The second International Pyrgeometer Comparison (IPgC-II)

27 September-15 October 2015

PMOD/WRC, Davos

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Measurement Platform at PMOD/WRC

38 Pyrgeometers
- 7 Eppley PIR
- 22 Kipp&Zonen CG(R)4
- 9 Hukseflux IR20

2 ACP
4 IRIS
Campaign overview

12 shaded / 26 unshaded positions
All but one ventilated

8 Pyrgeometers on operator data acquisitions
30 on PMOD/WRC DAQ

All Pyrgeometers were characterised in the PMOD/WRC blackbody

Measurements stored as 1-minute averages.

Analysis using the extended Albrecht formula:

\[ E = \frac{U}{C} (1 + k_1 \sigma T_{BODY}^3) + k_2 \sigma T_{BODY}^4 - k_3 \sigma (T_{DOME}^4 - T_{BODY}^4) \]
IRIS-ACP-WISG intercomparison during IPgC-II

2 clear nights: 29-30 September 2015

- ACP-IRIS < ±2 Wm⁻²
- WISG-IRIS/ACP = -5 Wm⁻²

The difference WISG to IRIS/ACP published in Gröbner et al., 2014 is confirmed during IPgC-II
Measurements of all pyrgeometers

3 Pyrgeometers without solar-blind filters
Night measurements

IPGC-II

Longwave irradiance Wm\(^{-2}\)

Difference to WISG Wm\(^{-2}\)

NIGHT & ALL DATA

Date

09/27 10/04 10/11

250
300
350

0
5
10

-10
0
5
10

09/27 10/04 10/11

Date
Residuals to WISG (after calibration)

Residuals to WISG:

\[
\begin{align*}
<\text{CG4}> &= 0.38 \text{ Wm}^{-2} \\
<\text{PIR}> &= 0.53 \text{ Wm}^{-2} \\
<\text{IR20}> &= 1.03 \text{ Wm}^{-2}
\end{align*}
\]
Daytime measurements WISG

IPGC-II

Longwave irradiance Wm$^{-2}$

Date

ALL DATA

Difference to WISG Wm$^{-2}$

Date
Daytime measurements relative to WISG

DAY & NIGHT DATA

CG(R)4
4 shaded

PIR
3 shaded / 2 unshaded

IR20
New Type T2
Body temperatures

IR20, when heated & ventilated

3 Wm$^{-2}$
Comparison to previous calibrations
Still much left to explore

- Analyse individual instruments
- ...Instrument types
- Day and Night effects
- Shade/unshade experiment
- Laboratory / WISG Calibrations
- Correlations with regard to ambient conditions (temperature, water vapour, …)

Share IPgC data (for example from Working group IR)