Review of "Retrieval of aerosol optical depth over land based on a time series technique using MSG/SEVIRI data" by L. Mei et al.

This article describes a new algorithm for the joint retrieval of surface reflectance and aerosol optical depth (and "aerosol type"), which utilises the high temporal sampling of the geostationary MSG SEVIRI instrument. I am somewhat surprised that it is being considered for Atmos. Chem. Phys., as it is manifestly a algorithm paper, and as such I would have expected to be directed towards ACP's sister journal, Atmos. Meas. Tech.

The paper is generally poorly written and shows many signs of being a sloppy, rushed job. The standard of English is rather variable and the paper lacks a clear structure; the reader is often left searching for the relevance and reason behind various passages of text. Furthermore, some sentences don't make sense and appear incomplete. Indeed the spelling and grammatical errors are so numerous that I am surprised this paper was allowed to reach the open discussion phase. Particular grips regarding the style and presentation of the paper include:

- Introduction doesn't describe why a new AOD retrieval method for SEVIRI is needed, or what the new method provides that is not already provided by the existing approaches.
- Not all symbols are defined (μ_0 and r_0 for example), some definitions are self contradictory (τ is defined as aerosol optical depth in the appendix and then as $\tau = \tau_{molecular} + \tau_{aerosol}$ at 4040-l06), and some values are defined with more than one symbol. The authors are particularly guilty of the last error with equation 23, where radiance is redefined (I to L), Earth-Sun distance is redefined (r to $d(t)$) and what was radiance is redefined as irradiance.
- Figure 1 and especially Figure 2 are not of publication quality and the figures are sloppy in general (figure panels aren't aligned, the font size of figure labels and legends are often too small to be legible etc)
- Section 4.1, and its overlap with the end of section 3, is particularly poorly written. At no point do the authors state that the purpose of this section: ie. to use AOD time series from SEVIRI, collocated with AERONET stations, to validate their retrieval.

Concentrating on the science content of the paper, I believe the algorithm presented in the paper shows some merit and is definitely worthy of publication. The authors have come up with a new approach (as far as I am aware) and done a reasonable initial validation. However, there is a great deal of scope for improving the clarity of the presentation:

- The authors need to state up front why they feel a new aerosol retrieval for SEVIRI is necessary and what makes their algorithm special.
- The discussion of the aerosol models used in the retrieval algorithm needs expanding. Why did the authors chose those particular models?
- I am not entirely clear if the authors are claiming that their algorithm can successfully retrieve aerosol type as well as AOD and surface reflectance. Fig. 9 is fairly illegible and section 4.3 doesn't help much. If this is the authors' assertion, they need to perform a validation rather than just plot as series of maps.
- The algorithm presented also retrieves surface reflectance, but these data are not discussed at all.

Overall, given the significant problems with this paper, as well as the fact that it seems out of scope for ACP, I do not believe it should be published in ACP, or any other journal, without significant revision.

Specific points and suggestions
The following are labelled with the page number and either the line number or the table/figure number. Note that this is not an exhaustive list of spelling or grammatical errors – such a list would be significantly longer.

4-35-l5: Sentence starting "The relationship of visible..." does not make sense.
4036-l20: I cannot decipher this sentence
4037-l16: (Claire et al. 2011) should be (Bulgin et al. 2011).
4056-Table 1: Define all symbols used.
4069-Figs. 9 & 10: A coast outline would make these plots much clearer.
4041-l19: The fact that an aerosol "type" produces a perfect fit to Eq.(22) does not imply that it is the "true aerosol type"; rather, it implies that the model used by in the retrieval is radiatively consistent with the measurements.
4043-l10: "TS algorithm" is not defined.
4045-final paragraph of section 4.1: The authors make a series of conclusions regarding the reasons behind the form of the linear fits shown in Fig. 5. The authors need to justify these statements – simply referencing MODIS DDV algorithm validation papers (which is a different algorithm with a

different set of assumptions) is not sufficient.

4047-l15: The statement that Figs. 7 & 8 show that the TS algorithm agrees much better with the Deep Blue MODIS product than the DDV is not justified. The two plots actually show rather similar agreement, given the completely different geographical areas and AOD ranges compared.