

This is a quick access review for the discussion paper

Effects of systematic and random errors on the retrieval of particle microphysical properties from multiwavelength lidar measurements using inversion with regularization

by

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The topic is very important in nowadays since for the retrieval of optical and microphysical aerosol properties from lidar signals it is urgently necessary to have a complete error analysis.

Therefore, I support this manuscript as a discussion paper.

The paper reports about systematic and random errors on the retrieval of microphysical properties in a very long-winded style. First systematic errors and second random errors are investigated. The first part seems to be new and is interesting. In Equations 1 and 5 a couple of misprints are included. It would be also very helpful for the reader to include two Figures of the used examples for the size distributions type I and II, in particular to decide or to discuss whether the values  $r_{\min}$  and  $r_{\max}$  are suitable or not. This a first main discussion point.

There is also a discussion in the paper (no page numbers are given) about the Mie kernel functions but neither a Figure nor a Reference is given. It is impossible for the reader to follow.

A second main discussion point is the following:

“We will show that the results obtained can also be used to assess the sensitivity of the retrievals to random errors in a new way.” ... “But random error in a set of optical data can be considered simply as a particular set of systematic biases in the input data where those systematic biases vary randomly from one measurement to the next.”

Is that a common and well-known tool? Then the authors should give a few References.

Otherwise, this needs careful and exhaustive explanations, why a random error can be simulated in this way.

The achieved sensitivity results to microphysical aerosol parameters are more or less already known.

Finally, a lot of self-citations are given.