

## ***Interactive comment on “Chaotic Signatures and Global Solar Radiation model estimate over Nigeria, a Tropical region” by Adedayo Adelokuna and Folasade Adelokun***

### **Anonymous Referee #2**

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Report on the paper "Chaotic Signatures and Global Solar Radiation model estimate over Nigeria, a Tropical region".

Trying to write a report on this manuscript is a tough task. The article is unclear, the style sloppy, and the authors do not bother to present it in a minimally attractive way. I do not dare say that it does not contain any relevant information, but if there is something which is worth being published it is well hidden.

#### - General considerations

The manuscript is much too long (21 pages, including the plots) for its scientific contents. There is a short abstract followed by a longer abstract (in boldface). Is this

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second abstract included at the request of the editors?

The abstracts do not clarify anything and are full of acronyms, which renders the text difficult to read. Instead of prompting the reader to follow with interest what the authors want to convey, such overuse of acronyms makes the reader to look forward to reaching the end of the paragraph soon.

#### - Comments on the science

Take the title to start with: "Chaotic Signatures and Global Solar Radiation model estimate over Nigeria, a Tropical region".

"Chaotic Signatures" exhibited by what? What is the meaning of "Global Solar Radiation model estimate"? Maybe "a model for estimating global solar radiation" is meant?

It is not clear to me what is meant by "Global Solar Radiation". Why don't the authors define clearly the concept at the beginning of the article? Is here "global" the opposite of "local" or do they mean "global" in the sense that it is the sum of the diffuse and direct solar radiation reaching one horizontal square meter on the ground? They should make clear whether it is an incident energy flux density ( $W/m^2$ ) or whether it is integrated over a time interval ( $J/m^2$ ), for instance the daily insolation on a horizontal plane. I suggest that the concept of "global solar radiation" is succinctly and clearly presented at the beginning and the difference with "solar irradiance" is explained.

Regarding the scientific contents: If I have understood it correctly, the authors parametrize the "global solar radiation" and say that it depends on the extraterrestrial radiation corrected by a linear term (that takes account of the relative humidity) and an exponential term (that takes account of the difference between the maximum and the minimum temperatures). I think this is a sort of clearness index introduced by Liu and Jordan, which is used when the amount of cloud cover is not known, and it is not that clear that it works well (see. e.g., "Strengths and limitations of the Liu and Jordan model to determine diffuse from global irradiance" by LeBaron & Dirmhirn 1983

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in "Solar Energy". vol. 31). I do not understand why the "global solar radiation" should depend on the difference between the maximum and the minimum daily temperatures (I do not say it is wrong, but some explanation should have been provided).

The authors leave three constants {a, b, c} that are determined through a least-squares fitting and then they say that the correlation is good. It is not clear to me whether the correlation has been obtained using a time series different from the one they used to determine the constants of the model. Furthermore, it is not even clear to me that they have performed these correlations based on observations. Maybe everything is OK and I am confused here, but the text is quite unclear and it takes a huge effort to understand it.

The general impression I get from the manuscript is that it is one of those papers on data analysis where the authors have a data processing program and a data set at their disposal. The program is fed with data from one end and something comes out at the other end.

Maybe there is something interesting hidden in the long, sloppy manuscript, but it is the author's task to present it in an attractive way by means of a fluent, concise and logically structured text; it is not the referee's task to decipher it.

- Style and writing

Is it necessary to emphasize in the title that Nigeria is a tropical region? This should be obvious to any reader of this journal, but in case the authors feel that this information is necessary, it could be said later in the manuscript.

Many sentences are trivialities or fillers. For example, in the Introduction (page 2, line 34), the Lorenz model of atmospheric convection is mentioned, but it has nothing to do with the contents of the paper and it is not used later. It makes the impression that, in order to justify that they intend to publish their manuscript in a journal on "non-linear processes", the authors had to mention one of the seminal papers in non-linear

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dynamics, be it used later or not.

An instance of useless text [page 1, lines 19, 20, 21]: "The information, therefore, suggests how vital the solar irradiance can be useful in Agriculture and Photovoltaic technology companies".

Another instance of poor writing [page 1, lines 8, 9, 10]: "The well-known statistical tools were used to analyze the chosen meteorological parameters and the correlation was found to be perfect, (...)". Here the article "the" is wrong (the meaning of the sentence is changed). It turns out that the correlation is not only good, but perfect... the correlation of what with what?

Why do some substantives and adjectives start with a capital letter ("Signatures", "Tropical") but others don't? Why "Photovoltaic technology companies". Why "Relative Humidity" (uppercase) but "temperature" (lowercase) in page 3 lines 23 and 24? In page 3 line 28 the "solar constant" (lowercase, while they write "Global Solar Radiation") is written as  $1353 \text{ W Delta m}^2$  (I assume the capital Greek letter delta resulted by mistake from a slash /). Somebody should have taken care of such details before submitting the manuscript.

Apart from the poor writing there are grammatical and orthographic errors. The text should have been revised by someone who is fluent in English before sending it to the referees.

Recommendation to the editor: Reject the manuscript.

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Interactive comment on Nonlin. Processes Geophys. Discuss., <https://doi.org/10.5194/npg-2020-12>, 2020.

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