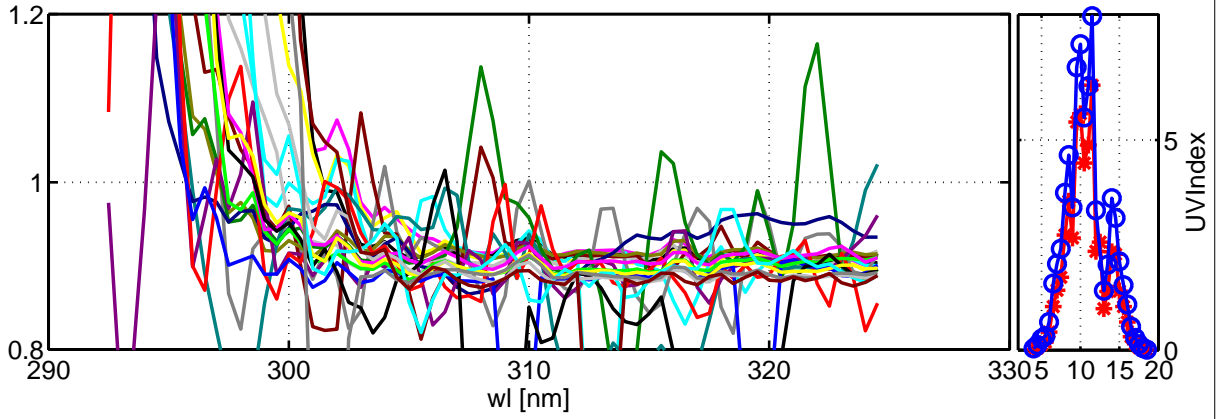
UV Index Rome 23–25 May 2006



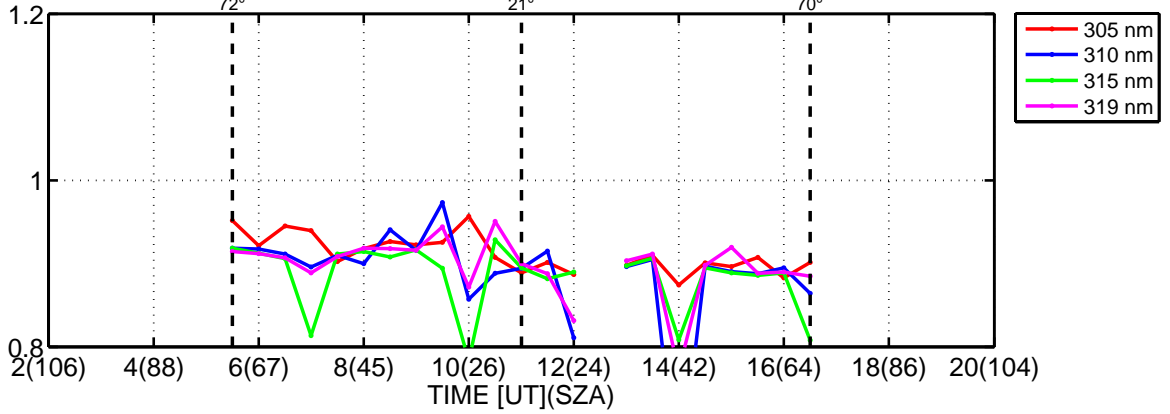
Global irradiance ratios 067/QASUME at Rome:23-May-2006(143) to 25-May-2006(145)



Global irradiance ratios 067/QASUME at Rome:23-May-2006(143)

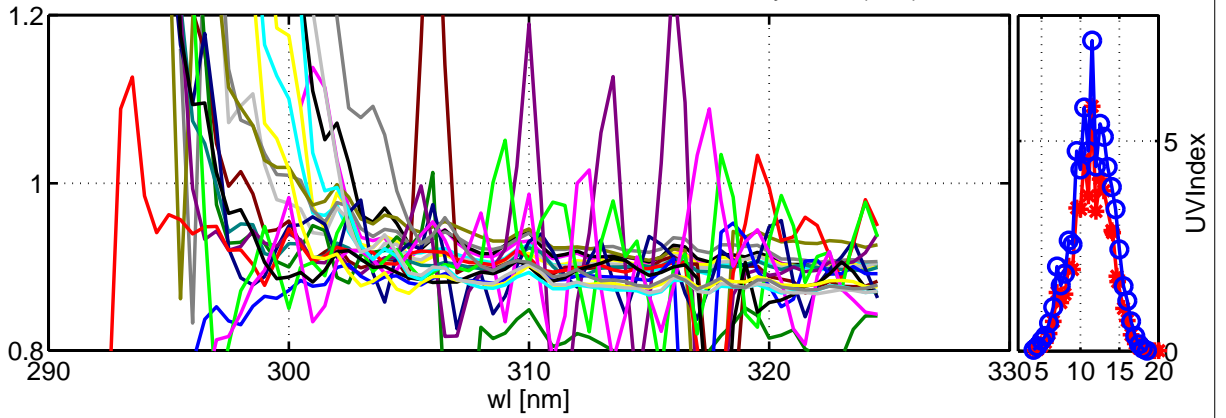


Daily variation. Wavelength bands are ± 2.5 nm

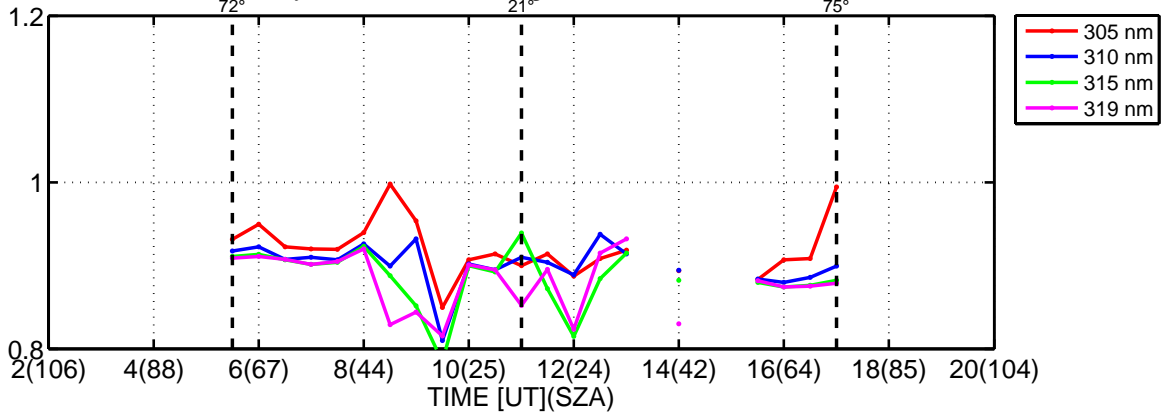


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Global irradiance ratios 067/QASUME at Rome:24-May-2006(144)

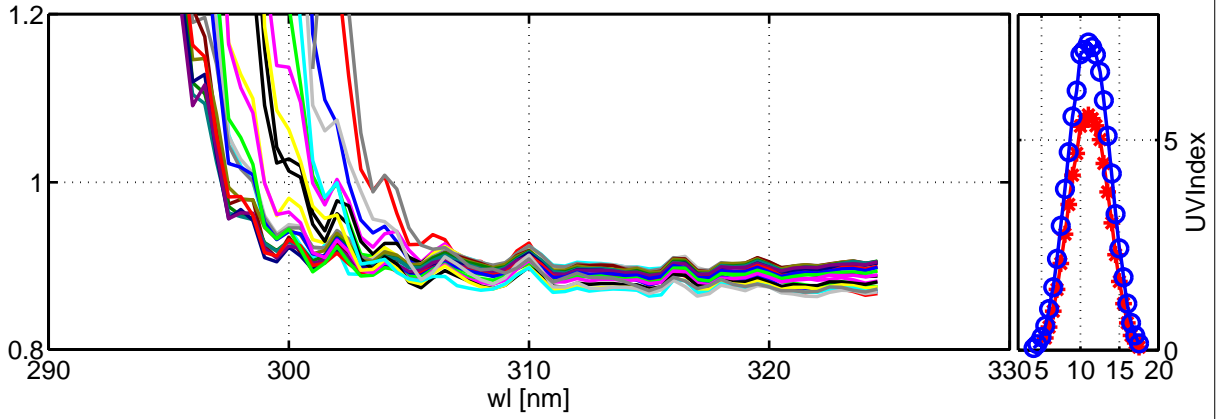


Daily variation. Wavelength bands are ± 2.5 nm

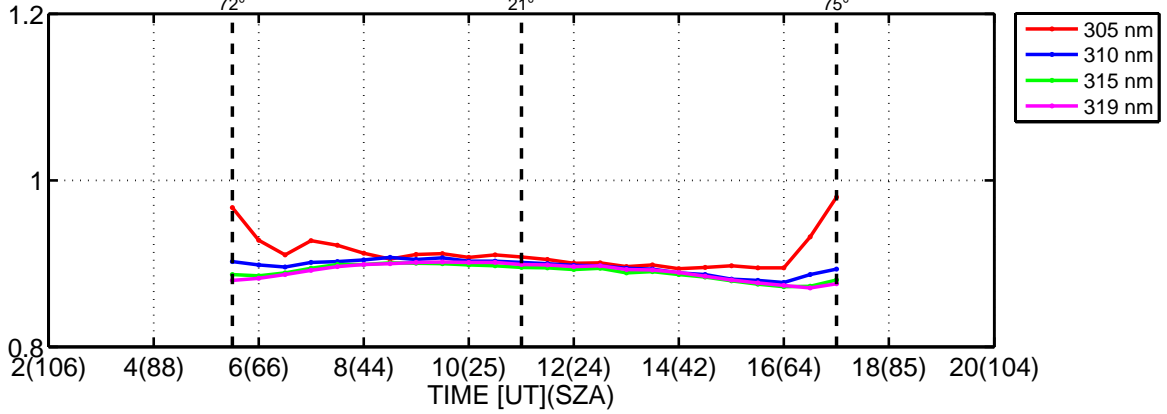


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Global irradiance ratios 067/QASUME at Rome:25-May-2006(145)

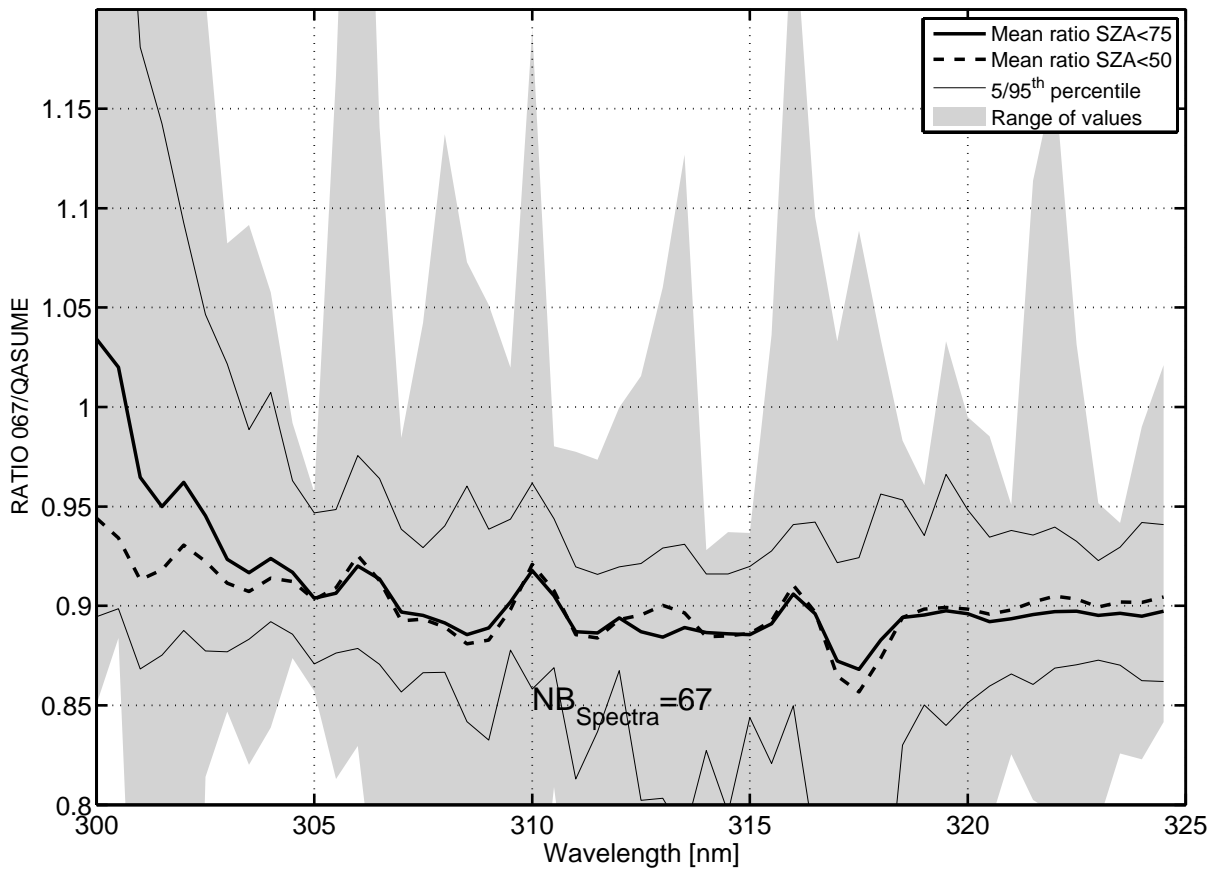


Daily variation. Wavelength bands are ± 2.5 nm

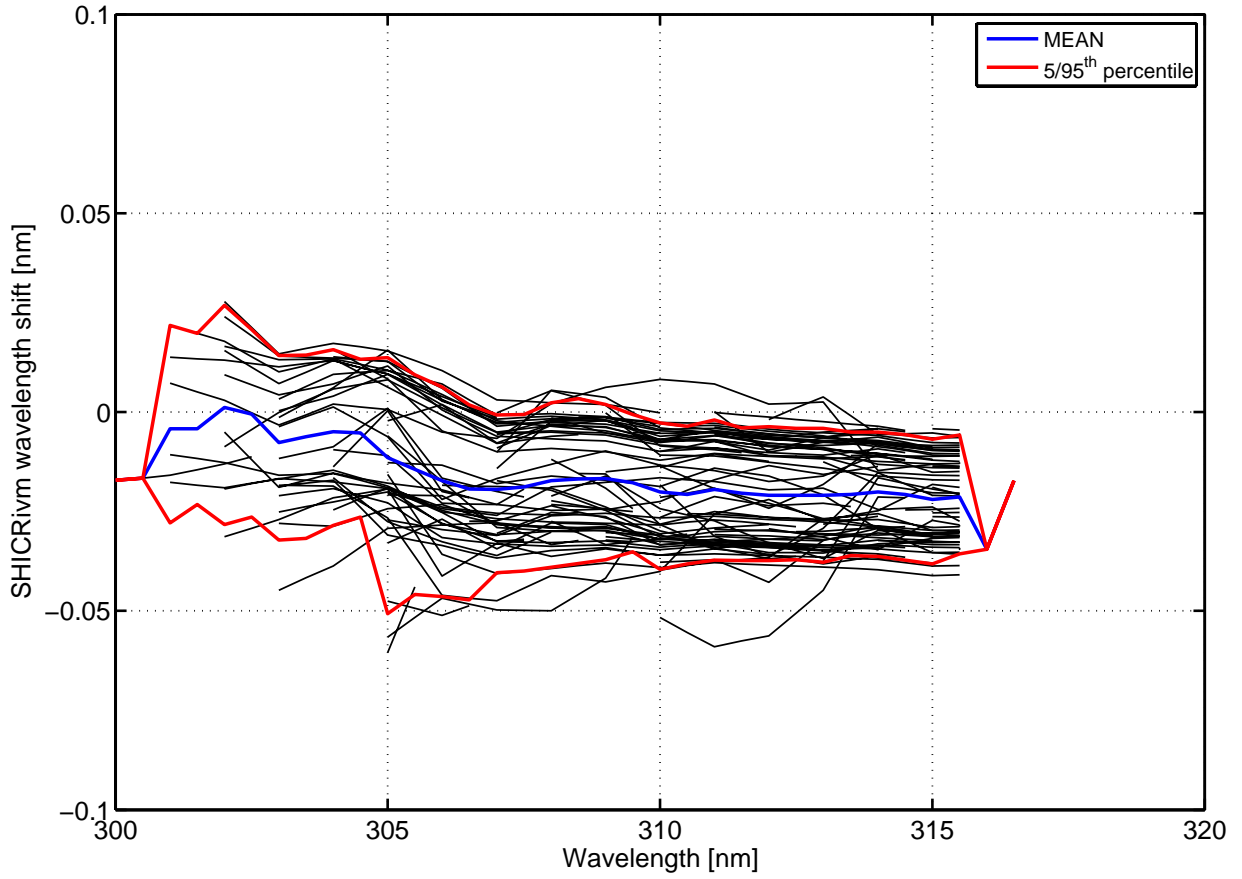


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Mean ratio 067/QASUME at Rome:23-May-2006(143) to 25-May-2006(145)



Rome, Brewer 067, May 23–25 2006



Spectral Responsivity change of B5503 at Rome, May 2006 (143–145), using T68523,T68524

