The authors have developed and demonstrated a simple yet seemingly reliable technique to differentiate small size clouds from smoke plumes in the fine spatial resolution MODIS data. The cloud-smoke discrimination method is based in the detection of the enhanced absorption by BC and OC of 412 nm radiance not observed in the presence of water clouds. The paper is generally well written and should be published after consideration is given to the issues below.

It is not clear in the text if the so-called 'smoke test' is applied to the 1 km gridded data (four pixels) or to the native 500 m pixels.

In the sensitivity study it is implicitly assumed that the pixel or group of pixels analyzed contains either smoke or clouds. It does not include absorbing-aerosol/ cloud mixtures which will still generate an absorption signal. Another situation of frequent occurrence during biomass burning events is the presence of smoke layers above clouds. Since in both instances above, the absorption signal will still be present, the pixels may still pass the smoke test, but the derived optical thickness will probably be over-estimated. The sensitivity analysis should be extended to these situations to provide a more clear idea of the strengths and limitations of the suggested cloud-smoke separation.

In the application examples the paper clearly lacks a validation analysis. A comparison of sun-photometer observations to MAIAC retrievals with and without the smoke-test would provide a clear way to evaluate the reliability of the proposed method of smoke-cloud separation. A simple visual inspection of radiance fields is insufficient.

The authors have tested the technique over areas where smoke is very much the only absorbing aerosol type. It is mentioned in the paper that cloud-dust separation will be addressed separately. Another aspect that needs consideration in the MAIAC algorithm (although not necessarily in this manuscript) is the distinction between smoke and dust aerosols since over many regions the world the presence of either type is likely to occur, or, what is even more challenging, dust - smoke mixtures in the same atmospheric column.

Other comments:

In the comments below the green highlighted text indicates recommended additions, and the red highlighted text correspond to recommended deletions.

Abstract

Line 6, describing 'a' technique

Line 7, from the clouds

Page 2

Line 9 ...is a the high 1km resolution of the aerosol product...

Page 4

Line 9 the MAIAC CM algorithm

Page 5

Elaborate on the basis of equation 2 or provide reference

Page 6

Line 4, Provide reference to the statement that the imaginary refractive index of BC is spectrally neutral.

Line 6, The spectral dependence in the UV is treated in detail by Jethva and Torres (2011), add reference.

Line 11, The authors are incorrect in their description of the Aerosol Index (AI) principle . In the AI it s not required that the TOA radiance at a single channel be reduced below the Rayleigh limit. The AI is the change in *spectral contrast* (produced by aerosol absorption) in relation to that of a Rayleigh atmosphere. Only in rare cases of very strong absorption the radiance at a single channel (or both) may be reduced below the Rayleigh limit.

Lines 12 to 15, not sure this statement is true. It implies that scattering alone (no absorption) reduces reflectances below the Rayleigh limit.

Page 7

Line 1, The statement that the retrieved AOT *'from the previous MAIAC retrievals'* is used, is very confusing. It sort of implies a 'chicken and egg' situation. When does the retrieval process actually start?

Page 8

Line 1,

To understand the capability....

Line 17 Figure 1 2

Page 9

Line 10, It seems to me that AOD (470nm) threshold of 0.5 would severely limit the usefulness of the approach. Most sub-pixel cloud contamination shows in the range 0-0.3 AOD. A full evaluation of the effect of this threshold value could be done involving a validation analysis using ground-based AOT measurements (see previous comment on validation).

Page 13

Line 14, I should be noted that the...