

Interactive comment on “Air Density Induced Error on Wind Energy Estimation” by Aurore Dupré et al.

Anonymous Referee #1

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The article deals with several aspects of air density calculation with respect to wind power production. The first part of the article shows, in one location, the difference between air density calculated from standard values of air temperature and pressure (15°C, 1013.25 hPa) and from their site-specific values (measured and estimated from reanalysis) in an hourly time series. The second part provides a brief look how the errors deviate over France - this is mostly because of systematic decrease of air pressure and temperature with altitude. The third part shows the impact of air temperature and pressure variability on energy production at specific wind farm.

In common practice it is well known and understood that air density is an important factor that affects the power production of wind turbines. It is a standard in wind energy industry that the wind turbine production is corrected for air density effects where it matters. It is usual that the data from reanalyses or measurements (for long-term prediction of energy yield) or from operational NWP models (for short-term forecasts)

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are applied.

From this perspective, the content of the article seems to be behind the common practice in wind industry. It mostly consists of trivial comparisons between common data sources. It explores the error that occurs when standard air pressure and temperature is used – but the standard air density is in practical application not used if the error matters. Also the dependence of power production on air density is well known, at least at such a high level as it is presented in this article. As far as I understood the article, it neither provides in depth exploration or explanation of a relevant issue in wind energy practice, nor does it bring a new finding for general knowledge. For this reason, if the authors would not explain that I missed some important contribution of the article, I do not recommend it for publication in scientific journal. Perhaps it would make sense to concentrate on some more specific issue and explore it in more depth and in a more comprehensive way.

As my recommendation is to reject the article, I did not formulate more specific comments. I can add them in case the article was still admitted for publication. Generally, in my opinion there are several results and topics touched by the article that would deserve more detailed and thoughtful explanation or interpretation. For example, it would be worth a comment why the NRMSE is much lower than MAE and BIAS in Table 5.

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