

Review of “More homogeneous wind conditions under strong climate change decrease the potential for inter-state balancing of electricity in Europe” by Wohland, Reyers, Weber, and Witthaut, submitted to Earth System Dynamics

The manuscript is very good and it is so well written and logically presented that it was a pleasure to review. I only have a few minor points.

Minor points

- 1) The captions of tables and figures are very long and include details on methods and even on findings. I found it useful actually, but captions should describe the figure or table, nothing more and nothing less. Maybe consult with the journal editors for guidance. You can easily move some of the caption text into the main text.
- 2) The abstract tends to over-emphasize the results without actual quantifications, which could be misinterpreted and used against wind energy if taken out of context. For example, rephrase as this: “... we find a robust but modest increase (up to 7%) of backup needs...” and “... resulting in parallel generation shortfalls of up to XX MW (corresponding to YY% of power demand) in up to ZZ% of the countries.”
- 3) Line 110: please explain how the extrapolation to 80 m was done. Log law? Power law? Interpolation of model levels?
- 4) Line 111: which standard power curve was used? How were wake losses accounted for?
- 5) Line 113: Why were the wind farms sized at 100 MW?
- 6) Table 1: this table is not needed and could easily be incorporated either in the main text or in the legend/caption of Figure 2.
- 7) Figure 2: please use the same colors for the 5 models as in Figure 6 and 7 for consistency.
- 8) Figure 2: What are the units of a) and b)? L_{ref} ? Shouldn't it be percent?
- 9) Figure 2c: Do you really need this figure? It has the same pattern as b) and it is difficult to conceptualize/understand. Also, having 2 figures instead of 3 would make them more readable. Right now they are too small.
- 10) Line 209: Is L the same as generation shortfall? Please mention in what units it is expressed (MWh/yr)
- 11) Around line 215: Please compare the values of L with the total energy or capacity of each country. For example, from Figure 3 the maximum size of L is around 250 TWh/yr, which is possibly small for Germany but would be large for Hungary. Maybe a fraction of total electricity consumption should be used instead? Basically, we need a sense of how significant a given value of L is.
- 12) Line 324: please provide a definition/formula of f. Is it the Coriolis parameter?
- 13) Figure 6: cannot see the error bars in a) and b).

Typos/spelling

1) line 60: double parenthesis and note that you need a comma after e.g. “(e.g., Chiacchio et al. 2015; Herwehe et al. 2014).”

2) line 92: double parenthesis and note that you need a comma after e.g. “(e.g., Bloomfield et al. 2016).”