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Atmospheric Measurement Techniques Discussions

Interactive comment on "Quantification of model uncertainty in aerosol optical thickness retrieval from Ozone Monitoring Instrument (OMI) measurements" *by* A. Määttä et al.

Anonymous Referee #2

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A new method is proposed for the estimation of aerosol retrieval errors based on aerosol models. This method is well supported by theoretical considerations and appears to be applicable in a wider scope than discussed, i.e. to retrievals where the parameter space is not sampled continuously. The manuscript needs some modifications in the phrasing to improve comprehensibility.

The manuscript is well suited for publication in AMT. I recommend publication after the minor issues specified below are adressed.

1. The term 'model' is overused to a degree that the manuscript becomes hard to read.

Please modify the text. It is proposed to introduce and consistently use throughout the text the acronym AM for aerosol model, to use the term 'describe', 'simulate', or other instead of 'model' whenever applicable;

2. p. 8510 l. 16 typo desSert;

3. p. 8512 l. 14 please introduce 'model discrepancy';

4. p. 8516 l. 5 please add to the definition of 's' ... of the atmosphere as seen from below;

5. Section 3.1, 3.2: please make more clear why you need to introduce the 'evidence'. The weighted averaging is made using as weight the term p(m_i | R_obs). Can this term be evaluated directly?;

6. Equation (5) typo: '|' is missing;

7. Equation (5) typo: '|' is missing;

8. p. 8520 l. 19 typo: To acknowledgING;

9. p. 8521 l. 15 please rephrase to improve readability;

10. p. 8522 l. 8 and 9 typo? why 'spatial' and not 'spectral'?;

11. p. 8522 Why is sigma_0 introduced? sigma_0 seems to describe solely the uncorrelated error, which is represented by epsilon and hence does not need to be captured by eta. Later, sigma is found to be zero emirically. It seems obsolete.;

12. p. 8525 l. 15 to 22, paragraph seems misplaced. should it appear earlier and on a higher level?;

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 8509, 2013.