

Interactive comment on “Comparison of OpenFOAM and EllipSys3D for neutral atmospheric flow over complex terrain” by D. Cavar et al.

Anonymous Referee #2

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The main subject of the article is the comparison between two different CFD codes for simulating neutral atmospheric conditions over a complex terrain using RANS equations (steady state and k-epsilon turbulence model). The codes (EllipSys3D and OpenFOAM) are compared on the basis of mesh generation (time spent, quality and “easiness” to use), resolution time and results. Two test cases are discussed, the Askervein hill and the Bolund island.

The paper is well written, of good quality and giving interesting information for CFD modelers in the wind energy sector. Authors made the choice to discuss CFD methods without describing the flow behavior nor comparing to state-of-art simulations (not even cited). Therefore, I wonder if it is in the scope of the journal. A CFD method oriented

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journal may be more suited.

General comments:

1- The current version of OpenFOAM is OF-3.0.1. Is the version OF-1.7.1 (released in 26th August 2010) still an academic/industrial standard? In my opinion, the discussion about this old OF version may be removed as it does not reflect the standard use of OF. The comparison is also bias by the fact that this given version doesn't include Richard and Hoxey wall function. The other version used OF-2.1.1 (from may 2012), is more recent but does it reflect the "state-of-art" of OF developments? Would OF-3 include new functions for mesh generation? What is the version (year) of EllipSys3D?

2- Numerous function are mentioned and it is sometimes difficult to know from which solver they belong. I would suggest to make a simple table defining the function of each solver.

3- Several fonts/format are used to underline function/solver names such as surfgrid, blockMesh... Please check carefully the consistency in the text (ie p 7 and 8 "HypGrid" and HypGrid are mentionned.) Why snappyHexMesh and blockMesh are not in the same font?

4- It has to be noted that the work is authored by some of the developers of EllipSys3D, the comparison of the two codes is therefore made between a developer for EllipSys and by a user for OpenFOAM.

5- The comparison is sometimes not very precise "was quite a quite difficult task" (p20, l12), "seems very difficult as a user.." (p.20, l.22), and it is unclear whether is come from a code limitation of less experience with the meshing procedure. Comparison on more objective criteria is desirable.

Specific comments:

Figures 1, 2, 3, and 6, 7, 8. The visualization of the OF grid generated is surprising, I believe the authors made an appropriated grid but the figure looks weird. It looks like

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the visualization is not appropriately done (triangulated by Paraview?). Additionally, the view chosen for the OF grid figures tend to diminish its quality. Please use the same kind of figure for both: view of the surface (like fig 1) and one vertical plane.

p3 eq(4), it is quite surprising to use 's' for mean wind-speed. U may be more appropriated in this context. Please change everywhere in the text.

Table 2: Could you consider a better way to include columns titles.

Fig 4 and 5. It would be interesting to compare the “best” EllipSys3D (HG2?) with the “best” OF(211-SHM4?). Same thing for Bolund.

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