

## ***Interactive comment on “Validation of a new SAFRAN-based gridded precipitation product for Spain and comparisons to Spain02 and ERA-Interim” by P. Quintana-Seguí et al.***

### **Anonymous Referee #1**

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Revision of “Validation of a new SAFRAN-based gridded precipitation product for Spain and comparisons to Spain02 and ERA-Interim”. This study compares three different daily precipitation datasets in the Peninsular Spain and the Balearic islands. The main purpose of the manuscript is to present a new SAFRAN dataset for the whole Spain and to provide validation metrics. I think that the dataset described in this study is highly relevant given several hydrological applications. The availability of this dataset for scientific purposes is also a valuable output. Nevertheless although the database created is really sound I find that the manuscript could be improved considering two main issues:

i) to include the validation of other variables obtained by the SAFRAN analysis and ii)

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to improve the validation of the temporal variability of the data generated.

I include comments on these two issues below. I would recommend the acceptance of the manuscript subject to the major changes suggested below:

1. The first paragraph in the introduction referring to current active research projects is unnecessary. This is not usually explained in scientific publications.
2. Page 3, 25, What is IB02?
3. Page 3, 29-30. The authors indicate that they are presenting a new SAFRAN dataset for the whole Spain. Nevertheless the other objective is less clear. If the authors are using this manuscript to present a whole SAFRAN dataset for the whole Spain including different variables, Why are they only focusing on the validation of precipitation and including a comparison with other precipitation datasets? I would find much more useful to present the new created dataset for the whole Spain as they do for section 3.1, providing more details and then to validate the different variables using observations of the different variables (e.g., wind speed, solar radiation, etc.). This would give much more consistence to the presented research and developed dataset instead of focusing only on the daily precipitation outputs.
4. Section 2. Spatial and temporal variability of precipitation in Spain is very complex, and if authors want to frame the developed dataset on the precipitation characteristics of Spain, they should describe in more depth this complexity. On the contrary, I suggest removing this section; it is not really necessary.
5. Section 3.1: the SAFRAN meteorological analysis system should be described in more depth since this is the basis of subsequent analysis. In particular, the Optimal Interpolation Algorithm should be better explained. Why is the reason of using the period 1979-2014?
6. How are the climatological zones defined here?. I consider this is a key issue that should be described in more depth.

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7. Section 3.4. Authors indicate that the SAFRAN dataset was created by two different projects considering different time-spans. Is this approach having some impact on the temporal and spatial homogeneity of the dataset? The approach of considering different dependent and independent station data for validation according to the period of analysis is complex and confuse. Authors should clarify issues of spatio-temporal homogeneity among the two projects.

8. Authors should include more error/accuracy metrics to assess the performance of the gridded data. For example, the correlation coefficient is a very poor measure for temporal agreement between observed and modelled data. I recommend to have a look into the hydroGOF R package.

9. It is not possible for me to read the figure 3. Color scale is not very fortunate. The use of different length for the circles as a function of the values of the validation metrics would be a solution but it would be really useful to show a scatterplot with the metric values between datasets or maybe a boxplot showing the error metrics in the different datasets. A simple average of the correlation coefficients is not very suitable metric to have an idea of the average accuracy of the datasets. Temporal validation would gain if not only the agreement for the entire data is analysed but also temporal agreement for low/high precipitation days, dry spells but also considering possible seasonal influences. For example, it would be useful to know the temporal consistency of the datasets for the different months of the year to determine if the consistency is temporally different between the dry and humid seasons. Also the assessment of the accuracy/error metrics for different elevations would be useful to assess the potential applicability of the data. In this case, the division between stations located above and below 1000 m would be insufficient. Although the number of stations above a certain elevation is low (this is already stated by the authors) it would be very useful to assess the goodness of the prediction in these stations (some of them above 1800 m a.s.l.). Mountain areas are the principal water towers in Spain and where the main floods are generated. For this reason I consider extremely relevant to assess (even using the low

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data available) the goodness of the SAFRAN outputs in these regions.

10. Really I would focus in more depth on the validation of the temporal variability of precipitation than on the spatial variability of the average conditions. Usually modelled precipitation tends to reproduce well the average spatial precipitation patterns and the general precipitation seasonality. Thus, given the potential applicability of the SAFRAN dataset to force LSMs, the assessment of the temporal accuracy of the data is much more relevant than the spatial accuracy at the Spanish spatial scale.

11. I find that the discussion section should be improved in more depth including limitations and potentials for the applicability of the SAFRAN dataset considering the proposed analysis related to the temporal precipitation accuracy. Given the potential applicability of the SAFRAN dataset for hydrological applications I find this much more relevant than assessing comparability with the Spain 02 dataset.

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