Thank you for your valuable comments ! You will find below an answer to all the comments and the corrections we propose in the paper.

Note: Corrections from your comments are highlighted in red color in the paper.

Reviewer comment : Line 37 - an addition of a value to define soot-rich conditions? This would also make clear what constitutes soot-poor in the next sentence.
Authors answer : A definition of soot-rich conditions has been added in **line 42**. The soot emission index for our case has been computed and given in **line 245**.

Reviewer comment : The model references that the engine is representative of an UHBR turbofan, however the water vapour emissions used (and hence in effect, estimated fuel flow) are from an RB211. This is an older, much lower BPR engine. It does not take away from the results and modelling, but perhaps more representative boundary condition to an UHBR could be used within future work.
Authors answer : This is correct. This has been clarified in **line 248**

Reviewer comment : Figure 2 could be reduced in size, and/or added alongside it, images of the mesh (and result of mesh adaption process) downstream could be shown to understand how refined RANS grids must be.
Authors answer : Images of the mesh downstream are available in our paper [1] concerning the aerodynamic analysis of the CRM wake for the exact same conditions (Fig 11 in [1]). Size of Fig.2 has been reduced.

Reviewer comment : The water vapour and soot particle emission number could also be added in Table 1 for engine boundary conditions. This would allow for results to replicated and compared more accurately within the community. This would be beneficial whilst experimental measurements remain scarce.

Authors answer : Thank you for this very important comment. A new table (table 2) has been added and gives the values of mass fractions used in the calculation.

Reviewer comment : Line 329 - would assuming that all soot particles were activated not lead to smaller ice crystals, as more particles compete for the same water vapour?

Authors answer : This is true but this effect is not taken into account in our Eulerian model. More precisely, our model considers that soot surface activation is done only with sulfur compounds. Ice production term in Eq.7 is directly proportional to activation fraction. Consequently, the higher the activation fraction, the higher the ice production and the higher the ice crystal radius. This represents a limitation of our model, as it should also consider soot activation caused by the ice cap formed on soot particles, and not only activation due to sulfur particles. This point has now been clarified in **line 355**.

Reviewer comment :In abstract/introduction, CO2 and NOx do not use subscripts. In 2.2 Microphysical Model, the chemical formulas do use subscripts. To be consistent, should CO2 and NOx use subscripts too? (i.e. CO_2, NO_X)

Authors answer : This has been corrected

Reviewer comment : Line 24 - can use ERF instead of 'effective radiative forcing' as acronym just introduced.

Authors answer : This has been corrected

Reviewer comment : Line 76 - Use of ‘us’ – ‘This allowed the full… …to be taken into account’ would be less ambiguous.

Authors answer : This has been corrected

Reviewer comment : Line 224 - Are these values defined within a table? (i.e. Tab. ??)

Authors answer : Values are now defined in Table 2.

Reviewer comment : Line 232 - Need to update table reference (Tab. ??)

Authors answer : Values are now defined in Table 2.

References :

[1] Bouhafid, Y., Bonne, N., & Jacquin, L. (2024). Combined Reynolds-averaged Navier-Stokes/Large-Eddy Simulations for an aircraft wake until dissipation regime. *Aerospace Science and Technology*, *154*, 109512.