WIND ENERGY SCIENCE DISCUSSIONS

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Interactive comment on "Vortex Particle-Mesh simulations of Vertical Axis Wind Turbine flows: from the blade aerodynamics to the very far wake" by Philippe Chatelain et al.

Anonymous Referee #1

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This manuscript is well-prepared, with a good overview of the scientific problem, adequate description of the methods used, presentation of verification and validation evidence for simulation results, and a good description of physical observations.

The following recommendations are made to improve the quality of the paper. 1. In Figure 1, please provide some explanation for the discrepancy in the two experimental measurements of tangential force coefficient near theta=90 degrees for tsr=2 and near 135 degrees for tsr=4.5. In the prior case, the error bars in the measurements do not overlap, which casts doubt on these data and confused at least this reader. 2. Please provide the Reynolds number for the VAWT flow that is being studied. There should also be some discussion on the state of the initial shear layers and tip vortices. Are

these expected to be initially laminar or turbulent, based on the flow Reynolds number? Is the SFS model active in the early wake shear layers/vortices? Are these initial flow structures in a transitional regime, and if so, how much confidence do you have in the ability of the LES model to correctly predict transition from an initially laminar to turbulent state? Might this affect some of the behavior of the wake instability and subsequent breakdown? 3. Related to the previous point, does Figure 6 show the resolved TKE, or total TKE (resolved+modeled)? 4. In paragraph 10, Page 12, there is a discussion on the possible presence of mean streamwise vortices through investigation of the velocity and TKE fields. Why not look at the streamwise vorticity field directly?