WIND ENERGY SCIENCE DISCUSSIONS

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Interactive comment on "Improving wind farm flow models by learning from operational data" *by* Johannes Schreiber et al.

Anonymous Referee #1

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Thank you for this submission. I found the concepts presented in this paper to be very interesting, and very convincingly presented. I strongly agree with the authors proposal, laid out in the introduction, that a compromise of using engineering models, with corrections learned from SCADA data is a good way to maintain the advantages of model-based and data-driven approaches. The authors make a convincing case, using wind tunnel and SCADA studies that the approach outlined in the paper successfully delivers these benefits. Therefore, I believe the paper is of high practical value as wake control, based on engineering models, is increasingly deployed in field campaigns.

An additional overall comment is that the introduction provides good motivations behind developing these techniques, and the references to existing literature and putting this work into context is very well done.

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Discussion paper

General Comments:

I wasn't clear on the concept of node locations (for example $c(.)$ $p(.)$) in equation 3). Do these node correspond to specific locations, for example turbine locations? If they are defined wrt inflow wind direction, do they need to rotate with wind direction?

Another point of confusion related to which online versions of tools is being discussed. FLORIS itself is available but the citation for FLORIS is a paper from Doekemeijer. Is this a specific version of the code, and also, is it also available online? Further, are the tools, modifications discussed in this paper available anywhere online as well?

Could you speak a little bit to one question I wondered about? If each parameter is assigned a normal tuning parameter, as well as a correction term, is there a not an issue of non-uniqueness, and an infinite (maybe bounded by the tuning parameter) set of identical options? Is there a danger also of over-fitting given the expanded set of parameters?

Specific Comments:

Page 6, line 25: "is the lateral distance to the wake centerline", isn't this made complex in wake steering if we assume effects such as curl, to define the wake centerline? Or is there an "effective" centerline (such as position of minimum production?)

Fig 2: Would it be possible to note the node locations in this figure?

Page 15: Ref to Wang paper, will this paper be available soon?

Fig 7: Is there any meaning to the x's being on the $f = -0.2$ line or is this just an obstructed place?

Conclusion: I understand this method mostly from fitting to a single direction and learning the corrections, but does it still afford a wind rose type calculation across wind speeds and directions?

WESD

Interactive
comment