First and foremost, thank you very much for this positive summary and emphasizing the core issues.

General comment

We want to point out and specify more precisely our motivation! The aim was a fast and lightweight algorithm but with sufficient precision for atmospheric conditions (and a minimum assumptions). However, this framework (the assumptions) is with extended functionality and a larger output (e.g. error propagation). Therefore we've changed the title and try to emphasize this more in the text.

This algorithm is not a competitor to the solution of sets of Fredholm integral equations, due to total different priorites!

Specific comments

P 4740
Notice that the triangular transfer function of the ideal DMA shown in Fig. 1 is originally due to Knutson and Whitby (1975). [...]

You are absolutely right! The mistake was due to a wrong cross-reference (Stratmann, 1997).

2.2 Charging probability and transfer function of multiple charged particles
The first paragraph of this section is confusing. I suggest rewriting (e.g. as below) and extending it. Also, I recommend citing the reference by Gunn as well as works on the charging of non-spherical particles like the ones given below and/or others.

and

The significance of the first paragraph above is not clear: What does "orientated average geometrical cross section" actually mean? Why is it "the much more important size parameter"? Why "would it increase for non-spherical particles"?

First of all thank you for the bibliographical references. This is exactly what we have missed and that we have intended.
Consequently, we have rearranged the whole section and added the following citation: Gunn (1956), Rogak & Flagan (1992), Ku et al. (2011).

P 4750
According to the Bienaymé formula (please, provide a reference) it is valid:

At this point, we disagree. The Bienayme formula belongs to basic statistics. With all due respect to Irénée-Jules Bienaymé, we are not able to handle such a literature research (19th century) in a little while. Moreover, there is a Wikipedia article on the subject, which contains the necessary information.

Results

Define the aerodynamic shape factor [...] Examples of the application of the algorithm to cases in which the aerodynamic shape factor varies in time are not provide

You are right, this point has been rather missed out. We consequently added the definitions, as well as a few sentences and the transformation formulas for volume equivalent diameter. We also added a reference to Hinds (1999) for some examples of real shape factors.
But we would like to point out, the focus of this paper is the algorithm itself, not analysing the aerodynamic shape factor, given an complete overview, or measuring techniques.

3.2 Inversion of a wide size distribution combining SMPS and APS data

Actually Fig. 3 is confusing: [...]

This issue has been clarified. We separated the curves into two sub-figures with individual labelled axes.

3.4 Suggested improvements and extensions

It will be useful to know the opinion of the authors about the priority

The truth is in this framework (with the assumptions) it seems to be already the maximum. Trying to consider also the shape of the DMA TF as well as higher polynomial interpolation would amplifier the noise. These steps would enforce some proper constraints and finally this would lead to the already existing statistical approach, the accurate algorithms. It would not be possible, to invert the size distribution and calculate the error propagation in such direct way.

We have rewritten this section to emphasize this, also as a demarcation and limitation to such statistical approaches.

For further discussion to this section we refer to the reply to Referee 2.

- Replacing or deleting minor words according to the referee is not explicitly listed.