Comment on essd-2020-312

Anonymous Referee #2

Referee comment on "Sub-seasonal forecasts of demand and wind power and solar power generation for 28 European countries" by Hannah C. Bloomfield et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2020-312-RC2, 2021

Review of manuscript ESSD-2020-312 entitled "Sub-seasonal forecasts of demand, wind power and solar power
generation for 28 European Countries" by Hannah C. Bloomfield et al.

This paper provides a novel data set of daily, national-aggregated sub-seasonal ensemble reforecasts of electricity demand, wind and solar power generation for 28 European countries. This is the first time that S2S reforecasts from ECMWF and NCEP have been thoroughly calibrated and post-processed for the purpose of energy-system modeling and investigations of forecast skill, weather variability, and potential benefits from such forecasts for the energy sector. The paper describes the data and reviews forecast skill for several use cases as a demonstration.
The paper is generally very well-written and suitable for ESS. The provided data will likely foster collaborations between meteorological research and the energy industry in a multitude of applications. I recommend to publish and have only few minor comments.

Minor comments

- please carefully check for redundancies. I noted few sections which appeared repetitive. I try to indicated these below.
- I found it a bit confusing that you name the weekly mean of day 5-11 as week 1 and so on. I would call this week 2 as this seems much more common. In the current form just stating e.g. that there is little skill in week 1 and hardly skill in week 2 undermines the potential of sub-seasonal forecasts as you would rather think of 1-7 and 8-14 day forecasts not 5-11 and 12-18...

l12: it would help to mention the number of ensemble members upfront and make sure to later stress the differences of reforecast to operational data.
l13: It would help to state how many forecasts are provided in total (initial times, and individual realisations (initial times x ensemble members)
l16: "demand-net-renewables" appears a bit jargon for people not familiar with energy meteorology - avoid in the abstract.
l16: Why do you limit the investigation on winter, stressing different levels of skill in seasons might trigger even more interest.
l17, l52 and later in the paper: It would also have been nice if you had shown some truly windows of forecast opportunities on S2S scales, e.g. contrasting MJO active vs. MJO

inactive periods, or periods of enhances / weakened SPV.

l61: perhaps also define demand-net-solar and demand-net-renewables explicitly.

l82: "model drift" is jargon here and I doubt that people from outside meteorology / forecasting understand it. Please define what you mean.

l157: remove the " at the end of the line.

Sections 2.1-2.5. It somehow remained unclear to me if you use daily-averaged data or 00UTC instantaneous. This is because already the description in l 70 of daily ERA5 data is not precise. Only in l96 it is stated that you use daily-mean for the S2S reforecast data. Try to state this earlier in the Section. In that regard l165 "daily" also leaves some room for interpretation. You likely mean "daily sum" here.

l218-221: these results should be compared and discussed along Büeler et al. 2020 how showed similar maps but for meteorological variables aggregated over 30 days. Overall I think the potential of your dataset for energy applications should also be discussed in the light of windows of forecast opportunities on S2S time-scales. Again Büeler et al. 2020 would be an example showing the enhanced / reduced skill for several countries following extreme states of the stratosphere though not investigating energy variables, yet. Soret et al. 2019 is another example using S2S forecast in the energy context. Both papers are the only ones so far that I found screening the last 2 years S2S database related publications at http://s2sprediction.net/static/documents#publications .

l230: You should briefly explain how to interpret the ACC. Usually only ACC >0.6 are considered as useful forecasts, cf textbook of Wilks.

l237: A bit unclear what "This" refers to. l238 again I find it odd to talk of week 2 if you mean 19 days.

l248: Spatial differences might also be due to meteorological weather variability which can be different in different countries.

l252: repetition

l258-262: Very nice discussion!

l290: why weeks in plural?

Section 4: avoid repetitive statements in the Conclusions. The conclusions could stress even a bit more potential applications and also refer to first studies going in that direction, however using meteorological variables.

Section 5 & Appendix A & l 385, 433: It remains a bit elusive how you used the hourly ERA5 data in this study.

l346: only two years of training data seems little. Some justification would be good.

Figure A1: It is a bit surprising why you now show Austria as an example, as other countries were discussed before. I would recommend using one of the exemplified countries here.

l416: repetition

References

Büeler, D., Beerli, R., Wernli, H., & Grams, C. M. (2020). Stratospheric influence on ECMWF sub□□seasonal forecast skill for energy□□industry□□relevant surface weather in European countries. Quarterly Journal of the Royal Meteorological Society.

Soret, A., Torralba, V., Cortesi, N., Christel, I., Palma, L., Manrique-Suñén, A., ... & Doblas-Reyes, F. J. (2019, May). Sub-seasonal to seasonal climate predictions for wind energy forecasting. In Journal of Physics: Conference Series (Vol. 1222, No. 1, p. 012009). IOP Publishing.