Long-term stability of two Eppley and two Kipp&Zonen pyrgeometers

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10/1994 – 10/2001   10/2001 – 05/2003   05/2003 –

Used Instruments

PIR 32800   unshaded; calib. by PMOD
CG4 020599   unshaded; calib. by K & Z
PIR 32802   shaded; calib. by PMOD
CG4 000517   shaded; calb. by K & Z
          (-> 18.10.2011)
CG4 000515   shaded; calib. by MOL-RAO
          (18.10.2011 ->   )

Data acquisistion system:
Combilog 1020 (Fa. Friedrichs, Hamburg)

Used formulas:

$$A_{PIR} = \frac{U}{C}(1 + k_1\sigma T_b^3) + k_2\sigma T_b^4 - k_3\sigma(T_d^4 - T_b^4)$$

$$A_{CG4} = \frac{U}{C} + \sigma T_b^4$$

Methodology
- Calculation of the mean A_{mean} for every minute
- Calculation the deviation $d_i = A_i - A_{mean}$
- Selection of cloud-free minutes
- Applying the APCADA-Algorithm to every instrument
- If N=0 <u>for</u> all instruments of one record -> selection of those data record
- Distinguishing between night-time and day-time
- (night-time: SZA > 95°; day-time: SZA < 85°)
- Condensing the data into monthly means

-0.70; -0.85
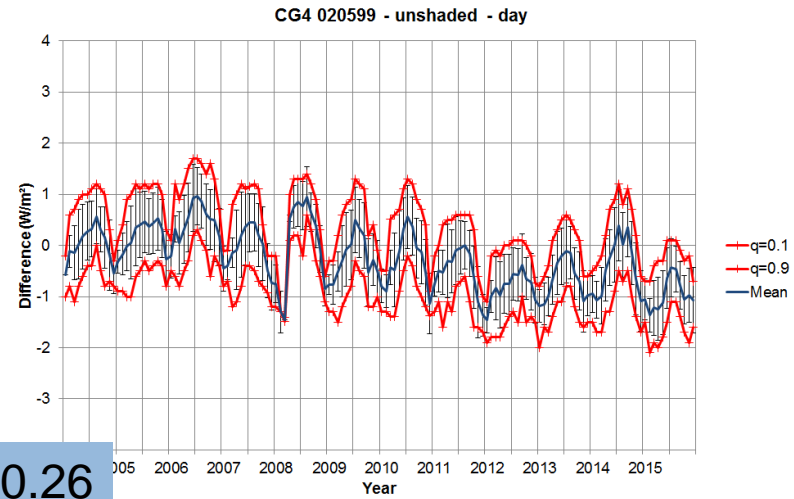1.85; -0.30

PIR 32800 F3 - unshaded - day
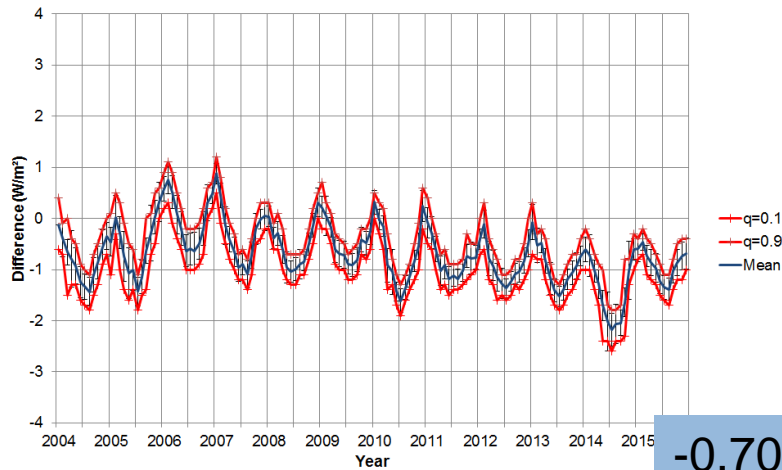
CG4 020599 - unshaded - day
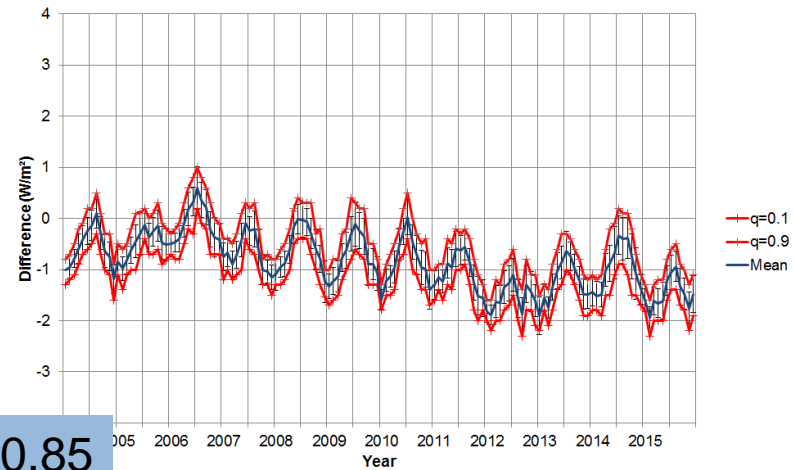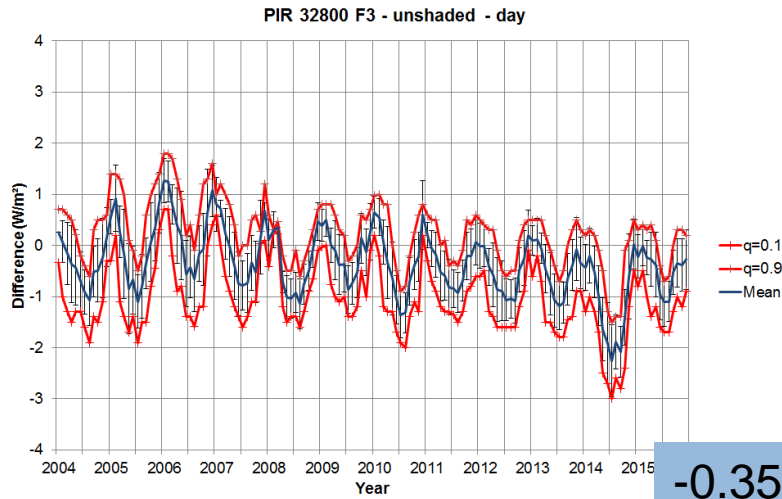
PIR 32802 F3 - shaded - day
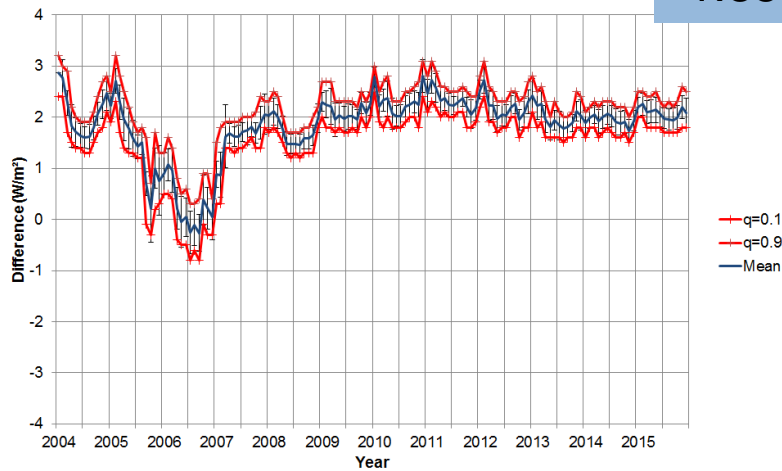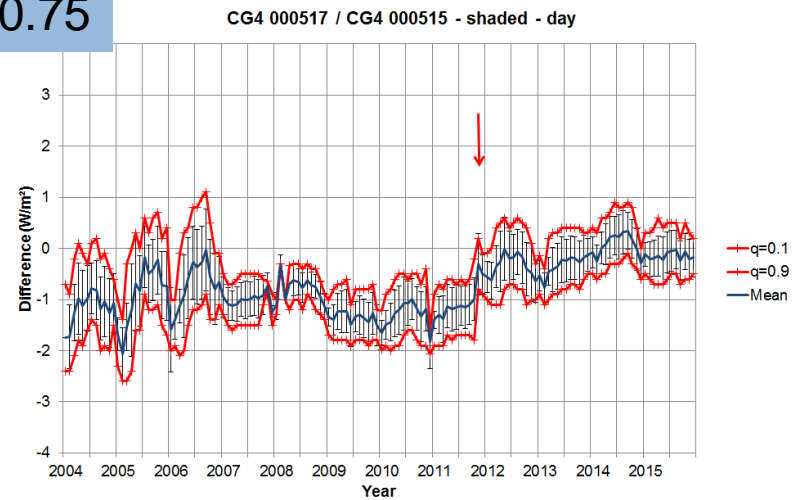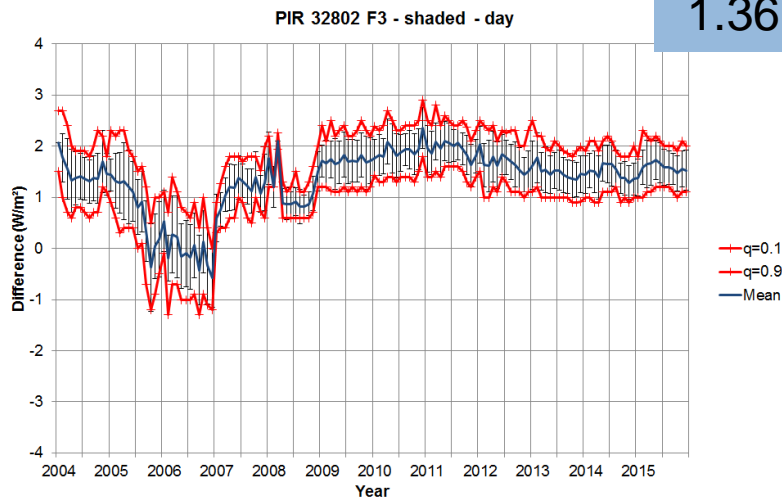
CG4 000517 / CG4 000515 - shaded - day
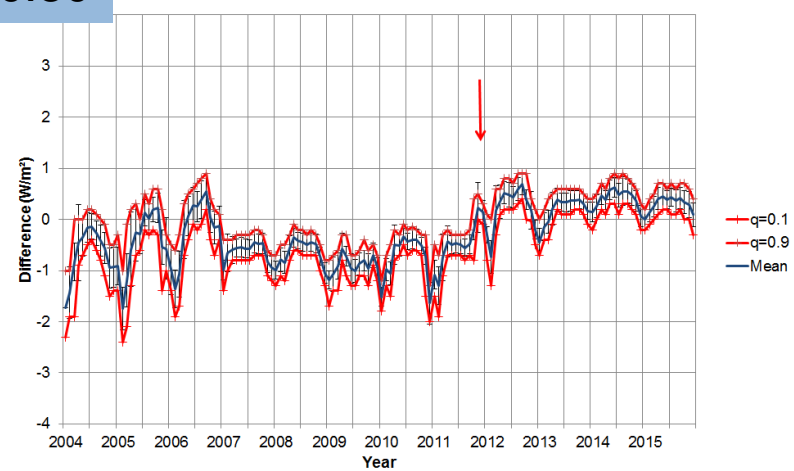
-0.35; -0.26
1.36; -0.75

	P u	C u	P s	C s
Night-time:	-0.70;	-0.85;	1.85;	-0.30
Day-time:	-0.35;	-0.26;	1.36;	-0.75

Summary/Conclusions

- Two pyrgeometers show annual course which has to be investigated
- The pyrgeometers are stable over a time period of > 10 years within 2 W/m²
- A further data analysis is necessary to explain some open questions

Thank you for your attention!

Photo: Jörg Karpinsky