

## ***Interactive comment on “Reconstruction of high resolution time series from slow-response broadband solar and terrestrial irradiance measurements by deconvolution” by A. Ehrlich and M. Wendisch***

**Anonymous Referee #2**

Received and published: 11 June 2015

The paper describes a method to reconstruct faster response data from originally slow-response measurements of longwave irradiation.

It is an important issue for applications that need to catch rapidly changing conditions (fast responding pyranometer in the photo-voltaic business for instance) or if the sensor is moving fast during sampling. Here the focus is on the latter.

The authors provide a thorough discussion of instrument specifics as well as the theoretical base of the deconvolution algorithm. Results of well-defined laboratory exper-

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iments are documenting the general applicability of the chosen approach. In section 4 two real data examples with upwelling longwave irradiation over partly broken sea-ice and scattered clouds above ice are discussed. Very interesting and substantial work !

Some minor comments/suggestions/corrections:

title:

The work is demonstrating the feasibility for reconstruction of slow-response terrestrial irradiance measurements. A similar behaviour can be expected with solar irradiance by pyranometers (as mentioned in section 1, line 85-88). But lab and field applications are conducted using CGR4 and no further specific work is presented related to pyranos. It should have it to be announced in the title.

sec 1, line 104-113:

Attitude correction is definitely needed with solar irradiance. However it is mentioned that no correction is applied and moreover no solar irradiation data are subject of interest later in the text. Might be stated less contradictory. What about attitude correction of longwave sensors ??

sec 1, line 125-129:

The aspect of a potential temperature equilibrium time lag is discussed with PIR, but laboratory and field measurements were conducted with CGR4. What can be stated about that ?

sec 3.2/sec 3.3.1

Amplitudes written in the text (line 392, 395) provided for boxcar reconstruction obviously do not correspond to what can be observed in figure 3. Moreover it shall be exactly the same as with the periodic oscillating time series (line 456-458) ??

conclusions, line 820-821:

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As discussed with the title, I do share your point of view that the setup would work with pyranometers, too. But time constants vary a bit, signal amplitudes differ and no results of investigations using pyranos are presented here. Thus a suggestion would be to use a more careful wording.

Typos:

- line 93: can 'be' faster instead of 'by'
- wrong year (2015 instead of 2012) provided at line 636, captions of figures 7 & 8
- line 749: 'can be removed efficiently'

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Interactive comment on Atmos. Meas. Tech. Discuss., 8, 5179, 2015.