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Atmospheric Chemistry and Physics Discussions

Interactive comment on "NASA A-Train and Terra observations of the 2010 Russian wildfires" *by* J. C. Witte et al.

Anonymous Referee #2

Received and published: 16 August 2011

Summary:

Overall Witte et al. present a well-written paper with clear analysis of A-Train and Terra based satellite measurements for an anomalous fire season in the vicinity of Moscow which greatly impaired the air quality of that city. Analysis is carried out using time series analysis as well as spatial distribution analysis of fire and resulting smoke with the use of grid boxes / domains. Both techniques are used to describe the fire frequency and intensity, location of smoke plumes and their optical properties and the time series analysis is also used to describe meteorological conditions. This paper should be accepted and published once some minor revisions are completed.

General comments:

Sometimes it is unclear to the reader why a given grid box / domain is chosen. These domains should be consistent where possible and clear justifications should be given where this cannot or should not be done. It would be nice if the various grid box / domain sizes were stated and justified in the introduction or in Section 2 if it was more generalized as "methods". For instance, why is the OLR and Figure 6 domain different from those used for trajectories and Figure 4.

The OMI SSA values reported throughout the paper seem to be rather high for what is typical of strongly absorbing aerosols, this could be due to cloud contamination from OMI's large pixels (see Specific comments for section 2.2). Also the modest shifts in SSA are quite close to the error range of the OMI SSA data product, the authors should mention both of these factors in the discussion. Moscow air pollution composition is likely complex and was affected by many factors due not only to the wildfires, but also to the stagnation, where the typical urban pollutants would have been trapped, re-circulated along with the influx of absorbing aerosols from the fires. Unique transformation due to stagnation and extended constituent lifetimes may have also been at work here.

Specific comments:

p. 19118, section 2.2: Would be good to mention the problems of cloud contamination for OMI-SSA as sub-pixel cloud contamination can lead to overestimation of 0.15 (Torres, et al. 2007). This should be mentioned when the measured values of SSA are reported.

p. 19118, lines 19-20: It should be mentioned that AI is dependent not only on aerosol layer height and AOT, but SSA as well and also if the aerosol layer is located above clouds or not.

p. 19119, section 3: Please give a bit more description of the radiosonde data used here, including whether this is based on daily averaged data from multiple launches and/or when the launches took place (morning, afternoon, evening?). 1-2 additional

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sentences should suffice here.

p. 19121, lines 21-23: for clarity, consider moving these lines to the end of the first paragraph of section 4.

p. 19124, section 5.2: please briefly explain the domain choice used for Figure 6.

p. 19124, line 23: this statement that decreased SSA is consistent with increased AI should be clarified (see comment for p. 19118, lines 19-20).

Detailed comments:

p. 19116, line 6: for consistency change “Sect. 6” to “Section 6.”

p. 19117, line 24: change “AOT55” to “AOT.55”

p. 19118, line 6: change “AI and AOT and SSA” to “AI, AOT and SSA”

p. 19121, line 16: change “end of heat wave” to “end of the heat wave”

p. 19135, Figure 2 caption: consider rewording last sentence for clarity, “This domain is contained within the area shown in Figure 1 c.”

p. 19141, Figure 6 caption: insert “daily” for MODIS fire counts; FNR change to FRP

p. 19142, Figure 7 caption: consider mentioning that this is the same domain / grid box area as the statistics listed in Table 2.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 19113, 2011.