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Interactive comment on “Using digital image processing to characterize the Campbell–Stokes sunshine recorder and to derive high-temporal resolution direct solar irradiance” by A. Sanchez-Romero et al.

G. Stanhill (Referee)

gerald@agri.gov.il

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Review AMT -2014-250 This paper presents a useful, detailed and clear description of a digital image-processing system to measure the width and length of the burn produced by direct solar radiation on the daily cards used in the Campbell –Stokes sunshine recorder. Results obtained using this system with a sample taken from two years of measurement from two models of CS sunshine recorders are then compared with measurements of direct beam irradiance obtained with a pyrheliometer. I recommend

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the paper's publication after the authors have addressed the few general and detailed comments listed below. General comments 1. The important comparison between length and breadth of burn as proxies for direct solar beam radiation presented in this paper should be supplemented by a comparison with the use of their product: that is the area of the burn. This would resemble the initial approach in which Campbell used the volume of wood burnt, and more recently and relevantly the paper by Galindo Estrada and Fournier D'Albe (1960 Q. J. Roy Met Soc 86) who compared daily values of the mass of sun card burnt with pyrheliometer readings. 2. Some practical details would be helpful to those thinking of using the system; How long does it take to process a sun card? What is the cost of the equipment needed? How available are sun cards stored in national meteorological service archives? Do sun cards deteriorate with time?

Detailed comments Lines 169-172 Why were only 269 sun cards examined out of 731 possible and how was this sample selected?

Line 276 Transparent rather than efficient.

Line 372 Also shown to be dependent on time interval.

Lines 443-447 The differences described are more than 'slight'.

Lines 530-531, 584-585, 622-624, 627-628, 634-635. These references are incomplete.

Gerald Stanhill

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