

Interactive comment on “Evaluating the spatio-temporal performance of sky imager based solar irradiance analysis and forecasts” by T. Schmidt et al.

Anonymous Referee #1

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***** General comment *****

This manuscript presents a methodology for forecasting solar irradiance over a local domain (tenths of km) by using sky images taken at about the center of this domain. There is nothing strictly new in the methodology presented; what it may be new is the combination of several already developed methods and algorithms (for image processing and cloud amount/cloud type classification; cloud motion; solar irradiance estimation; . . .)

The paper is in general well written and correctly structured. The abstract provides a concise and complete summary, and the title reflects the contents of the paper (which

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is focused on evaluating the methodology by making use of a remarkable network of pyranometers deployed in the area of study). The authors give proper credit to related work so the number and quality of references are appropriate. The description of methods is sufficiently complete (along with the corresponding references) to allow their reproduction by other scientists. The results are sufficient to support the interpretations and conclusions. Despite all of this, my main concern is about the orientation of the paper, which has less to do with truly scientific questions and more about the technical implementation of a number of methods and the evaluation of the whole methodology. With this, I mean that the paper is good enough, but it would be more appropriate (from my point of view) for a more technical journal (Solar Energy, Energy, Renewable Energy, . . .) than for ACP.

I would like to highlight the honesty of the authors when presenting results and conclusions. Thus, they recognize that the sky imager forecasts do not outperform the reference persistence forecasts. This result does not undermine the value of the study, as the authors are comparing their sky imager methodology with a very good persistence forecast that can be made because of the large network of pyranometers deployed in the area. They could have compared with a persistence forecast based only on measurements from one (or a few) pyranometer(s), probably obtaining a better result for their methodology.

***** Suggestions for minor revisions *****

- Remove the last paragraph of section 1. You don't need to specify what is going to be in the subsequent sections.
- P. 27004, lines 4-5. Explain what is the “grade of saturation”.
- Section 3.4.1, last sentences of first paragraph. I think you should explain a little better the transformation you are talking about and the meaning of Fig. 5.
- Definition of MBE. Why do you use measurement minus estimate (analysis or fore-

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cast)? I would say that usually the definition of MBE is the other way around (y_i minus x_i) so in case of overestimation, MBE is positive, while MBE is negative in case of underestimation.

- Conclusions. You mention that installing several pyranometers is very expensive, but this is relative. Relative to the investment in a huge solar plant, installing dozens of non-first-class pyranometers may be easily affordable.

- Table 1. Too many significant figures are given for CBH and CC. Given the values of the standard deviation, I would use only 2 significant figures, so for example (for Cu) it would be CBH = 2200 +/- 1500 m; CC = 55 +/- 32 %. In addition, I find very low CBH for some cloud types: an average of 2700 m for Ac/Cc, and an average of 3400 m for Ci/Cs (note that in principle, cirriform clouds must be above 6000 m). Do you have any explanation for this?

*** Typos and technical corrections ***

- Abstract. "very short term" instead of "shortest term"

- p. 26999, lines 16-17. Please rewrite de sentence.

- Section 3.1.1 and next. Be consistent with the use of RBR or RbR.

- p. 27007, definition of cloud categories. Please use capital letters for Sc, St.

- p. 27015, line 25. RMSE is always positive.

- Figures 10 and 12. Please try to use other colors or line shapes to allow better distinction between Sc and Ac/Cc, and among Cb/Ns, St/As and Clear.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 26997, 2015.