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WIND ENERGY SCIENCE DISCUSSIONS

Interactive comment on "Validation of uncertainty reduction by using multiple transfer locations for WRF-CFD coupling in numerical wind energy assessments" *by* Rolf-Erik Keck and Niklas Sondell

Rolf-Erik Keck and Niklas Sondell

rolf.keck@gmail.com

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Hi Christian,

I provided answers to the reviewers comments in the pdf file, but maybe it was not visible in the uploaded file? I will write out the questions/comments and answers here in plain text.

Regards,

Rolf-Erik

Row 39 - Q. But once you spotted a suitable site with ME-WAM, you would still need a met mast campaign on site in order to produce a bankable mean wind speed or would the numerical results already be sufficient for financing a project?

A. We do not see ME-WAM as a full replacement for on-site measurements in mature projects. I think it would be very difficult to get financing for a wind farm on only numerical wind assessments.

Row 55 - Q. What does corrected time series mean?

A. We scale the raw WRF time series based on a roughness and terrain driven zero-plane displacement correction. We also long term normalize the time series.

Row 70 (fig 1) - Q. It would be nice to have the axes ticks with the spatial dimensions in the graphic

A. Good idea! I will include that in the revised version.

Row 76 - Q. You mentioned a steady-state CFD solution, so do you impose the mean of your time series at the virtual met mast or an actual time series?

A. We impose time series in the CFD solution. There are benefits to this in the CFD methodology we utilize as it leads to a more refined sector interpolation compared to using averaged data.

Row 125 - Q. Were grid refinement studies done in order to see if the numerical solution converges?

A. We tested quite a lot of different grid and domain configurations in the development. As the objective here is to archive a stable coupling with the WRF model we cannot have too fine resolution in the CFD solver. So instead of striving to archive a grid invariant solutions in the CFD solver, the objective here is to have the finest CFD resolution we can without causing to much problem in the WRF-CFD coupling. The size location

for suitable the data transfer decreases as more details are introduced in the CFD solution relative to the WRF resolution. We therefore need some smoothing to make our method stable which is introduced by the relative coarse grid resolution of 100m in the CFD model.

Row 130 - Q. Did you take a look at your y+ values for assessing the near wall modelling?

A. The y+ value in our configuration is about 50. The documentation of the CFD solver states that the span of appropriate y+ values to use with the selected wall function is 30 to 130

Row 174 - Q. Can you at a high level summary of your computational costs, e.g. something to the effect of it took N hours on a machine with M cores of type O and a memory of P.?

A. Good comment, Each realization of the 2nd half of the modeling-chain requires about 100 CPU-hours and about 40GB of RAM.

Row 215 - Q1. Please enrich the figure caption with some more information. I had to scroll back up to the text to verify what exactly is displayed here (in this case before MTLA). Q2. Also please use SI units in all graphics, I guess it is m/s, but who knows :)

A. Good points. I'll update that throughout the paper.

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