General comments

This is a paper of high interest. Using only a well-proved technique (Langley) and high accurate, well calibrated instrumentation, the authors address a relevant scientific topic: an accurate estimation of extra-terrestrial Solar Spectral Irradiance (SSI), here presented between 300 and 500 nm. This is a major inputs for atmospheric science, obtained without any measurements from space, and also, an improvement of their own previous results (JGR, 2001). The spectral measurements at high resolution presented here meet the demands of the radiative transfer modelling because of the wavelength dependence of the photochemical reactions taking place in the planetary atmospheres. The problem of the limited spectral resolution of double monochromators is well addressed here by this combination of two instruments for the Langley plots. The quality of the results (instrumentation, scientific work, field measurements) is clearly sufficient to support the interpretations and conclusions, in spite of the cut-off at 300 nm (in comparison with space based measurements going down to the deep UV, but suffering in other hands, from many limitations to maintain the radiometric absolute scale). In the present paper, the results are clearly useful for atmospheric, ground-based and oceanic researches, and less for solar physics and SSI variability (because of the limitation to 300 nm). The paper present an original and new contribution, through fruitful collaborations between renowned institutes (PMOD, PTB, ISO), and the reference to previous an similar works is also well stated (text, number and quality of appropriate references). The traceability to the PTB absolute radiometric scale was well managed during all the duration of the field campaign.

The title is clear and reflect the content of the paper. The abstract present a concise summary. For the overall presentation, it is well structured but the balance between the text and the number of equations/plots could be a little bit revised, to avoid that mathematical formulae were sometime only described by sentences. For the reader, facing to the description to the instrumentation and data processing, it could be preferable to have more plots, schemes and equations. The general measurement equations (for both instruments) could be presented in the paper to provide a good general overview of the data processing. Some part of the paper could be clarified, as it will be explained here after.

Specific comments

- Page 3, line 8: description of the tube for direct solar measurements (FOV of 2.5°). Is there any estimation of the circumsolar contribution (2.5° minus the solar disk) that should be non-negligible in the UV during field measurements (in comparison to space measurements)? At the PTB, the straylight in this FOV should have been normally removed during the calibration. Maybe the stability and performances of the solar tracker allowed a possible reduction of the FOV to ~1°? It is an important topic for the extra-terrestrial SSI retrieval from Langley plots.

- Page 3, line 14: only one lamp was used to monitor a possible change of absolute responsivity due to transportation and aging effects. Why not more than one lamp? A triplet of lamps would have improved the uncertainty budget.

- Page 3, line 20: same remark for the FOV and circumsolar UV contribution, fully negligible?

- Page 3, lines 25-29: it could be better for the reader to present the equation of this instability correction, instead of sentences. We understand that a comparison between the filter radiometer and the weighted FTS spectrum (by the SRF of the radiometer) can help for instability correction, but what means (line 28) 'radiometric corrected FTS spectrum'? It should be better to present here the equation (that should be also a part of the main FTS measurement equation).

- Page 4, line 10: Maybe it should be indicated somewhere that the retrieval of I0 is 'model dependent' (in comparison with space measurements), through the relationship between SZA and the individual air mass, plus the modelization of the ozone layer.

- Page 4, line 12: the range of AMF was fixed to 1-3.5, instead of 2-6 or 2-8 in general. For AMF > 3.5 it is due to SNR limitation, we assumed, but what about the atmospheric instabilities for AMF below 2 (noon time at IZO)?

- Page 4, equation (3): so, on the left, there is all parameters/variables measured or estimated by calculation and modelling. But (line 21-23), using the AERONOET data from IZO and calculation of m_aod, it is also possible estimate the product Tau_aod x m_aod and to put this contribution on the left before the Langley regression. Is it how you proceeded?

- Page 4, line 22: write 'to the total optical depth' instead of 'to the aerosol optical depth'?

- Page 4: could it be possible to have at least, one Langley plot (one of the 7 selected) to improve the traceability of your works?

- Page 5, line 9 to 14: so you performed simulated Langley plots? Is it correct? What was the reference spectrum I0 used for this study?

- Page 7, line 1: could it be possible to add the reference for the kittPeak high resolution spectrum in absolute level?

- Page 9: comparison with other spectra. Even if the SSI variability is not very high above 300 nm, it should be preferably mentioned in the discussion that the comparisons are performed for the different dates (please indicate the dates) and thus, different solar activity. This fact could affect or not (depending on the amplitude of expected SSI changes) the ratio of spectra. Could you estimate this contribution?

Technical corrections

- Page 2, line 28: 'W' instead of 'S' for the longitude of IZO.