Responses to Reviewer Comments: Report #2

We would like to thank the reviewer for the effort in reviewing and commenting on this article. The comments provided have helped to improve the manuscript considerably.

Please find below our responses to each comment highlighted in blue ***and the modified line, figure or table was also mentioned in each case.***

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1. General :*There are numerous grammatical / spelling errors in the text which must be corrected in addition to inconsistent notation.*

The article has been reviewed.

2. General: *The validation study applied was not necessarily particularly convincing, if possible it would be desired to see application to a more complicated geometry.*

In most of the literature, more simple geometries (like flat plate in a closed wind tunnel or airfoil with sandpaper roughness) was used which we thought it wouldn't be representative in this case. However, the validation cases used in this work were used in other literature like (da Silva et al. Cited in the paper). We thought that this experiment in particular should be close to our case since it represent an external flow case with relatively close roughness height values.

3. General : *The error metric chosen is in the view of the reviewer not particularly representative, as the relative error across the airfoil surface is not weighted based on location, which may lead to incorrectly displayed results and or results which are difficult to interpret.*

These plots have been updated using standard error equation to avoid high errors at experimental points with Cp close to zero. Also, the modified Fig. 14 takes into consideration only the points on the iced profile to give a closer look on the behavior of rwf's only

4. Line 18 :*This drop in Blades'*

Corrected. Line 18

5. Line 19 : *Presence of rough ice surface*

Corrected. Line 19

6. Line 33 : *Form computational point of view*

Corrected. Line 33

7. Line 34 : *Ration*

Corrected. Line 34

8. Line 48 : *to no-slip condition*

Corrected. Line 48

9. Line 52 : *around iced wind turbine airfoil*

Corrected. Line 52

10. Line 74 : *Spalart*

This line is now deleted according to other reviewer's comment

11. Line 74 : *viscousity-like*

This line is now deleted according to other reviewer's comment

12. Fig. 1 : *Flow direction should be given in this diagram*

IT has been added in Fig. 1

13. Line 131 : *Equ.*

Corrected. Line 126

14. Fig. 3 : *Are local changes in height also accounted for within the modelling parameters? Or are deviations away from the mean line assumed to play a negligible role?*

The roughness deviations from the mean line are used to calculate average roughness height, diameter and pitch. These averages are then used to calculate equivalent sand roughness height which is fed to the roughness model. This has been elaborated on more clearly in Sec. 3.2. Fig. 4

15. Line 166 : *Paramedical*

Corrected. Line 174

16. Line 175 : *Between0*

Corrected. Line 183

17. Line 178: *This is not visible in the given plots and is very much a definition of how one would define a "good" agreement. I only really see the momentum model predicting somewhat representative C_P values up to 70 degrees.*

Lines 175-179 have been reformulated. Line 183

18. Line 180 : *Spalart*

Noted and will be corrected. Line 188

19. Line 181 : *Model*

Corrected. Line 189

20. Line 182 : *that rough*

Corrected. Line 190

21. Line 208 : *over prediction: Word usage not consistent. Sometimes you write over prediction, sometimes underprediction (no space).*

Corrected. Line 208

22. Line 210 : *Figures 10a-10d: Again notation not consistent. Sometimes you write "Figures" sometimes fig.*

Corrected in the whole document.

23. Line 212 : *While the Momentum rwf :Consistency! Momentum rwf. Momentum RWF*

Corrected

24. Line 213 : *Formatting here not good. Huge empty page.*

Corrected. Line 220

25. Equ. 17 : *N is the measured points? Is this simply the number of points or is some type of integration scheme being used.*

Equ. 17 is the simple averaging equation and N is the number of of measured points. This will be indicated in the equation to avoid confusion. Equ. 14

26. Equ. 17 : *Furthermore, if this is over the entire airfoil is this really a suitable measure? The accuracy of the model is much more important near the leading edge, where d(Cp)/dX is the largest, and hence where the pressure distribution most greatly affects blade loading. The results, if weighted for regions of interest may be significantly different.*

Error chart (Fig. 13) has been replotted for the Cp errors in the iced region only. This figure has been updated and discussed in the next submission. The error criteria is shown in Equ. 14 and Sec. 4.5

27. Line 254 : *bad style (So,)*

Corrected, Line 264

28. Line 256 : *bubbles'*

Corrected. Line 266

29. Line 260 : *forms realtively*

Corrected. Line 272

30. Line 260 :*That’s*

Noted and will be corrected. Line 273

31. Line 266 : *AoA's*

Corrected. Line 278

32. Line 270 : *The model overhead may be equivalent; the computational expense will however change eg. if a 1-2 equation model is being applied.*

Text has been updated. Line 281-283