Atmos. Chem. Phys. Discuss., 9, C7106–C7109, 2009
www.atmos-chem-phys-discuss.net/9/C7106/2009/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "OMI observations of the anomalous 2008 Southern Hemisphere biomass burning season" *by* O. Torres et al.

Anonymous Referee #1

Received and published: 13 November 2009

1 Main points

This paper presents basically two findings.

- Over South America, the biomass burning season in 2008 revealed very few fires, and the corresponding absorbing aerosol index from OMI showed low values
- Over Central Africa, the 2008 biomass burning season was normal, but the transport over the Atlantic Ocean was stronger than normal. This can be explained by anomalous free tropospheric winds in 2008

These findings are interesting. In the discussion, the authors link the 2008 anomaly to the governmental regulations by the Brazilian government. Without any ground truth or additional information, this is quite a claim. This claim implies that space borne observations can be used to verify policy. I think the authors should tune down this claim quite a bit or should come with additional information (e.g. deforestation inventories, etc.). Today, I heard in the news that Brazilian deforestation indeed declines. The reason mentioned was not regulation, but the dropping food price.

Another argument that calls for a down-tuning of the government-driven connection is the fact that biomass burning was low in 2006. Indeed, it was claimed (Koren et al., 2007) that this indicated a trend-reversal of biomass burning in the Amazon. Unfortunately, 2007 turned out to be a year with quite extreme burning. This paper is quoted in the introduction, but not discussed further on in the paper.

I think the paper would improve with a more balanced discussion that mentions the possibility that regulations caused the lower amount of fires in 2008. But other explanation cannot be ruled out, see the 2006 case. It would be even better to include some ground truth, but a am not sure if these data are available. Also, a first indication of the 2009 situation (again low?) would support the claim.

2 Minor points

page 21510: line 10: I would replace 'understand' by 'analyse'

page 21510, line 22: 'and other substance .....precursors'. This suggest that NOx and CO that were mentioned earlier are no ozone precursors. Rephrase.

page 21511, line 3: spreads south. I would use: progresses southward.

page 21511, line 6. The Labonne paper (Labonne et al. Injection height of biomass burning aerosols as seen from a spaceborne lidar. Geophysical Research Letters

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(2007) vol. 34 (11)) using CALIOP data shows that aerosols remain in the boundary layer over land. This issue is not resolved, but proper referencing is needed.

page 21511, line 21: It is not made clear why MODIS AOT data are not used in this paper.

page 21513, line 7. The authors make a direct connection between UVAI and biomass burning. This should be further substantiated. The connection is vital for the conclusions. There are more papers around that can help to make this connection (which is probably strong). E.g. Hoelzemann et al. Regional representativity of AERONET observation sites during the biomass burning season in South America determined by correlation studies with MODIS Aerosol Optical Depth. Journal of Geophysical Research-Atmospheres (2009) vol. 114 pp. D13301.

page 21513, line 10. The OMI biomass burning record only covers 4 years!

page 21514, line 12. 'dramatic'. Again, do not exaggerate. From figure 3 it is clear that a drop in biomass burning activities is not uncommon in South America.

page 21514, line 19: 'twice as long'. I do not see this. Longer OK, but twice as long?

page 21515, line 5-13. Here it is suggested that the reduction in the fires follows political boundaries. But what happened in 2006? The argument can also be reversed by saying that the 2007 fires were anomalously high in Brazil. To substantiate this claim some additional information should be given. What did the Brazilian government do to prevent fires? And are there data available that monitor deforestation. From space, we have products like burned area, and other land-use change products. These should show substantial changes in deforestation between 2007 and 2008 if the claim is correct. And what about the 2009 biomass burning season. It would help very much to get a first impression of the 2009 fires (again low?).

page 21516, line 3: Indeed the wind speed increases from 2005-2008, but it seems more logical to explain this as a variability in the system.

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page 21516, line 10 and further. I do not think all the possibilities have been explored. And what about the role of clouds in masking fires and smoke? At least, a regional analysis of the rainfall pattern should be made.Now only a bulk rainfall analysis of south America is presented. Winds were stronger over the atlantic ocean, and could have brought more rain over the East of Brazil. It is claimed that political boundaries are followed in figure 5, but this is not very clear to me. The largest reduction in fires is seen in the North-East part of Brazil. Surprisingly enough, figure 2 shows a maximum in the OMI aerosol layer in that area, and not over the area where the fires increased in 2008. So, the link between fires and aerosols seems less robust than is suggested. To claim (l 25) that the reduction in fires was the result of governmental regulations is in my opinion a step too far. Ground truth, documentation of governmental actions, and additional regional analysis are all needed to further substantiate this claim.

page 21517, line 6: I think variability and trend are mixed up here. To call the 4-year time series (5.5., 5.5, 6.7, 7.0) a trend seems a bit odd. It is part of the normal variability of the circulation patterns.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 21509, 2009.