Dear editor,

Thank you again for your comments. I have taken into account your suggestions and you will find below the modifications made to the manuscript (in italics).

- P2, Sentence beginning in line 26 must be rewritten. It is spoiled and thus unclear.

  The sentence has been split in tow:

  For example, after 60 s of simulation, great uncertainty exists on the hydrometeors presence; depending on the time step used, rain, graupel and snow may (with very significant content) or may not exist. It should be noted here that 60 s is the order of magnitude of the time-step length used in the Météo-France small scale operational numerical weather model, AROME (Application of Research to Operations at Mesoscale, Seity et al., 2011), which shares the same physical package with the Meso-NH model.

- P10, line 12: You state that the curves in Figures 8 and 9 are "perfectly indistinguishable". For Figure 9 I agree, but not for Figure 8. Please clarify.

  The sentence is rewritten:

  With the revised version of the microphysical scheme, the simulated values for the different simulations shown in Fig. 7 and Fig. 1 are now perfectly indistinguishable in Fig. 9 and Fig. 8 for every common output times (the simulation with a 60 s time step, with the dashed line in the figure, provides outputs only after 60, 120 and 180 s of integration time).

- P 12, Line 4: has this "other" scheme a name? Please be more concrete.

  The scheme has no specific name and is called ‘Eulerian scheme’ in the manuscript. I worked on the sentence to suppress the word ‘other’ and explicit better where the scheme comes from.

  Two schemes are available: the AROME operational one (Bouteloup et al. (2010), BSB2010 hereafter), which is a statistical scheme and the Eulerian scheme included in the original version of the ICE scheme.

- Line 9. change "important" to something else or delete it. I would also be happy if you work again on this sentence. I cannot understand how a hypothesis (something in our minds) can cause a problem in a computer code.

  Maybe “The assumption made in the scheme” would have been better than “hypothesis”. I simplified the sentence:

  These schemes take into account a terminal fall speed directly linked to the mean hydrometeor content (the more the content, the more rapid the fall). This feature makes it difficult, for these schemes, to accurately resolve the sedimentation process.

- Line 19/20: I assume that "model schemes" does here refer to the two schemes that you are going to test. It would be good if you clarify this, because it is easy to think that you mean your two reference schemes.

  The two schemes in use in the model (BSB2010 and the Eulerian scheme) however (...)

- Line 29/30: This is difficult to understand. I think I know what you mean but it takes a while to get it. It seems that you have used 600 different timesteps: 0.1, 0.2, ... 59.9, 60.0 seconds. The problem is that the word step is used twice in the sentence with completely different

meaning. Please reformulate, and do this as well in the figure caption of Figure 11.

I hope the new wording is easier to understand:

The top panel of Fig. 11 shows the resulting profiles for different time steps (600 simulations are performed using time steps between 0.1 s and 60 s with an increment of 0.1 s) using the BSB2010 scheme (this is not a time evolution, all profiles are the result of a 400 s long integration).

The caption of Figure 11 is changed accordingly:

Vertical profiles of the rain mixing-ratio (the color scale represents the mixing-ratio in g kg^{-1}) after a 400 s long integration for different time steps (600 simulations are performed using time steps between 0.1 s and 60 s with an increment of 0.1 s, abscissa) for the BSB2010 scheme (upper panel) and the Eulerian scheme as available in the operational source code (lower panel).

- Page 13, first sentence: It is unclear what you want to say.

  Phrase is rewritten:

  The BSB2010 scheme behaves differently regarding the CFL number. For CFL numbers larger than one, the diffusion on the vertical is more intense than for CFL numbers smaller than one. And the result obtained for a number of one is completely different from the results obtained with other values.

- Page 14, lines 29, 30: The sentence in brackets needs reformulation. I cannot understand it.

  The sentence is replaced by the following ones:

  In addition, it will be necessary to overcome the time-step dependency issue in order to allow the comparison of the different schemes. One way to do this could be to make a compromise by selecting a time step that is not too large to be able to mask the time-step dependency and, at the same time, not too small to limit the computation cost.