Comment on gi-2021-16

J. Ignacio López-Moreno (Referee)

Referee comment on "Evaluating methods for reconstructing large gaps in historic snow depth time series" by Johannes Aschauer and Christoph Marty, Geosci. Instrum. Method. Data Syst. Discuss., https://doi.org/10.5194/gi-2021-16-RC2, 2021

The manuscript presents the comparison of different methods to fill gaps in snow series. This is a task that has generated many doubts to snow reseachers and this paper provides very useful information for readers. The paper has a clear structure, is well written and conclusions are sound and clear. Therefore, I recommend the publication of the article, with just a few comments that authors may consider to prepare a revised version of the manuscript.

1- in my opinion, it would be interesting to present some analysis to show how differenet methods are suitable to fill gaps of different length, as probably there will be important differences among accuracy scores and methods.

2- As you can include other categorical variables in the Random Forest, authors can test or at least discuss other possible predictors that might refine the results. In example clasiffy if gaps occur in low/average/high snow years; or it existed different dominant weather types or atmospheric patterns in a given year when gaps must be filled.

3- Authors may discuss to which extent the use of more physically based (when possible) may improve the error estimators compared to the degree day model. Researchers from CEN uses adjusted crocus/safran simulation to fill gaps in snow series (see https://doi.org/10.1002/joc.6571 as example). In a similar way bias corredted ERA-land series could be used for some areas, or used as "virtual" best correlated stations.

Looking forward to see your revised manuscript,

Ignacio López-Moreno