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Atmospheric Measurement Techniques Discussions

Interactive comment on "Metrology of the Solar Spectral Irradiance at the Top Of Atmosphere in the Near Infrared Measured at Mauna Loa Observatory: The PYR-ILIOS campaign" *by* Nuno Pereira et al.

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Response to referee: The authors acknowledge the inputs of the referee which added value to the quality of the manuscript, namely concerning the quantification of the uncertainties in air mass factors.

Major issues General comment: the sentence on lines 1-2 of p.11 has been rewritten as it was intended to only compare IRSPERAD (Izana 2011) and PYRILIOS (MLO 2016) and declare PYIRILIOS as the more reliable of the two and not of all NIR datasets.

Langley plots selection: section 2.7 was updated taking into account the reviewer comments: The criterion for the selection of Langley plots (max 10% variation during half-day) was replaced by an analysis of the sensitivity of the Langley method to the aerosol optical depth (AOD) as measured by the AERONET instruments. The only remaining data pre-reduction criterion is the selection for cloudless clear sky (half-) days. The removal of this criterion allowed us to increase not only the number of half-days available (8 to 12) but also to work with lower AMFs. The results of the analysis of this sensitivity are presented on section 3.6. Figure 1 updated accordingly.

Air mass calculations: The Schmid and Wehrli approach for the calculation of air masses was already being used in this data treatment (but not stated); their method to estimate the uncertainty in the AMF calculation is now included; section 2.2. was rewritten and section 3.5. (Estimation of air mass factors uncertainties) was added. Minor issues

The flat-field of the instrument was measured during the ground based campaign at MLO. The telescope was interfaced with the sun tracker body through an angular fine-tuning mechanism; this allowed us to establish a precise parallelism between the sun tracker detector and telescope sun-facing surfaces. This mechanism permitted to precisely depoint the telescope relative to the solar tracker and thus the Sun for a series of angles, for two perpendicular directions. The results are shown in Figure 1 of this document. Green and blue markers represent the two perpendicular directions of depointing. The dashed lines represent the Sun tracking accuracy, $< 0.01^{\circ}$, provided by the manufacturer the response of the detector is flat within these limits as seen by both curves.

The linearity of the instrument was measured during the PTB calibration. It was previously referred in page 5 lines 2&3 that the blackbody 2 temperature set points are used to verify the linearity of the spectrometer. This can be misleading as this was just an extra verification of the linearity. The linearity was verified using a dedicated experimental setup in which the entrance optics was moved away from a stable 200W

lamp for a series of known distances; the measured distance-irradiances data points were successfully fitted to an inverse square law function.

Although not previously referred in text, the solar zenith angle calculated with Meeus [1998] algorithm was corrected for atmospheric refraction, according to Bennet [1982]. This is now stated in the text.

Specific points

P1,l16: reference added P1,l17: done P2,l23: done P6,l9: no table A1 anymore Figure 3: figure updated Table A1: no table A1 anymore

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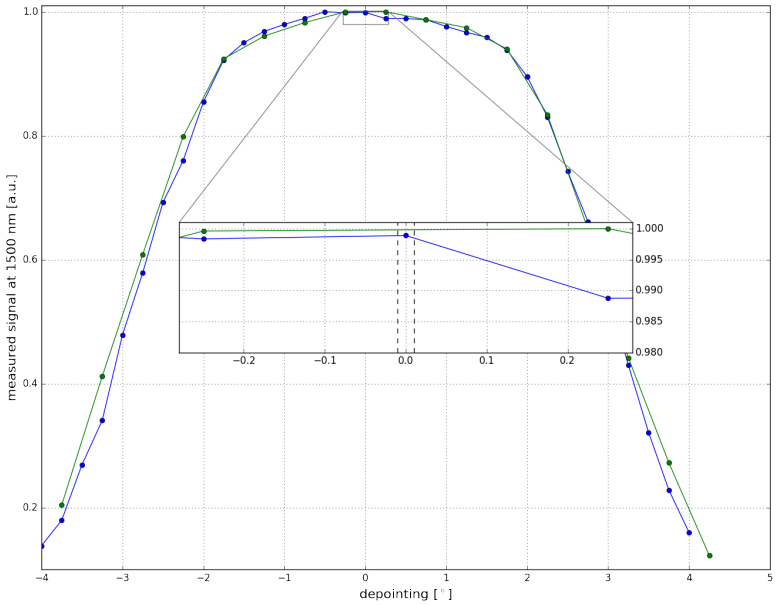

Fig. 1.