Review of 'Simulation of transient gusts on the NREL 5 MW wind turbine using the U-RANS-solver THETA'
by Annika Länger-Möller

The article presents the results of CFD simulations for a wind turbine model under transient gust conditions. The NREL 5 MW wind turbine with rotor and tower only is modelled. The CFD solver used is called U-RANS solver THETA and it is an in-house incompressible NS code developed in DLR. A resolved-gust approach, which is introducing the changing velocity at the inflow boundary conditions ensuring the loss-free transport of gust velocity in the flow field, is implemented in the CFD solver to simulate transient gust conditions based on the IEC 61400-1 standard. Unstructured overset grids are used in the simulations. Comparisons of the CFD results are made with the results of FAST analysis for validation of the new approach.

Comments:

1. Please comment and discuss on followings to clarify the implementation of the resolved gust approach in an incompressible solver:

a. Loss-free transport of gust velocity through the flow field may require the free-stream velocity update not only on inflow boundary but on other far boundaries (top and sides) as well, or actually whole domain if necessary. How are the slip-condition velocities (or frestream conditions changing on these far boundaries? Gust model is changing inflow velocity i.e., free-stream, and inflow velocity will effect all boundaries. Please clarify.

b. And no-slip condition on the bottom boundary will result in somehow development of a Boundary Layer (BL) in the unsteady solution. Is there any development and effect of this BL on the tower and rotor, or flow field? Please clarify.

2. Discussing clearly all the assumptions and difficulties encountered in such expensive unsteady computations will be helpful for future studies.