Line numbers refer to the last version of the manuscript.

Minor changes:

- The use of the term “operating set-point” in some parts of the paper to refer to the layout or atmospheric conditions (e.g. in L58) could be misleading in a control context where set-point may refer to command. A rather preferred term could be for instance “operating conditions”.

- Eq. (4). The total farm power (P) could be named as (P_{WF}) to better match the subsequent reference in Section 4. The subscript WF could also be applied to Eq.(5).

- L209, I’d suggest to include the explanation of the term multi-modality (L261: “the presence of multiple and distinct maxima”) when the term is first mentioned in the text.

- Table 2. Maybe you could include somehow that the second range for eps corresponds to the C1 constraint, since this is not explained until L454. Reference to Table 2 could also be made in L456.

- Figure 2: The figure is not fully colour-blind friendly, specifically the lines corresponding to Gaussian and GCH models, which are very close, of similar line style and have the two most confused colours (green and red). Could you please kindly modify it to make it clearer for everyone?

- For the sake of clarity, please indicate in all figure captions to which layout corresponds the figure. Missing references in Fig. 2 (2x1 wind farm), Fig. 5-9 (5x5 wind farm) and Fig. 10-12 (Horns Rev wind farm).

- For the sake of higher colour-blind friendliness, in the discussion about Fig. 5, when referring to the markers, please include not only the colour (blue, green, red), but also the type of the marker (square, triangle, circle). Please also include the type of marker in the figure caption. The same goes for the discussion of Fig. 9.

- L295. Could you please provide any answer on RC1 comment about the statement “which saturates the upper bound constraints at 25º for all but the final turbine row”, which refers the authors to previous results in the literature (Zong and Porté-Agel, 2020)? The comment is also related to those in Fig. 10 by RC1.

- L301. According to your answer to major concern 2 by RC1, you have selected the 10 random cases in Fig. 4 from the 50 cases studied in Section 4.3. It might be worth mentioning it in the section.

- L358. The comment refers to both Fig. 5-c and 5-g, so you could make reference to both sub-figures.

- L407. In the discussion about Figure 9, maybe the use of “the first case”, “the second and third cases” is not the most adequate since this order does not match the order in the legend or in the velocity plots.

- L412, I guess you refer to Figure 8-d specifically.

- L416, in the reference to the figure you could also include “Fig. 9-d”

- L418, you could also include a reference to “Fig. 9-b”

- L427, in the reference to Fig. 5, please specify to which sub-figure you want to make reference, if any in particular.

- L454. When introducing constraint C1, could you please include an indication on why you choose the positive yaw angles as supposed to lead to more global maxima or to preferred solutions?

- L464. For the sake of clarity, please also include that the so-called nominal optimisation does not apply constraint C2 either, as RC1 suggested.

- L467, please make reference to Table 2.

- L476. To better complement the discussion and demonstrate the overall effect of the optimisation constraints, could you please include (e.g. in a table) the normalised farm power obtained by each of the optimisations depicted in Fig. 10? This might not be relevant in model comparisons for all the reasons discussed with referees, but can be of interest when analysing a particular model with different optimisation approaches. This may also help to differentiate the C1 and C1+C2 approaches. Do the results from the latter justify its greater complexity? Additionally, some comment about the number of runs required would be of interest, as RC1 commented.

- L504. Could you please better support the statement “For all wake models, the row-averaged probability density functions indicate an overall reduction in optimal yaw angle dependency to initial conditions for the constrained cases” by indicating from which specific aspect of the results this conclusion derives? (Comment by RC1).

- L506. Could you please specify in which subfigures it is observed the following statement: “Higher probability density function magnitudes can be observed, with more than double the values for some row distributions”? (Comment by RC1).

- There are several comments by RC1 pointing at the benefits that stochastic optimisation could also provide to the problem under study, referring to (Kuo et al., 2020). For the sake of completeness, the authors could include some comment (e.g. in the introduction) showing this as an alternative option, not covered in this manuscript but that could also be used to address the limitations of SLSQP approaches. It is true

that the reference indicated by RC1 is now included in the introduction but just as part of a mere listing of optimisation techniques without further indication. If you do not consider RC1 comments as pertinent, please provide some explanation of why.

- Some parts of the authors' answer to RC2 would be of interest in the text of the manuscript. For instance, aspects from the third paragraph of the answer to comment 1 could be nicely included in the discussion. Also, the main differences between SLSQP and TuRBO algorithms stated in your answer to comment 4.

- Please check and harmonise the references to figures throughout the text so that they fulfil the journal guidelines:
  The abbreviation "Fig." should be used when it appears in running text and should be followed by a number unless it comes at the beginning of a sentence, e.g.: "The results are depicted in Fig. 5. Figure 9 reveals that...".
  https://www.wind-energy-science.net/submission.html#figurestables

- According to the journal guidelines (https://www.wind-energy-science.net/submission.html#references) you will be requested to include a persistent identifier (DOI preferred) for all the references. So, you could already advance those modifications from now.

Typos:

- Figure 5: required space "the(a)"

- L508. Multizone and Gaussian nominal cases would be related to Fig. 12-a and 12-b instead of Fig. 12-b and 12-c.

- L512. Fig. 12-c instead of Fig. 12-d?

- L519. Please eliminate "a" in the sentence "This can achieved by a permuting the turbine…".

- L642. Subscript of the rotor velocity in the text would be with capital letter "R" to match the equations.