Atmos. Chem. Phys. Discuss.,
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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterization of the radiative impact of aerosols on CO_2 and energy fluxes in the Amazon deforestation arch using Artificial Neural Networks" *by* Renato Kerches Braghiere et al.

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Anonymous Referee #2

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Description about the data sets and methods are not provided clearly in the beginning of the manuscript. Reader will only find part of the information in the conclusion section (1)

ANN technique explained in the "method" section should be focused in relation to the current manuscript (2)

Some key references are not cited: 1. Aerosols and their influence on radiation partitioning and productivity in northern Australia May 2009, Theoretical and Applied Climatology 100(3):423-438 2. Exploring the link between clouds, radiation, and canopy productivity of tropical savannas December 2013, Agricultural Meteorology 182(183):304-313 3. Advantages of diffuse radiation for terrestrial ecosystem productivity, JOURNAL OF GEOPHYSICAL RESEARCH,VOL.107,NO.D6, 4050 4. Fires increase Amazon forest productivity through increases in diffuse radiation, Geophysical Research Letters, 10.1002/2015GL063719 5. Enhancement of crop photosynthesis by diffuse light: quantifying the contributing factors, Ann Bot. 2014 Jul; 114(1): 145–156 (3)

The use of MODIS AOD (10 km x 10 km) is not justified well (4)

A very long conclusion. Well, it is not really a conclusion, but rather mixed with the scope of the study, methods and summary of the results. These components should be separated and placed under Introduction, Methods and Results sections respectively (5)

Authors' response:

We thank anonymous referee #2 for evaluating and reviewing our manuscript. We are especially grateful for suggestions to restructure the manuscript in order to make more easily to understand with a more 'natural flow'. We have to the best of our abilities responded to them.

We have restructured the Conclusion section according to the comments and suggestions offered by the referee in the specific comments (see details in 1). We have made it shorter and more objective. We have transferred part of the explanation of the datasets earlier in the text to sections 2.2 'Flux tower data' and 2.3 'MODIS data.

We have made section 3.2 'Artificial Neural Networks' more concise and focused to the

current scientific problem presented in the manuscript (see details in 2).

Although we agree that comment 3 might be true, we have tried to add all the main key references in the literature to our knowledge, but we have tried and amended some extra references that came up to us as fundamental in this research field., i.e., Roderick et al. (2001), Oliveira et al. (2007), and Mercado et al. (2009). A good review on the diffuse fertilization effect literature is presented in Kanniah et al. (2012) and we have indicated this paper as a reference. Additionally, more recent and important studies have been referenced in the manuscript, e.g., Fletcher et al. (2018), Persad and Caldeira (2018), Lee et al., (2018), etc. We also thank you for your suggestions of more specific references and look forward to read them and possibly address them in the following phase of the manuscript.

Addressing comment 4, we have added extra paragraphs at the beginning and at the end of section 2.3 'MODIS data' in order to better justify the use of MODIS AOD. Basically, MODIS AOD level 2 data (Levy et al., 2015) were used for all analysis in sites without a multifilter rotating band spectroradiometer (MFR) in situ, i.e., Bananal Island and Sinop. For Rebio Jaru, both data sources (MODIS and MFR) were available and a comparison between the two AOD 550 nm products is show in the attached figure from August, 16th to November, 14th 2007.

The MODIS level-2 atmospheric aerosol product (MOD04_L2) is provided on a 10x10 pixel scale (10 km at nadir). The level 2 product was chosen due to its estimation of the aerosol retrieval uncertainty to assist with error analyses as well as a best estimate of the aerosol optical thickness data with quality assurance flags already applied. Although spatial resolution is courser at level-2, lower product uncertainty improved our analysis. As for changes suggested in comment 1, we have made the conclusion section shorter and more objective, as well as restructured the manuscript throughout.

References:

Levy, R., Hsu, C., et al., 2015. MODIS Atmosphere L2 Aerosol Product.

NASA MODIS Adaptive Processing System, Goddard Space Flight Center, USA: http://dx.doi.org/10.5067/MODIS/MOD04_L2.006

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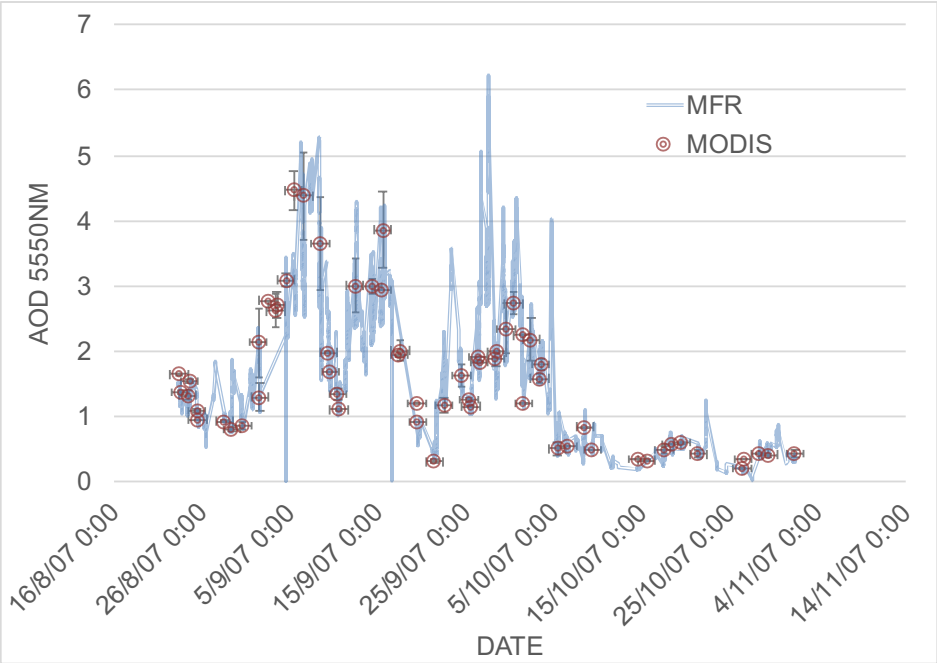
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6
5
4
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AOD 5550NM
MFR
MODIS
16/8/07 0:00
26/8/07 0:00
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15/9/07 0:00
25/9/07 0:00
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Fig. 1.