Reviewer comments to wes-2023-145 "Combining wake redirection and derating strategies in a wind farm load-constrained power maximization" by A. Croce et al.

The submitted paper deals with the integration of loads into wind farm control. The subject is very relevant. Industry has been hesitant to introduce wind farm control because it is unclear how it affects loads and fatigue damage. Usually, control algorithms maximize only power production. The authors propose to introduce loads into the search for higher AEP through constraining the optimization function. The contraints are based on design load cases and include ultimate and fatigue loads. Two control actions are combined. Wake steering through misaligning the turbine and turbine derating. While wake steering generally increases loads, derating decreases them. Through this, a strategie where the turbine operates in a safe envelope can be found. The paper is well written and structured. It is recommended for acceptance after minor revisions.

Comments:

- The authors do not discuss the wake behaviour due two the possible combination of derating and wake steering. Are there any studies that investigate the combination of derating with wake steering? How does the derating affect the wake displacement?

- Adding to this point, it is also not deeply discussed how these phenomena are modelled in FLORIS. To the knowledge of the reviewer, there are currently no explicit models for derating in the wake models in FLORIS. How does the derating affect the wake added turbulence and wake recovery? Are there hints that the modelling through changing the Ct curve of the turbine is sufficient? How does derating affect a steered wake in FLORIS?

- Line 408: It says twice 3.8%

- Figure 11 has a very small font

- It seems that turbine 5 in figure 11 is both waked and performing control actions. Does the impinging wake of turbine #1 influence the result? It is hinted before, that the method so far is only applicable for free stream turbines. If that is the case, it is a bit confusing to show also an optimized turbine #5.