

## ***Interactive comment on “Two decades of distributed global radiation time series across a mountainous semiarid area (Sierra Nevada, Spain)” by Cristina Aguilar et al.***

### **Anonymous Referee #1**

Received and published: 11 December 2020

General comments: The manuscript presents the raster datasets of 19 years of monthly and annual global solar radiation covering the mountainous terrain in Sierra Nevada, Spain with a spatial resolution of 30 meters using a solar radiation model developed in a previous study. While the effort is generally welcome, I have several concerns. 1. The datasets, when compared with most other datasets published on the journal, cover only a very small geographical area, which may significantly limit its use and impact. 19 years of monthly and annual datasets are probably still too short for assessing the trends and shifts in the solar radiation regime. While daily radiation data could be very useful for snow-dominated hydrological modeling in the area, the datasets, unfortunately, don't contain daily scale data. 2. The overall structure

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(i.e., sections and sub-sections) is a little bit confusing and need to improve or reorganize. As an example, the same section title, Data Availability, appeared twice in the manuscript. 3. The manuscript spent several paragraphs (for example, section 3.2 and 4.2) on filling data gaps in weather station records and analyzing filled weather station data. Why is this important and necessary? In my opinion, the unfilled weather station data is good enough to generate and validate the datasets.

Specific comments: L13, what does “filled” mean? L13-17, a very long and confusing sentence. Please separate it into several sentences. L18, what does “dispersion” mean here? L19-21, a very confusing sentence. Please rewrite the sentence. L30, I just don’t understand “. . . constitute the major when not the only water source for many rivers in the summer” L45-47, Awkward sentence, against interpolation doesn’t mean against modeling solar radiation. L57-61, this literature review on GIS-based solar radiation modeling is outdated. L72, what do you mean by “distributed maps”? And 30-m is not really high resolution nowadays. Figure 1. Please indicate that numbers at the stations are their IDs. L108, simply use “Data” L110, what is the source of the DEM? L113-114, this is not a sentence. L113, change “the longest available point information of in situ daily global radiation . . . measured . . .” to “the longest available in situ daily global radiation . . . is measured . . .” L124, “the recorded data” L124-125, what do you mean by “standard limit checking” and “singularities”? L130, prior to? L131, two screenings? L136, what do you mean by “the expression of”? L141, it is not clear how the last screening was performed. L159, what model? Is this the same model used to create the dataset for every cell in the study area? L169, how does the location of weather station affect the modeling result? How the weather station data is used spatially, i.e., which cells use which stations? L170, how do those DEMs affect the modeling result? L170-172, what the purpose of the sentence? L180, N is the number . . . L180-181, this is an interesting interpretation on RMSE. L192-197, Need to provide some details on the spatial and temporal characteristics of the Landsat images used to calculate albedo. L226-228, this is interesting. Are those claims supported by the validation? Please provide the evidence. L237, at each of the? L245, what do you by

“a curved evolution”? L251, Monthly Rg maps L252, what are “the rest of the statistics”? There is no caption on this in Fig. 7. L261, what do you mean by “the monthly distribution of Rg in ...”? L273, very confusing “Monthly distribution of filled daily”! at each of? L286, what are those gray zones? Please explain in the caption. L307, see comment on L273. L316, The second sentence in the caption is very confusing. L325-327, don’t understand how the datasets can be used “in other mountainous areas with Mediterranean-type climate conditions and limited radiation station-based observations”. L328, How reliable is it to use 19 years of data assess the trends and shifts in the solar radiation regime? L330-332, but those hydrological modeling typically needs daily solar radiation data which are not provided in the datasets. L576, “spatially distributed” → spatially interpolated? L580, Is it possible to directly interpolate CI from the weather stations?

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