

Wind Energ. Sci. Discuss., referee comment RC1
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Comment on wes-2022-11

Anonymous Referee #1

Referee comment on "Research challenges and needs for the deployment of wind energy in hilly and mountainous regions" by Andrew Clifton et al., Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2022-11-RC1>, 2022

Dear authors,

thank you for a valuable overview of the challenges of complex terrain. Overall I quite liked the paper, and have just a few minor comments.

Two comments to start with: you seem to lump operational forecasting together with wind resource assessment, which is not getting so clear from the introduction. It's fine to discuss both, but it was my feeling from the start that you were mainly discussing WRA. And is there no other noteworthy issue than icing, since you have that particular effect quite prominent? Lightning or dust, e.g.?

Line 24+: "Also, some regions...have to build in hilly..." The assessment here sounds a bit negative. Often you also see wind power erected on hills to get the speed-up effect on hill tops, which is an active choice.

L102: Hopefully, to use more effort has a positive effect, not just a potential effect?

Figure 2: Looks weird. What is the high-frequency floor at 4 m/s, why is it not changing at all during the two days, and from the plot there is no way that both time series have the same mean (within 4%). The diurnal "mountain" goes to 10m/s, flattening the steep slopes to a rectangle gives some 4-5 hours duration per day, and the floor is pretty much identical. With those simple geometric assumptions, I get the red line to be over 5m/s in average.

L222: Drones can cover an area, or is that not what you are thinking of here?

L242: Should you also include Direct Numerical Simulation (DNS) in this list?

L248: ICON-D2 is to my knowledge not a LES code?

L306+: There are attempts to make climate models more user friendly under the Copernicus initiative from the EU ("C3S").

L454: On the difficulties of ground-based lidars you probably have a reference?

L506: please add references to both test centres.

L644: The rationale for the RIX was that from the slope of 30%, the flow is non-attached, and is outside the operational envelope of WASP. It would be nice to also mention both

critical slopes in the comparison.

Typos and other editorial issues (please only answer to those if you disagree):

Abstract lines 2+3, please check the sentence structure.

L81: "At this stage of a wind energy" - project?

L142: check sentence structure.

L187-190: "This can mean that they measure in inhomogeneous flows" sounds maybe not quite right here. And the measurement volumes are only a part of the problem, the way the lidar averages over a circle is also to blame (as you also illustrate in Figure 4).

L197: vary -> very?

L216: There seems to be a reference missing at "()"?

L289: ...require the wind industry _to_ develop... ?

L421: IEA Users_TCP ?

L430: focus_on

Page 17, footnote 1: "Task 19 document" is not a good reference, sounds more like a placeholder during the writing process...

L494: to be minimise -> to minimise ?

L565: ...from one regime to the other, errors... (add comma?)

L705: Task 43_Digitalisation_ (adding the short qualifiers to the task names makes them easier to remember).

L750: The Acknowledgement is quite unspecific, usually they require project numbers.

And you often seem to have an extra blank before your references, but maybe that's just some layouting which will go away in the final paper trim. E.g. L90, L100, L173, L333, L339, L406, L600