

DEPARTMENT OF PHYSICS
ATMOSPHERIC, OCEANIC AND PLANETARY PHYSICS

Prof. Philip Stier
Associate Professor
Climate Processes

Clarendon Laboratory, Parks Road, Oxford OX1 3PU
Tel: +44(0)1865 272887 Fax: +44(0)1865 272923
philip.stier@physics.ox.ac.uk <http://www2.physics.ox.ac.uk/research/climate-processes>



Mr Reuven Heiblum and Coauthors
Weizmann Institute
Israel

17 April 2014

Dear Authors

Subject: Editor Decision

Thank you for providing the revised manuscript "*On the link between the Amazonian forest properties and shallow cumulus cloud fields*" as well as your responses to the issues raised during the review.

Based on the reviewer's comments and my own assessment I have concluded to reconsider your manuscript for publication in Atmospheric Chemistry and Physics after minor revisions.

Many of the reviewer's comments have been resolved in your response. However, I would kindly ask you to address the issues listed below.

I am looking forward to your revised manuscript.

Kind regards,

A handwritten signature in black ink, appearing to read 'P. Stier'.

Philip Stier

Co-Editor
Atmospheric Chemistry and Physics

General issues:

The analysis of the links of pFCu to EVI is very sound. However, while strong conclusions are drawn about the link of pFCu and aerosol optical depth (see list of statements below), this part of the analysis does not go deep enough to establish the causality stated in the conclusions. The related conclusions are heavily reliant on the analysis in Fig. 7, showing that regions of a large difference in pFCu between 2011 and 2010 are often found in areas of high AOD. However, the spatial correlations between these fields are not particularly strong – in fact the correlation between the topography (Fig.1) and the difference in pFCu appears to be at least comparably good, highlighting the difficulty to establish causality from such correlations.

I suggest to either limit the drawn conclusions to what is demonstrated through the analysis or to extend the analysis to support every conclusion.

- *“The results for 2010 are consistent with previous findings in the Amazon (Koren et al., 2004; Davidi et al., 2009). Shortwave radiation absorbed by biomass burning aerosols heats the mid-atmospheric levels, which results in stabilization of the atmospheric profile and reduction in cloud cover. “*
There exist a large range of possible semi-direct effects (see e.g. Koch and Del Genio, ACP) and the presented results do not analyse the mechanisms.
- *“A comparison of the meteorological parameter averages between years 2010 and 2011 in the high AOD region shows minor differences of less than ± 2 m for HGT at 700hPa and 0%-10% for RH at 850 hPa, suggesting that the lower pFCu during 2010 was due to high AOD and not meteorology.”*
It is highly likely that the inter-annual differences in AOD (emissions) are driven by differences in meteorology. The presented results do not seem to rule out that these also drive the differences in pFCu?
- *“The results in Figs. 6, 7 strengthen previous findings that show that high AOD (i.e. high concentrations of biomass burning tends to stabilize the atmosphere and inhibit all types of cloud formation).”*
The presented results do not investigate the mechanisms.
- *“The results in Figs. 6, 7 strengthen previous findings that show that high AOD (i.e. high concentrations of biomass burning aerosol) tends to stabilize the atmosphere and inhibit all types of cloud formation.”*
The presented results do not investigate the mechanisms.

Specific issues:

1. Page5, line 125 *“It has been shown that this index correlates well with forest productivity and canopy density, and can be a good predictor for evapotranspiration and moisture fluxes to the lower atmosphere, which in turn drive the formation of Amazonian clouds.”*
It would be good to add references here.
2. Figure 8: please increase the dot size in the legend as it is hard to determine the colours.