

## ***Interactive comment on “Recent variability of the solar spectral irradiance and its impact on climate modelling” by I. Ermolli et al.***

**G. Kopp**

greg.kopp@lasp.colorado.edu

Received and published: 15 October 2012

A nice overview of the (surprisingly large!) variations between SSI measurements. It's nice to have those published so the community is aware of their limitations when applied to long-term climate studies.

I'll instead focus my comments on the much easier TSI section, §2.3.

1) Regarding understanding the former offsets between TSI instruments, the authors are taking undue credit by claiming that "PREMOS ... has solved this discrepancy" (p. 24575, lines 18-19). PREMOS has certainly contributed to the understanding of the instrument offsets and it has confirmed the lower TSI value initially reported by the SORCE/TIM (Kopp, Lawrence, Rottman, Solar Physics, 2005) by transferring the

C8189

ground-based TRF calibrations to space. However, it is greatly overstated to claim that the discrepancy was \*solved\* by PREMOS.

The causes of the discrepancy, namely uncorrected scatter and diffraction, were identified at the 2005 TSI Accuracy Workshop (summarized by Butler et al. 2008) and verified prior to the PICARD launch by TSI Radiometer Facility (TRF) testing of the PREMOS, VIRGO, and ACRIM3 instruments (as reported by Kopp & Lean, GRL 2011; Kopp et al, Metrologia 2012). The solution has been the work of the international TSI community, including contributions from NASA and NIST (2005 TSI Accuracy Workshop), TRF calibrations of the PREMOS and VIRGO2 (Fehlmann, thesis, 2011), TRF funding by NASA, and TRF calibrations with the ACRIM3 team. It was these ground-based tests and collaborations that identified, quantified, and verified the causes of the discrepancy between the TIM and older TSI instruments.

The PREMOS results are certainly a valuable contribution to understanding the TSI offset discrepancies, but this effort has involved many collaborative groups over the last 7+ years.

2) The ACRIM3 results are not consistently represented throughout this section. They are referred to as being high relative to the SORCE/TIM (p. 24575, line 16) and then later (p. 24576, line 12) as being corrected to a lower value agreeing with the TIM. The most recent ACRIM3 data (Version 11/11) and even a prior version (11/04) gave a TSI value very comparable to the SORCE/TIM; indeed, if I remember correctly, this earlier and lower-valued ACRIM3 11/04 data version preceded the public release of PREMOS data in agreeing with the now-accepted lower SORCE/TIM values.

Similarly, Table 1 shows an outdated ACRIM3 value from at least three data versions ago.

3) Regarding the statement that for "SOHO/VIRGO the scattered light issue was not the reason for its discrepant reading" (p. 24576, line 14): It may well be that scattered light is the reason for the discrepant reading of the SOHO/VIRGO, since scattered

C8190

light could similarly be the cause of the erroneously high readings of the WRR against which the VIRGO is calibrated. That is, scattered light could cause discrepant readings in \*both\*, which would also explain why "the WRR offset produced approximately the same systematic shift as the [VIRGO] scattering error" (line 17).

4) "Solar constant" is an archaic misnomer, and should be referred to as "TSI". I do understand that while this term has historical attachment, we are now working at a fidelity where solar variations are relevant for climate modeling, so "solar constant" is outdated.

---

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 24557, 2012.

C8191