

**Associate Editor Decision: Publish subject to minor revisions (Editor review)** (17 May 2017) by

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Comments to the Author:

This is a very interesting work concerning the evaluation of

a. MSG/Seviri based GHI

b. RAMS based GHI

and c. RAMS-MOS (and persistence) based GHI

The work has been improved based on the reviewer's comments and the author's revision and it fits very well to the AMT journal.

I would suggest the publication of this paper to AMT after taking into account some minor comments below.

#### MSG-GHI inputs

The MSG relate section (2.1). This sections mainly describes the SICCS and Greuel, 2013 paper. In order to assess the use of this method to the selected Italian stations, some more information have to be provided about the input data used for each station.

For example Greuel, 2013 tables 1 and 2 describe the inputs used but then a choice of these for each station has to be made. e.g. if water or ice clouds were used, if the change of albedo was taken into account, also what water vapour value was used. Finally, if the station height has been taken into account in the radiative transfer modling calculations.

The SICCS algorithm is unaware of the stations, and no specific choices for these stations have been made. The cloud information (e.g. liquid or ice) comes from the CPP cloud property retrieval (i.e. from the satellite data), which is run prior to SICCS.

The information on surface albedo comes from a seasonally (8-day) varying MODIS-based climatology, interpolated to the MSG-SEVIRI grid. The information on total column water vapour comes from ERA-Interim. Surface elevation comes from the ETOPO2v2-2006 database. These inputs vary spatially and temporally (except elevation).

We propose to add the following text in the manuscript providing some more information on the inputs to the SICCS algorithm.

We wrote in Section 2.1 : "Other inputs include surface elevation from the ETOPO2v2-2006 database, monthly varying integrated atmospheric water vapour from the European Centre for Medium range Weather Forecast (ECMWF) ERA-Interim reanalysis, and 8-day varying surface albedo derived from Moderate-resolution Imaging Spectroradiometer (MODIS) data."

line 492 "more than halved" - you can provide the actual percentages

-The percentages have been added for the four seasons and for the whole year. As stated into the paper the percentage is more than halved if we exclude mountainous stations. Considering all stations, the RMSE of the MSG-GHI hourly estimate is "closer" to the RAMS-GHI one-day hourly forecast.

We wrote: "The RMSE of the MSG-GHI hourly estimate is more than halved compared to RAMS-GHI, with the exception of the mountainous stations where the RMSE of the two datasets are closer. In particular, excluding (including) the mountainous stations, the RMSE of the MSG-GHI hourly estimate is 49% (59%) of the RAMS-GHI one-day hourly forecast in winter; this percentage is 43% (49%) in spring, it is 54% (60%) in summer, it is 50% (57%) in fall, and it is 47% (52%) for the whole year."

Kosmopoulos is actually Kosmopoulos

-Ok. Thank you and sorry for this mistake.

line 606 "big issues" I would rephrase that as despite the large discrepancies it is a challenging issue.

-We wrote: "Overall, the results of this paper show that the MSG-GHI estimate and the RAMS-GHI have large discrepancies with observations in cloudy conditions, and they are still challenging issues."

The cloud scenes are now divided to clear, contaminated and overcast based on MSG. They could be divided based on pyranometer data which represent more real conditions. Since, now it is difficult to be implemented, some discussion on this issue could be useful. For example that MSG failures on the cloud "typing" (clear, contaminated, overcast) will affect also the statistics.

for example contaminated data in theory are the most difficult ones to model as the hourly GHI is related with the percentage of time that the direct sun component is not attenuated by clouds. However largest RAMS deviations are shown in overcast data and maybe this has to do with the above cloud typing.

- Thank you for noting this point. We wrote in the Summary and Conclusion section: "It is important to note that the cloud scenes (clear, contaminated and overcast) are divided in this work based on MSG data. This classification could be done considering the pyranometers data, which are more representative of real conditions and this issue will be considered in future studies. Errors in the classification of sky conditions impact the results of this paper. For example, contaminated data are the most difficult ones to model as the hourly GHI is related with the percentage of time that the direct sun component is not attenuated by clouds. However, the results of this paper shows that the largest RAMS deviations are in overcast conditions and this could be caused, at least in part, by errors in cloud typing."

line 612-613 case to case, I think you mean location dependent.

-Corrected. "Considering also the variability of the RAMS performance from site to site, the usefulness of the RAMS forecast from an economic perspective is location dependent (Wittman et al. 2008)."