Reply to the Reviewer #2

The paper addresses an interesting topic but I feel like it misses a validation of the baseline simulation first. This should be done before proceeding to testing mitigations in the simulation.

comments:

-line 175: why is the outer volume a cylinder? I had expected a rectangle with a wall boundary condition to represent the ground/building on which the turbine is installed.

Reply: Cylindrical domains are often employed for simulating individual wind turbine blades or small wind turbine systems. The geometric similarity between cylinders and wind turbine blades allows for a better representation of the airflow around the blades. However, rectangular domains are more suitable for simulating larger wind fields, such as interactions between multiple turbines or airflow distributions within a wind farm. The rectangular shape aids in comprehensively capturing the overall characteristics of the wind field but might lack the detailed flow patterns of individual blades.

- why is dynamic mesh used and not moving mesh? Is the mesh quality around the airfoil good during all time steps? Can you please include plots showing details of the mesh around the airfoil? In case moving mesh is used, one can control better the quality of the mesh around the airfoil.

Reply: In this study, the rotating zone refers to the dynamic mesh of rotation, without using moving mesh, and the rotating frequency is 60 rpm. The mesh independence test can demonstrate the mesh quality, and we show details of the mesh around the airfoil based on reviewer's comment. The mesh quality around the airfoil is good during all time steps. Dynamic mesh allows for adaptability to complex geometries without requiring re-meshing. An implicit scheme is employed to calculate the transient terms, so the acoustic cases were less sensitive to the CFL number. CFL number is acceptable around 1 based on the FLUENT manual. Therefore, the CFL number 0.12 to 2 and a time step of 0.01 s were used in the paper. We added this information in section 2.5 in the revised paper.

- what is the courant number you have with the selected time step?

Reply:

CFL=u*dt/dx, u=12 m/s, dt = 0.01 s, dx=0.06 to 1.

So the CFL=0.12 to 2 in this paper.

- the near-wall region and outer-flow region were not refined/made coarser to confirm mesh convergence. I think this is a necessary step to be sure about the convergence. Also a convergence study on the time step is necessary.
Reply: Mesh independence calculations have been performed and shown in Fig. 3 (a) and (b), and Table 2 in the revised paper.

-the acoustic power plot doesn't have 3 similar periods. Do you have an explanation for that?
Reply: Because the insufficient mesh numbers in Mesh 1 and 2, they might lead to less accurate results. Hence, the acoustic power plot doesn't have 3 similar periods. Similar results were obtained for the predicted acoustic power on the blade, as shown in Fig. 3(b). Mesh 3 and Mesh 4 resulted in nearly identical predictions, so Mesh 3 was selected for subsequent analysis because it had a smaller grid number and thus was less computationally intensive.

small comments:

- 1st sentence of the abstract: "Wind turbines are a promising solution for sustainable energy": I suggest to narrow it down to Small vertical-axis wind turbines. The noise reduction methods for horizontal wind turbines are different than what is described in the following sentences.
Reply: Thanks for pointing out. We have changed the content.

- line 33: these numbers don't match the typical formula used in IEC61400-11.
Reply: Based on reviewer's comment, we have deleted the content.

Thanks for the valuable comments.