Level 1 results from project:

Validation of SCIAMACHY In-flight Measured Irradiances, Radiances and Selected Tracegas Products by Comparison with Measurements from Independent Satellite Instruments (VIRTIS, FKZ: 50 EE 0025)

Jochen Skupin

Project status

- many level 1 problems already identified, most prominent ones:
  - wrong determination of polarization by 0-1 processor
  - problems in instrument calibration (inconsistencies in keydata provided by TPD, radiometric offsets)

$\Rightarrow$ level 1 validation with independent satellite instruments was postponed in favor of the so called 0-1 Masterplan (detailed plan to identify/correct errors and improve 0-1 processor and keydata)

$\Rightarrow$ byproduct of the 0-1 processor verification:
absolute radiometric calibrated solar spectra measured by SCIAMACHY in different viewing geometries

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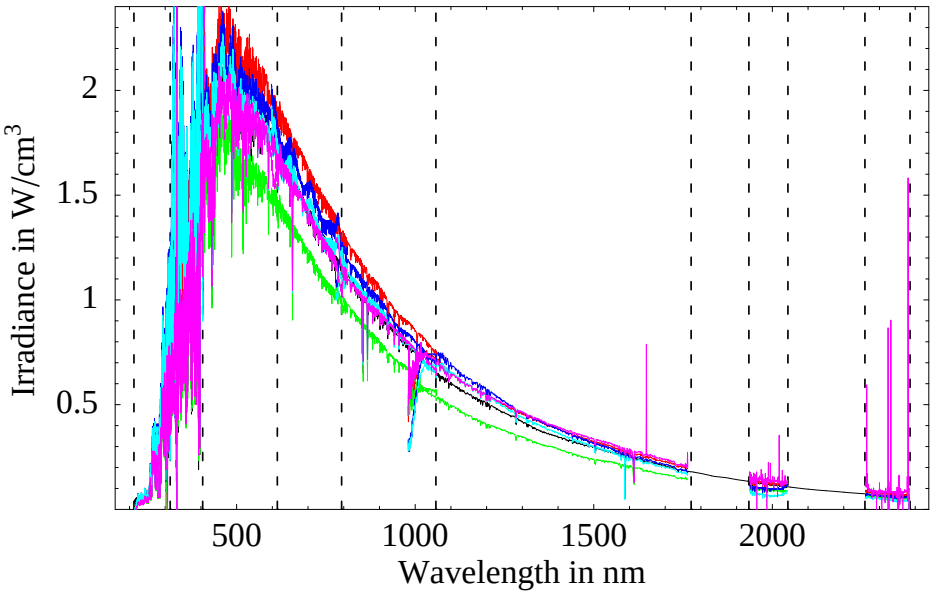
Solar spectra measured by SCIAMACHY in different viewing geometries compared with Kurucz solar irradiance spectrum



– Kurucz solar irradiance

– ESM diffuser (calib. with ABS_RAD, state 62)

– ESM diffuser (calib. with ABS_IRR, state 62)

– solar occultation (pointing, state 47)

– sub−solar (pointing, state 53)

– ASM diffuser (calib. with ABS_RAD, multiplied by 12, state 17)

- sun is an unpolarized source,
  polarization issues don't matter too much

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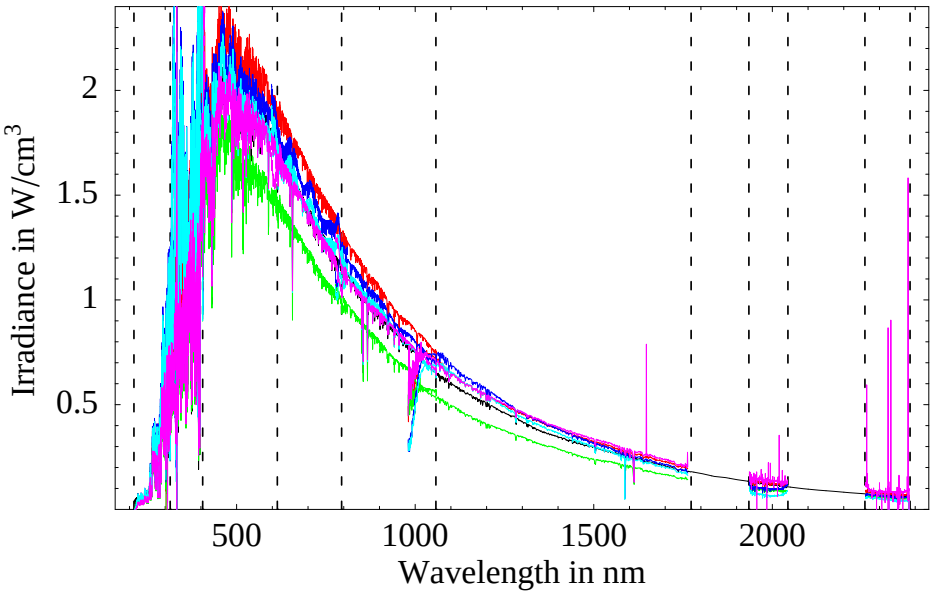

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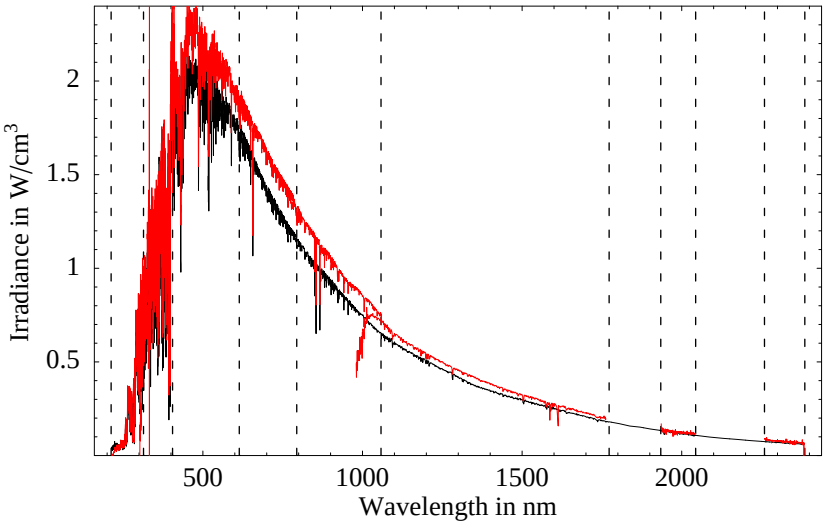
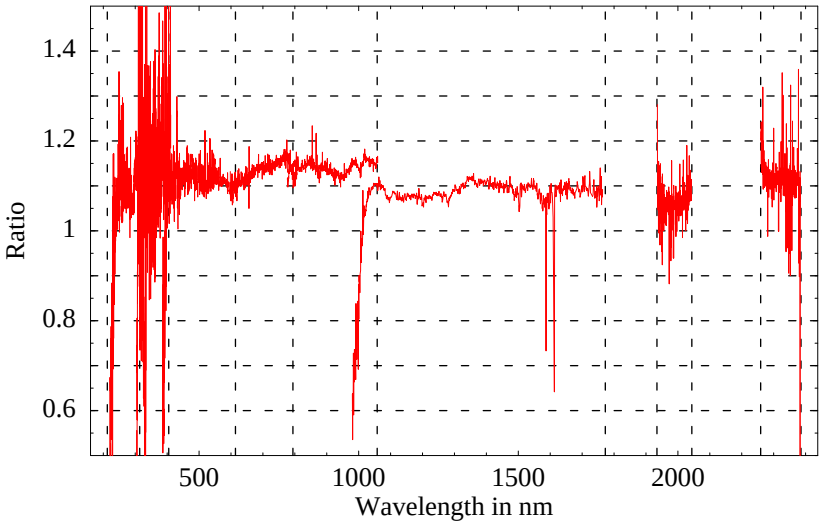
Calibrated ESM diffuser measurement (calib. with ABS_RAD, state 62)

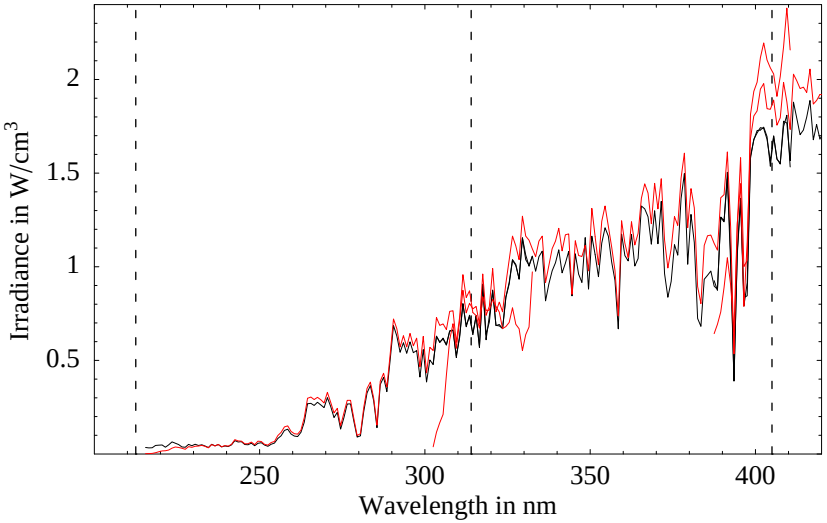
Comparison with Kurucz



Ratio with Kurucz



Comparison with Kurucz (UV binned to 1 nm)



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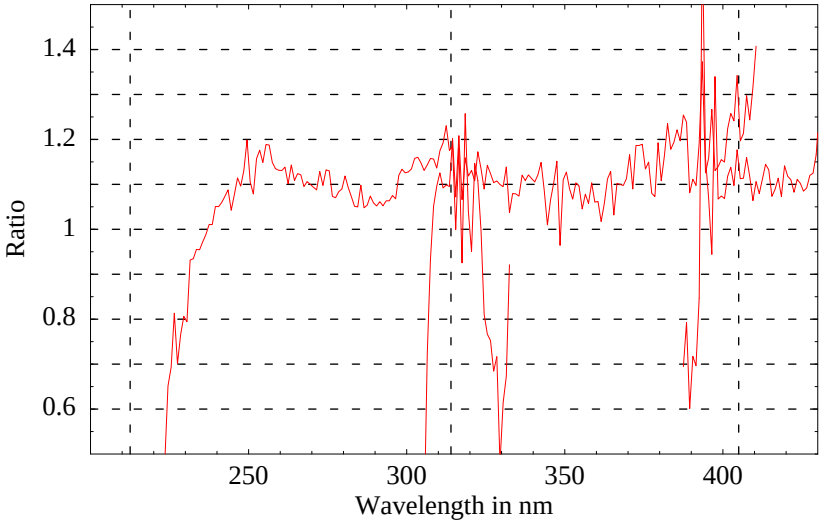

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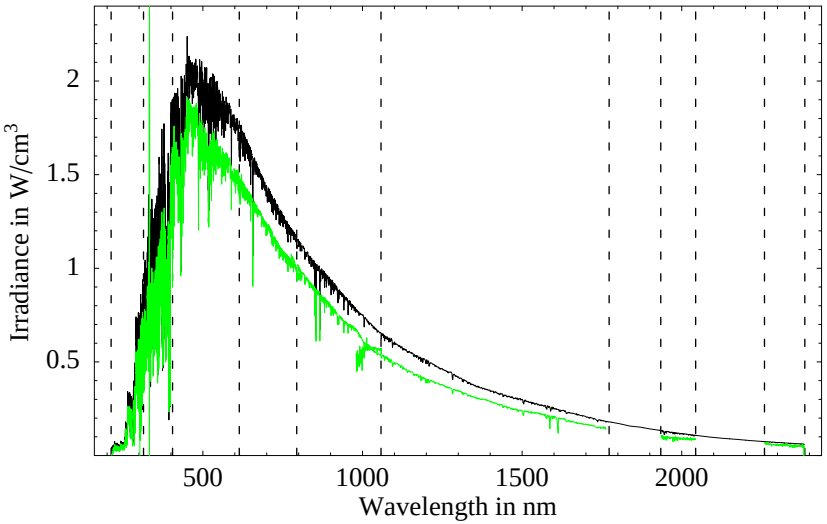

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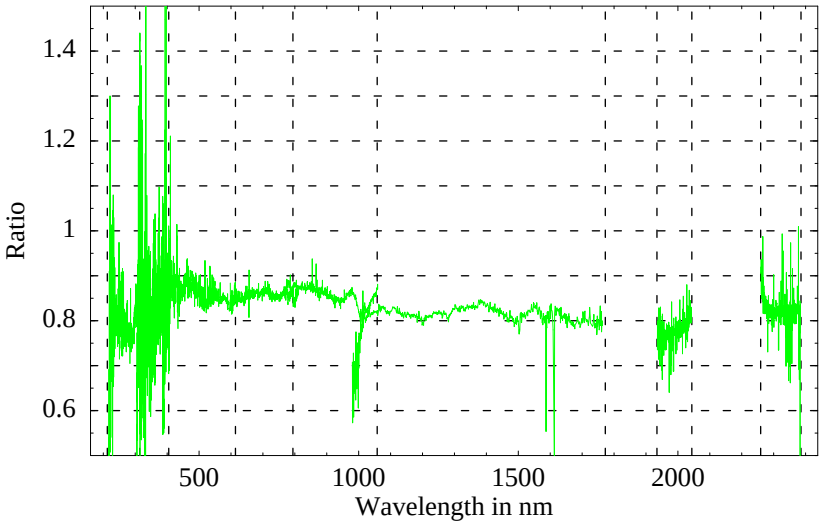

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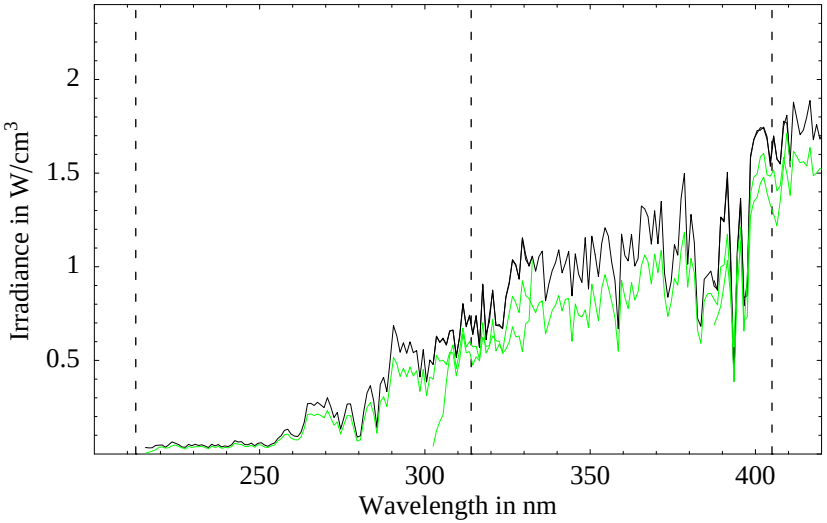

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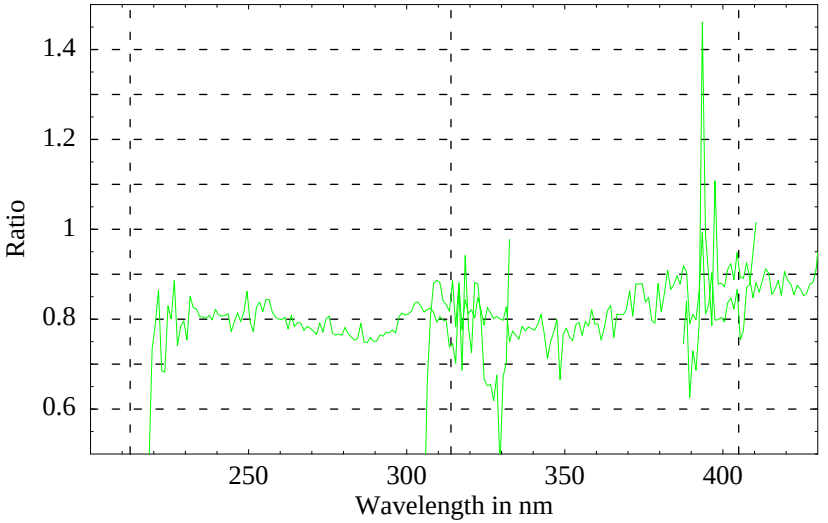

Calibrated ASM diffuser measurement (calib. with ABS_RAD, multiplied by 12, state 17)

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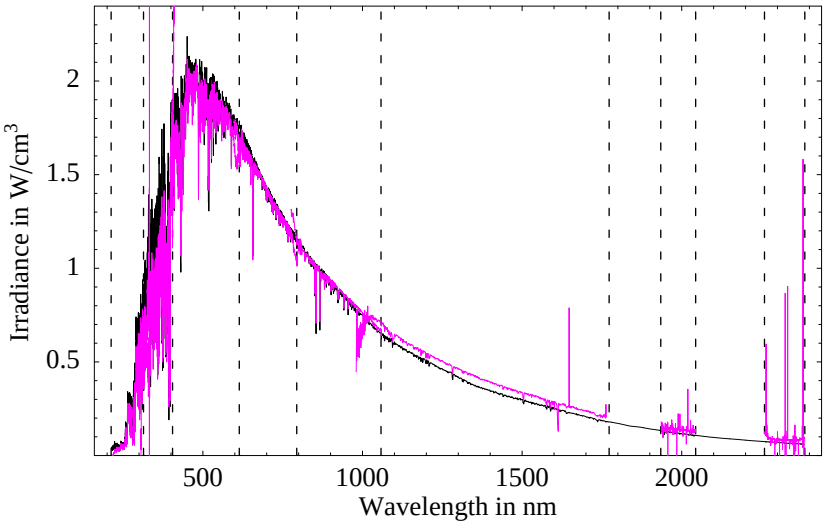

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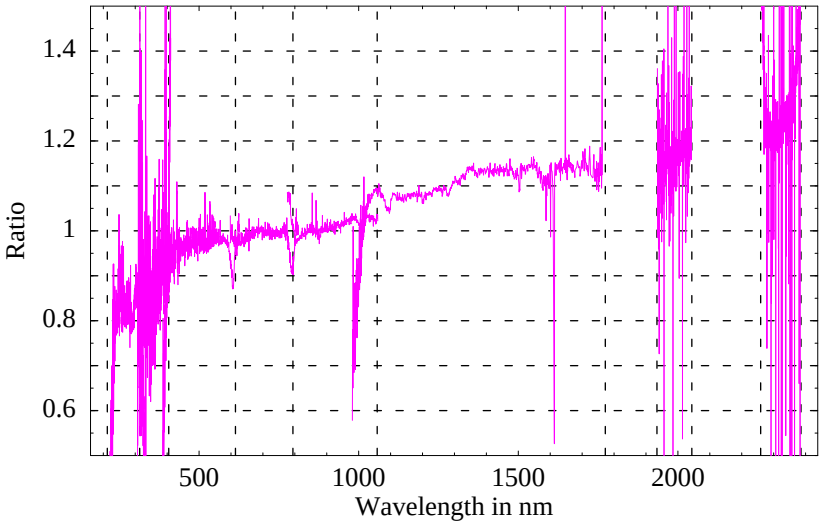

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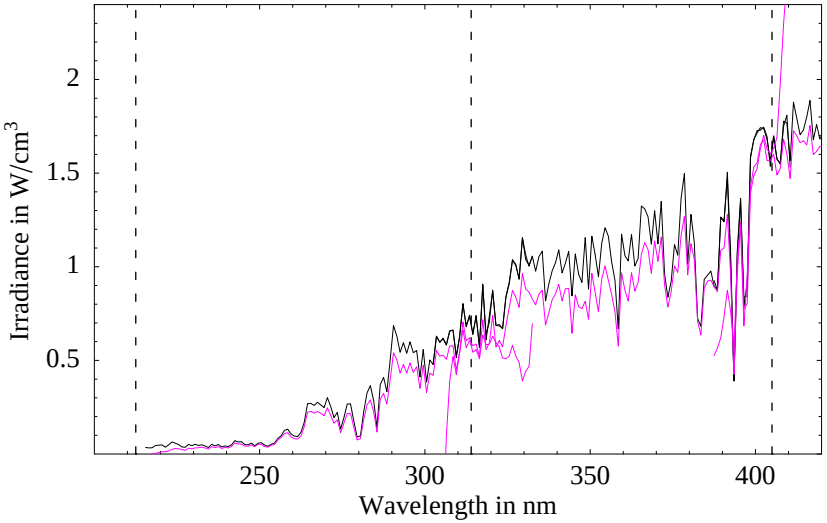

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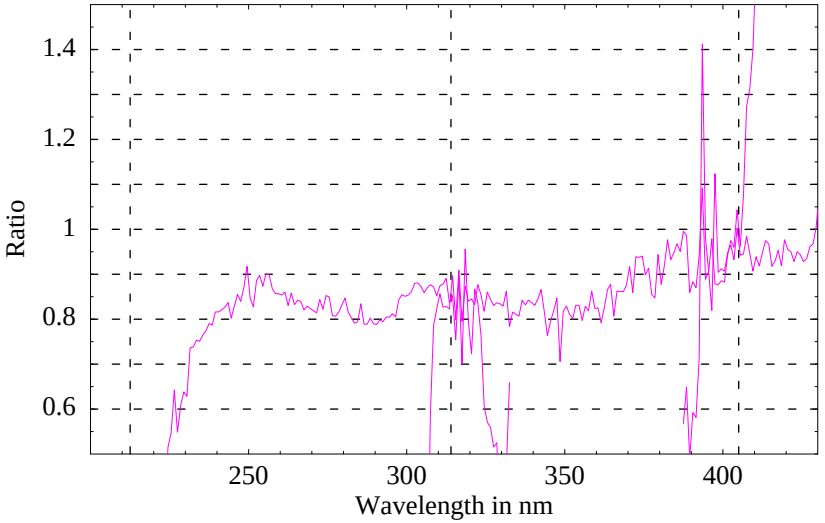
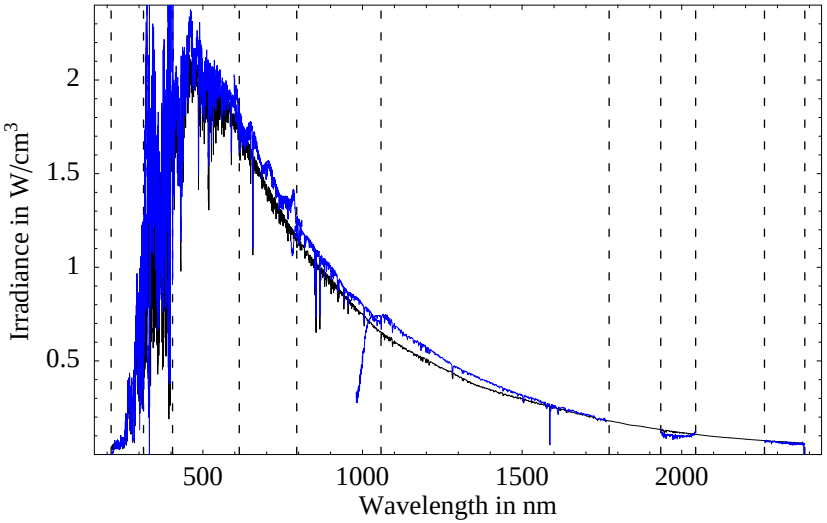


Calibrated solar occultation measurement (pointing, state 47)

Comparison with Kurucz



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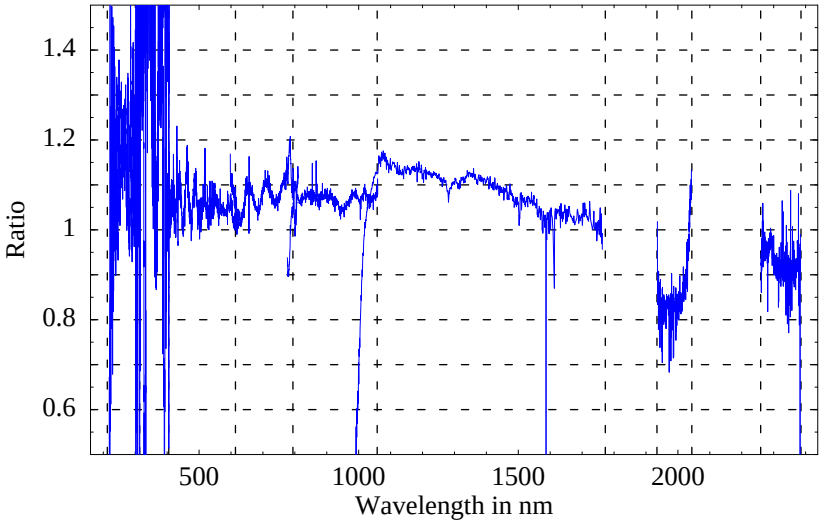

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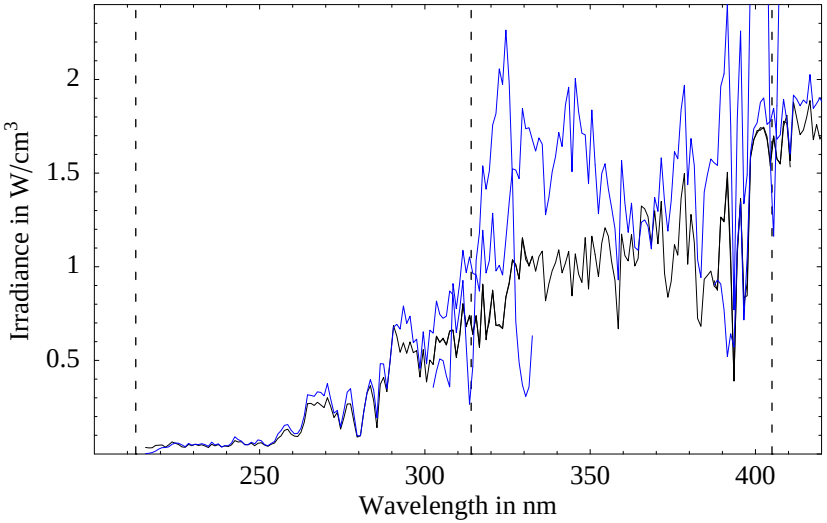

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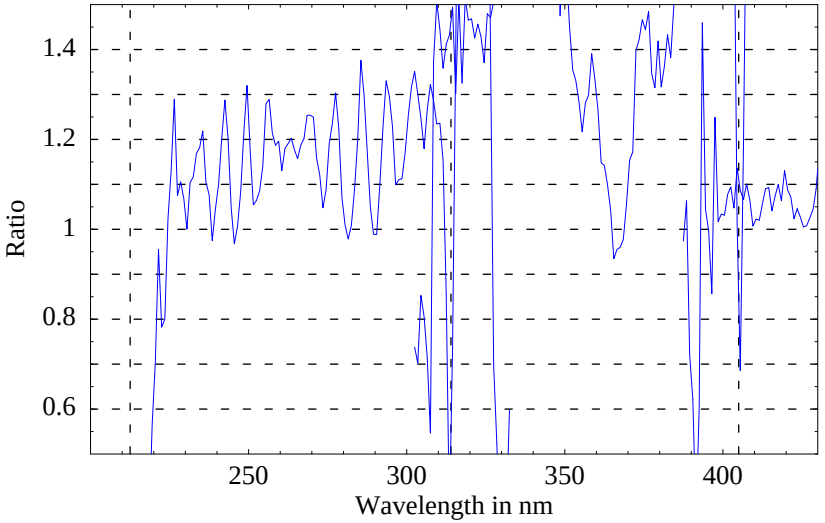
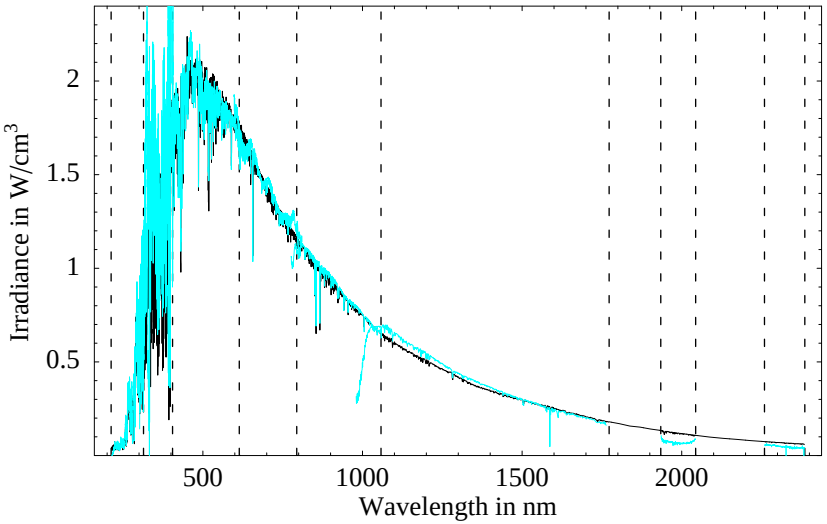


Calibrated sub-solar measurement (pointing, state 53)

Comparison with Kurucz



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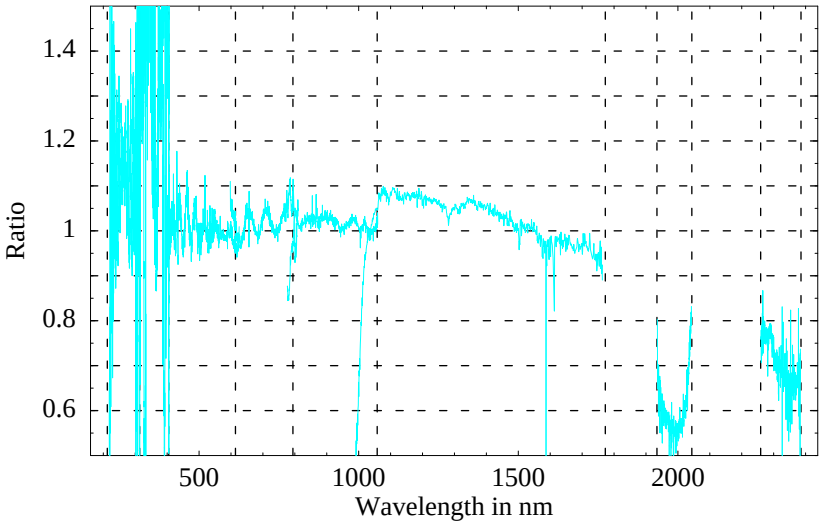

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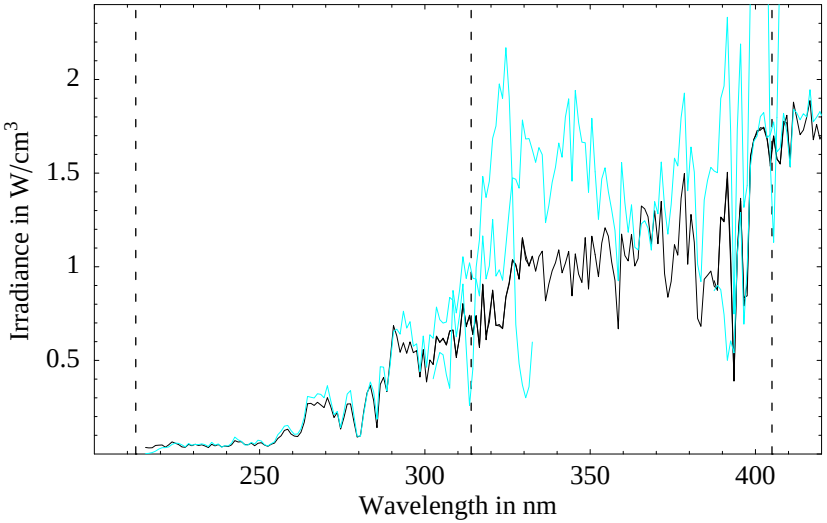

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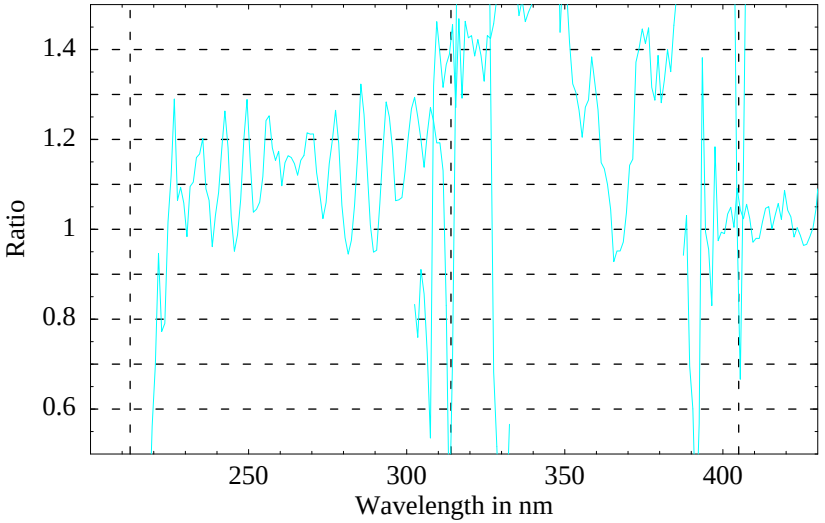

Conclusions

- ☺ instrument in good shape
  (solutions for problems in IR channels already defined)
- ☹ need for delivery of *all* measurement data from SCIAMACHY calibration periods (OPTEC 1-5) and documentation how to calculate keydata from these data (to be provided by TPD) to guarantee open calibration/keydata issues can be solved
- ☹ need for faster debugging, improvement and implementation of 0-1 and 1-2 processors
- ☹ need for faster 0-1 reprocessing of SCIAMACHY data in ground segment

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