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Interactive Comment

Interactive comment on "A database of multi-year (2004–2010) quality-assured surface solar hourly irradiation measurements for the Egyptian territory" *by* M. Korany et al.

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In my own name and on behalf of all the co-authors, I would like to thank the two Referees for their very interesting comments. Our item by item detailed answers to these comments are provided below. Stéphane Alfaro (and co-authors)

Referee#1 This database created within the framework of the SUSIE project is the result of great efforts from various Authorities and scientists. As solar power in Egypt is apparently set for a massive expansion, this study not only supports meteorological

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and climate-related research, but also renewable energy projects. The dataset spans from 2004- 2010 and is therefore sufficiently large to detect trends and/or prospects of solar irradiation in different types of Egyptian climates. I checked the data: the structure and allotted metadata are consistent and easily understandable. The data can easily be downloaded and directly used to plot time series. What I do not understand is why the authors erased "obviously erroneous measurements" but on the other hand data flagged as 2 or 3 (greater than rarely observed and outside the range of extreme values) have been preserved. A short explanation for this approach would be helpful.

Our answer: When a period of instrumental malfunction could be detected during the first visual screening of the data, we did not consider it necessary to maintain the 'obviously erroneous' measurements in the database. However, some problematic data could escape this first simple screening, and this was the purpose of the various tests applied during the quality check to identify them. After plotting the meteorology data of Aswan and Barrani, I encountered some obvious outliers and a period of seemingly erroneous measurements (Temp dry at Barrani in the first half of 2009) – see attached figures. The authors should maybe add a comment to the datasets to inform users about this. Our answer: Following the recommendation of the referee, a comment has been added stating that in spite of the care brought to the checking of the meteorological datasets some outliers or suspicious data (for instance null values of Tdry recorded at Barrani in the first half of 2009) might still be present.

Specific comments: 1) At the beginning you use GHI, DHI and DNI as abbreviations, later on you use G, D and Bn, that is a little confusing. Our answer: We have removed the GHI, DHI, and DNI abbreviations, as they were not necessary. G, D, and Bn are the variables associated to the global SSI and its components,

Page 739, line 10: "Between 88 and 99%..." I don't really understand where the 88 and 99% come from. Do you mean 1-12 % of daytime data are missing, or do you mean 1-12 % has not been validated? If it is the latter, then I would like to know why? Our answer: This means that only between 1 and 12% of the daytime measurements fail to

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pass at least one of the tests applied to check their quality. 3) Page 742, line 8: If the instruments are so close to a local airport is there any danger of interferences due to e.g. temporal shading of the sun by an airplane? Our answer: No, the measurements are performed inside the airport area but at a location where there is no possibility of shading by airplanes. 4) Page 742, line 14+: at the Cairo site is sounds to me as if there could be interferences due to smog or antennae of some kind, maybe briefly explain? Our answer: No, physical obstacles do not obstruct the field of view of the instruments. Regarding the second point, the referee is right: At this urban location, large amounts of airborne particles (aerosols) of anthropogenic (smog) and natural (windblown dust) origins play a great role when it comes to assessing the magnitude of the direct, diffuse, (and therefore global) components of the surface solar irradiation. Studying the impact of the aerosols on the characteristics of the surface solar irradiation is one of the main goals of the SUSIE project. 5) Page 742: for the desert sites: any danger of sand storms or unusually high errors due to moving sand? Maybe a short sentence on this issue and how this is addressed (more frequent cleaning, see page 743, line 21 etc.)? Our answer: Again, yes windblown dust plays an important role. A comment on the fact that frequent cleaning is necessary in this type of environment has been added in the text. 6) Page 745, line 18 and 23: when you speak of correction, what do you mean – do you adapt the value in some way or remove it? Our answer: As you know, meteorological parameters are not fully independent and some 'logical' relations might exist between them. For instance, is not possible to have rain without clouds, or a low visibility without an associated weather phenomenon like fog or dust. Based on the data acquired at the nearest station, the EMA observers try to detect these types of logical errors in the database. Transcription errors are also sought by comparing the original hand-written records with the computer sheets. If any, the detected errors are corrected in the computer database. 7) Page 747, line 23: One word to the nighttime values: did you just set them to 0 or is this an actual measurement? Our answer: Yes, these are actual measurements 8) Page 749, line 24: please do not write "available at www.pangaea.de" but "available at doi:10.1594/PANGAEA.848804". The journal will

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provide the hotlink behind the doi. You also don't say: the article is available at Elsevier. Our answer: OK. This has been corrected.

Technical corrections: Our answer: Except for the capital letter of the word 'Sun', which has been maintained because it is a proper noun, all the other modifications requested by the Referee have been made.

Referee#2

We have made all the editorial modifications suggested by the Referee.

Answers to the Referee's more specific concerns:

Page 9, line 17 - "experienced observers screen the records". Does this occur on site? What kinds of errors represent "logistical" errors? Clock / time errors? Power failures? In this section we read that the observers "correct" the data? But in the next section (page 10, line 2) we read that visual inspection serves to "detect and remove periods of obviously erroneous measurements". Please can we have more clarification of what gets corrected or removed by observers?

Our answer: The screening of the records is not performed onsite but at the Data Collection Center, which is to say at the EMA headquarters in Cairo. In the text we mention 'logical' errors (not 'logistical'). For instance, in the data saved by the automated instruments there are sometimes duplicate (the same line appears two or more times). These types of errors are corrected at this early stage of the quality check.

Page 13, line 13 - Flag 4, here again we read about visual inspections and suspicious data. At least here the the data get flagged, not corrected? How does this differ from previous visual inspections? What kind of errors does this step confront or identify?

Our answer: Though having passed the different tests composing the QC, some point data might seem improbable as compared to the general trend observed during a given day. In this case, it is flagged manually after visual inspection (flag 4).

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Page 17 - Noting that the stations all have standard WMO ID numbers, the surface met data provided here will also pass through WMO QC processes and reside in WMO and downstream archives (e.g. CRUTemp4)? Should we expect any differences in the end products due to different processing?

Our answer: WMO do not apply QC to the SSI measurements, which is the main object of our study. Therefore, there cannot be any conflict between two different quality checks.

Page 21 - The data QC outcome seems to depend solely on successful hours of operation relative to total potential hours of operation. But the reader doesn't get any sense of precision or accuracy. For example, how do the calibration drifts, of 5 to 10% over many months from Table 2, impact the measurement accuracies? On page 7 we read about achievable relative uncertainties of 3, 8 and 20% for high, good and moderate hourly values. Can the authors provide the readers with any sense of relative uncertainty for these data? Do they qualify, or might they qualify, as high vs. moderate quality?

Our answer: If for a given instrument, periodic recalibration reveals a notable change of accuracy (for instance 3% for the first class instruments) the instrument is replaced. Thus, the accuracies given in Table 2 correspond to successive instruments. There is no drift in accuracy. Regarding the uncertainties of the results, they depend on the instrument. The PSP and the NIP used for measuring G and Bn, respectively are top quality instruments and the uncertainty is 3%. The diffuse component is measured with the 8-48, an instrument of moderate quality. The uncertainty on D is 8%. We have included these precisions in the revised text.

Final comment - Although I could easily inspect the data files, the authors might have provided at least one data figure that they find interesting, to encourage users to explore interesting features or take advantage of exceptional reliability, etc.

Our answer: As recommended by the referee, we have added two figures. They repre-

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sent the variation with time of G measured at the Cairo station (Fig. 2a) between 2004 and 2010, and the associated flag values (Fig. 2b).

Interactive comment on Earth Syst. Sci. Data Discuss., 8, 737, 2015.