

Wind Energ. Sci. Discuss., referee comment RC2
<https://doi.org/10.5194/wes-2021-140-RC2>, 2022
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Comment on wes-2021-140

Anonymous Referee #2

Referee comment on "High-Reynolds-number wind turbine blade equipped with root spoilers – Part 1: Unsteady aerodynamic analysis using URANS simulations" by Thomas Potentier et al., Wind Energ. Sci. Discuss., <https://doi.org/10.5194/wes-2021-140-RC2>, 2022

The paper presents an investigation on the effects of using spoilers at the root of a turbine blade to improve the aerodynamic performance of the profile. The study is interesting and introduces new information, the topic is relevant for the scopes of Wind Energy Science.

The analysis is limited to 2D results, both steady and time-resolved; the problem is properly introduced and the results are nicely presented and discussed. The referee has found some lacking aspects in the description of the methodology. For this reason, the referee is recommending a revision of the paper prior to consider the paper suitable for publication.

1)

In section 3.1, where the CFD code is presented, the authors provide the details of the discretization scheme only for the unsteady term, while full details would be required about source, divergence and Laplacian terms appearing in the equations (included the ones related to turbulence). The solution strategy should also be reported (SIMPLE, PISO, etc.).

2)

In section 3.2 the verification of the CFD code is reported, with convincing arguments. However, this computational study completely misses a proper validation of the computational tool, considering both steady and unsteady results as well as near and far

wake predictions. Since this is a journal publication, the authors are encouraged to provide the experimental assessment of the code or, at least, introduce relevant references and a brief discussion.

3)

The results are presented in detail with the support of references, and identifying the novelty in the approach. There is only one aspect which is questionable, related to the far wake analysis; as well known, U-RANS approaches might face difficulties in reproducing reliably the far wake of blades (and wind turbines); LES approaches might be preferable, especially considering that the wake of the blade equipped with spoilers is affected by aerodynamic instabilities. In absence of a proper validation, how reliable can be considered the spectra reported in Figure 11? Authors should discuss this issue in the paper.