

Interactive comment on “Development of a sky imaging system for short-term solar power forecasting” by B. Urquhart et al.

Anonymous Referee #3

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This paper discusses the design, development, and operation of a high dynamic range camera (the USI), with a close-to full sky field of view, to be used for cloud measurements for assisting solar power plant operations. The camera is designed to be sufficiently fast to enable useful insolation forecasting over the following 30 minute period after an observation.

The paper is well written and includes many details and discussions which clarify the issues involved with imaging day-time skies in the presence of the high intensity solar disc. More generally, this paper should also serve as a useful introduction to many practical sky imaging and calibration issues for those new to the field.

There are perhaps a few issues not discussed, but which could be considered as fur-

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ther topics to be included or commented on:

Were there any initial design criteria identified in the project? 16 bits and the quoted dynamic range are interesting numbers but what are actually necessary? The following issues relate to this basic thought.

The camera is intended for long term use in the field, but there is no discussion of any possible long term degradation issues in this 16 bit system. I wondered how the sensor array will respond to daily repeated exposure to the solar intensity over a limited part of its sensitive area. Is it expected that the uniformity checks discussed in the paper will be repeated at some regular interval? – What interval would be suggested? In any case, at what level would degradation affect the ability of analysis algorithms to quantify aerosol scattering, and will that level be reached with this non-occluding system?

Experience tells me that, in an exposed environment, such as 'hot and dusty deserts' which will be common for solar systems, there is likely to be surface damage to the acrylic dome optics through wind-carried particulates (as opposed to a cleaning issue mentioned on page 26). Do the authors have comments on long term degradation from their experience? Such damage has the effect of scattering the incoming sunlight into a large area of the image, again making faint cloud and aerosol effects difficult to image.

Minor typographical issues have already been identified by another referee.

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 4859, 2014.

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