February 13, 2006

**Comparison of several extraterrestrial irradiances**
**Peter Kiedron**

Note: In February 9 version of this document an error is smoothing routine lead to creation of false artifact in the ratio of ET spectra around Ca 390nm Fraunhofer lines. This was corrected in this version (February 13). Also a spectrum from Germar Bernhard was included in the comparison and per Peter Pilewskie request the spectrum he provided was removed.

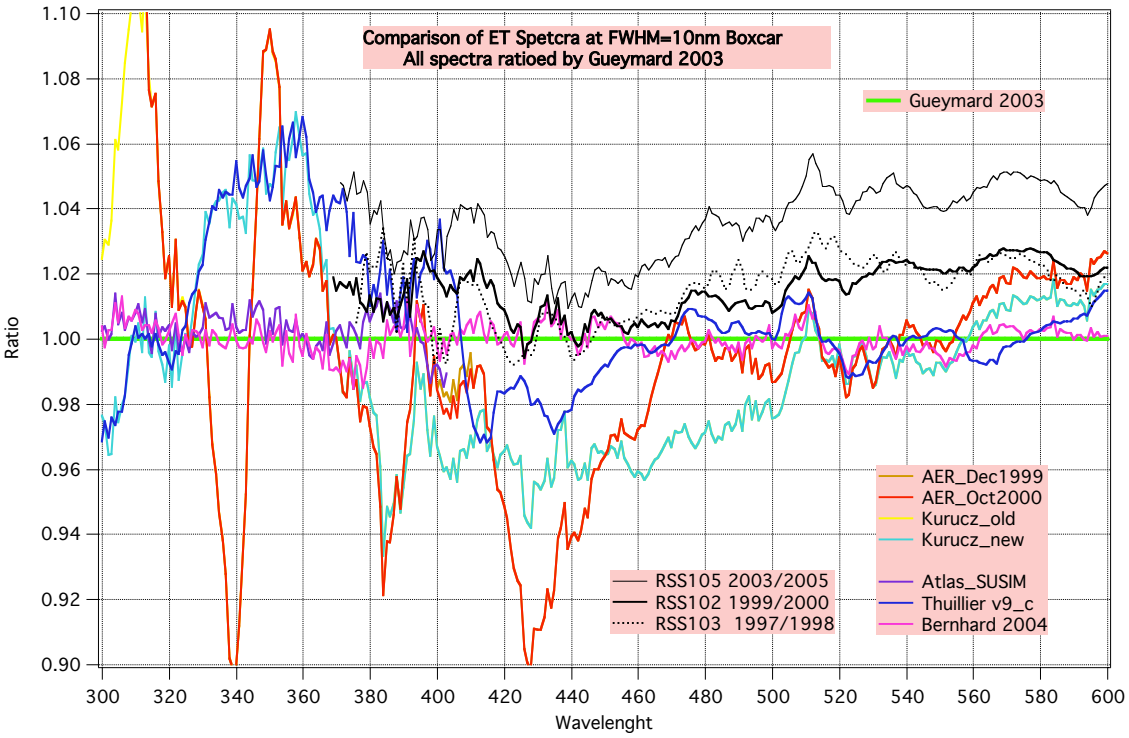
The following spectra were compared:

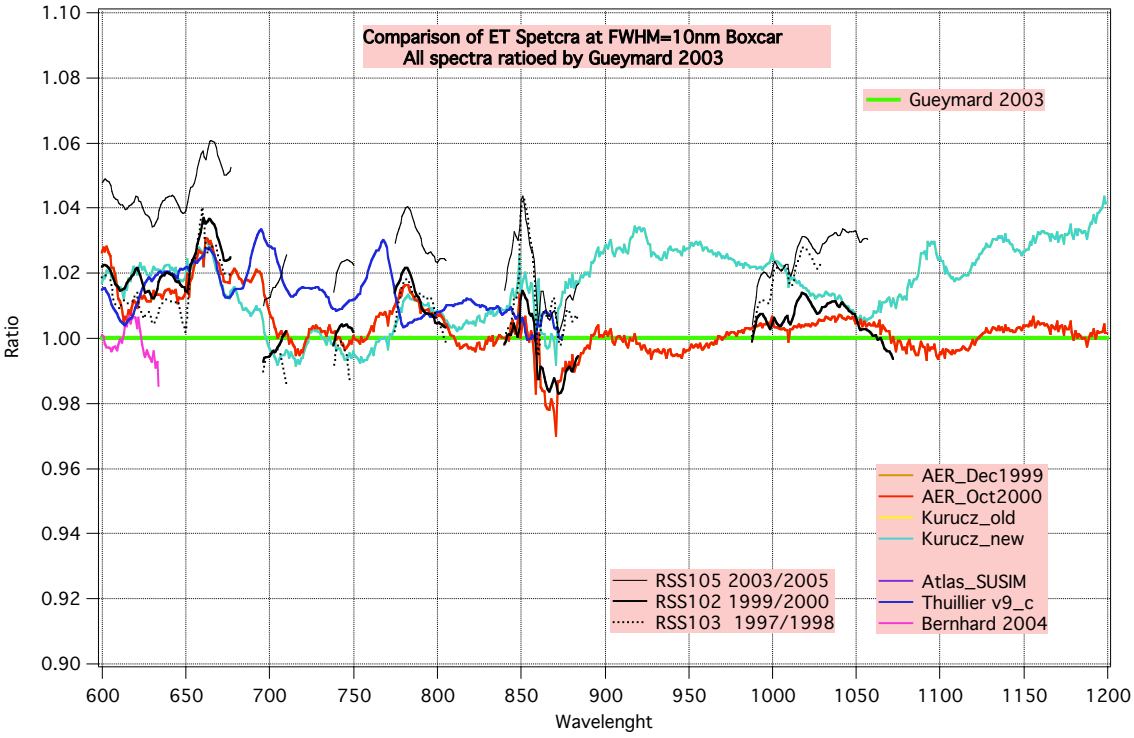
| Name on graph | File name | Data Provenance |
|---|---|---|
| Gueymard 2003 | NewGuey2003.txt | Directly from Chris Gueymard |
| Kurucz_old | oldkur.dat | These files came from Qilong Min in late 1990s |
| Kurucz_new | newkur.dat | |
| AER1999 | I_aerDEC99 | These Kurucz spectra came via AER (Tony and Eli) during work on RSS103&102 comparisons with LBLTR in 2000 |
| AER2000 | I_aerOCT00 | |
| Atlas_SUSIM | ATLAS3_SUSIM_13_Nov_1994 | Via Jim Slusser |
| Thuillier v9_c | uvviir_v9_c | From Thuillier in circa 2000 |
| Bernhard 2004 | ABS_ATL_SPEC_KITTPEAK2_NEWGUEY2003s.TXT | From Germar Bernhard |
| RSS103 1997/1998 | Vo_RSS103.txt | Generated at ASRC from SGP deployments and Licor and NIST/FEL lamp calibrations |
| RSS102 1999/2000 | ET_according_to_rss102.txt | |
| RSS105 2003/2005 | Vo_allAVG_RSS105.txt | |

The following publications are related to the used spectras:

| Name on graph | Reference |
|---|---|
| Gueymard 2003 | C. Gueymard, ""THE SUN,S TOTAL AND SPECTRAL IRRADIANCE FOR SOLAR ENERGY APPLICATIONS AND SOLAR RADIATION MODELS"", submitted to Solar Energy, 2003." |
| Kurucz_old | Kurucz, T.L., Synthetic infrared spectra, *Infrared Solar Physics*, *IAU Symp. 154*, edited by D.M. Rabin and J.T. Jefferies, Kluwer, Acad., Norwell Massachusetts, 1992.<br><br>Fontenla, J., O. R. White, P. A. Fox, E. H. Avertt, R. L. Kurucz, Calculation of solar irradiances. I. Systhesis of the solar spectrum, *Astrophys. J., 518*, 480-500, 1999. |
| Kurucz_new | |
| AER1999 | |
| AER2000 | |
| Atlas_SUSIM | Michael VanHoosier<br>vanhoosier@susim.nrl.navy.mil<br>202-767-2517 or 703-971-7646 |
| Thuillier v9_c | Thuillier, G., Herse, M., Labs, D., Foujols, T., Peetermans, W., Gillotay, D., Simon, P. C., & Mandel, H. 2003, Sol. Phys., 214, 2 |
| Bernhard 2004 | G. Bernhard, C. R. Booth, and J. C. Ehramjian. (2004). Version 2 data of the National Science Foundation's Ultraviolet Radiation Monitoring Network: South Pole, J. Geophys. Res., 109, D21207, doi:10.1029/2004JD004937 |
| RSS103 1997/1998 | Harrison, Lee, Peter Kiedron, Jerry Berndt, and James Schlemmer, Extraterrestrial solar spectrum 360–1050 nm from Rotating Shadowband Spectroradiometer measurements at the Southern Great Plains (ARM) site." *J. Geophys. Res.* 108: 4424, 2003. |
| RSS102 1999/2000 | |
| RSS105 2003/2005 | |

All spectra were smoothed with fwhm=10nm boxcar filter and then divided by Gueymard 2003. The results in 300-600nm range and 600-1200nm range are in the following two graphs.


Comparison of ET Spetcra at FWHM=10nm Boxcar
All spectra ratioed by Gueymard 2003
Gueymard 2003
AER_Dec1999
AER_Oct2000
Kurucz_old
Kurucz_new
Atlas_SUSIM
Thuillier v9_c
Bernhard 2004
RSS105 2003/2005
RSS102 1999/2000
RSS103 1997/1998
Ratio
Wavelenght


Comparison of ET Spetcra at FWHM=10nm Boxcar
All spectra ratioed by Gueymard 2003
Gueymard 2003
AER_Dec1999
AER_Oct2000
Kurucz_old
Kurucz_new
Atlas_SUSIM
Thuillier v9_c
Bernhard 2004
RSS105 2003/2005
RSS102 1999/2000
RSS103 1997/1998
Ratio
Wavelenght