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Atmospheric Measurement Techniques Discussions

Interactive comment on "Retrieval of aerosol mass load (PM_{10}) from MERIS/Envisat top of atmosphere spectral reflectance measurements" *by* G. J. Rohen et al.

Anonymous Referee #2

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The manuscript "Retrieval of aerosol mass load (PM10) from MERIS/ENVISAT top of atmosphere spectral reflectance measurements" of G. J. Rohen et al., submitted to Atmospheric Measurement Techniques, covers an important valuable application of the retrieval of aerosol properties from space-based measurements for air quality monitoring. The authors show that a linear correlation between aerosol optical depth and PM is not sufficient to explain the natural variability of PM. By adding other parameters like boundary layer height and humidity, the correlation is improved. Nevertheless, the results presented here show that space-based PM retrieval is particularly valuable in rural area (proved by Fig. 11) where in situ measurements are very sparse and then

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Interactive Discussion
Discussion Paper

should help to understand the transport of PM over large areas. Over cities, the correlation found is only based on 7 points (Fig 10), which makes the conclusion a bit optimistic.

Overall, the manuscript is well written but the structure of the paper is not good. I recommend the author to ask a scientist outside of his group to carefully read the manuscript to check inconsistency (for example the wavelengths of the MERIS bands are different in line 7 of page 5435, line 20 in page 5453 and in table 1).

I have some general comments: There is a lack of recent publications on this topic in the manuscript. A lot of papers have been published in the field and must be added. It should be mentioned also that PM is a gravimetric measurements of dry particles (the tubes where the particles are trapped are heated).

Finally, I do not recommend this manuscript for publication in AMT in this form but after a major revision that fulfil the AMT standard.

Specific comments:

Page 5431 Last sentence: I do not think that space-based measurements of PM will be able to replace ground measurements for at least two reasons (1) we need ground measurements for validation or calibration as the authors did ; (2) most of ground measurements are made in cities where the retrieval of aerosol optical depth is really complicated due to lack of surface reflectance model of urban area.

Page 5431 Line 14: the reference to von Hoyningen et al., 2003 is not correct for aerosol retrieval over water.

Page 5431 Line 23: “many assumptions” is not enough; can you give some example like surface or aerosol models? What do you mean with local models?

Page 5432 Line 20: Remove references to Levy’s papers since they did not work on PM retrieval.

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Page 5432 Line 20: rephrase by including that they use AERONET to get aerosol absorption properties.

Page 5433 Line 1: I am surprised by the sentence “For instance,. . .”. I thought that the definition of PM is clear. Could you tell a bit more about that and give some examples ?

Page 5433 Line 8: According to the reference list, the year of the reference is wrong.

Page 5433 Line 10: Is there any European group that work on assimilation of space based aerosol optical depth for PM transport modelization?

Page 5435 Line 1: Last sentence, why?

Page 5435 Line 13: Do you mean “surface” pressure? if yes please add.

Page 5435 Line 16: At which wavelength the TOA reflectance must be lower than 0.2.

Page 5435 Line 25: What is the CAMELEO database? Do you have a reference for it?

Page 5437 Last part: What is the explanation of the increase of the bias with the wavelength? Is that related to the surface model or to the spectral dependency of the aerosol models?

Page 5438 line 4: define m. why rho is humidity corrected?

Page 5438 Line 10: add “height” to the end of the sentence

Page 5439 Line 21: “a” is missing in uncertainties.

Page 5440 Line 10: I do not think that the air mass factor depends on T and P in this formulation.

Page 5440 Line 13: why is SEAWIFS appears?

Fig. 5: what stand for WASO, SSAC and SUSO ?

Fig. 12: Make figures more readable. What is the black shape on the bottom of the

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Interactive Comment

bottom figure ?

Interactive comment on Atmos. Meas. Tech. Discuss., 3, 5429, 2010.