Response to reviewer 2

General Comments

This paper describes the initial phase of a model intercomparison project focused on the modelling of fog. Focussing primarily on the atmospheric development of fog, 5 large eddy simulation (LES) and 10 single-column models (SCM) are run with prescribed high and low aerosol/CDNC in the simulations while surface properties were constrained following a slightly idealised version of the LANFEX IOP1. They found that there were large differences between the models and highlighted the importance of the inclusion of processes such as cloud droplet sedimentation as well as the sensitivity of parameterisations within the microphysics.

It is great to see the international community come together to tackle the problem of fog modelling. This manuscript provides a good overview of the capabilities and limitations of the current state of the art models for fog. The comparison of the models for the same case and with similar constraints is useful. I think this paper provides a solid baseline for further studies and would recommend it to be accepted for publishing, with a few minor revisions.

Many thanks for the positive assessment of our work.

Specific comments and technical suggestions

Figures: The observations in all figures except 1 ,11 & 12 are very hard to see. Maybe plot it last so that it lies on top of the simulations, and/or use a darker shade in your colouring.

This was a deliberate choice. We wanted the focus of the plots to be on the model comparison, and the observations are shown less prominently to give some context and background. We agree they are a bit too faint on some plots though, so have thickened the lines to make them more visible.

Line 6: "under high aerosol or cloud droplet number concentration (CDNC) conditions."

This has been changed.

Line 30: Maybe say "The current intercomparison" instead of "This intercomparison"? As you were just talking about the previous one it was not immediately clear to which one "this" refers to.

This has been changed as suggested

Line 47: How exactly did you "idealise" IOP1? It is not clear.

This is discussed in the paragraph below this sentence, which has been expanded to give more details on the case setup and idealisation thereof as suggested. The main simplification is that no forcing other than surface temperature is applied, i.e. no forcing of the horizontal winds, and no overlying cloud cover is advected over the site.

Line 82-84: It might be useful to briefly describe the relationship between LWP and fog/cloud for readers less familiar with the phenomena. i.e. how do you distinguish between fog and cloud when looking just at LWP? Assuming the observed LWP towards the end of the period is cloud, do you expect the models to simulate that too?

Some text describing this has been added as suggested. For the bulk of the simulation, there is only fog, hence this is what the LWP is showing. We've noted that the presence of the cloud at the end shows up in the observed LWP, and is not simulated and therefore shouldn't be reproduced by the models.

Line 165: To which figure are you referring to here?

We've added a pointer to Figs 5c and 6b here.

Table 4: It would be nice to have a reminder of which models are SCM and which are LES in this table. Either as an extra column or in brackets after the model for the ones that doesn't have it in the name.

This has been added as suggested.

Line 225-227: Yet the fog seems to persist for too long into the daytime for the LES models as well?

We've added more discussion earlier in this section about how the real dissipation is not represented by the intercomparison participants, and therefore we make no attempt to compare either the LES or SCMs to the real dissipation. This sentence was trying to link together the fact that fog which is too thick will, in general, likely be difficult to dissipate, and therefore persist for too long. We have clarified the sentence slightly.

Line 254-255: To me it doesn't look like the microphysical parameterisation has a larger effect than the prescribed CDNC values. c10,u=10 have a similar LWP to c50,u=0, but all the other c50 simulations are well above the rest, whereas the c10 simulations only have a slight increase with increasing u between 2.5 and 10. So except for setting u=0, you'd need larger CDNC for u to have more effect. But your point stands that it does make a difference.

We've modified this to simply state that the mu value can have similar sized effects to the prescribed CDNC.