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Biogeosciences Discussions

Interactive comment on "Life cycle of bamboo in southwestern Amazon and its relation to fire events" *by* Ricardo Dalagnol et al.

Anonymous Referee #1

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This manuscript uses Landsat and MODIS imagery over the MODIS time period (2001 to 2017) to map bamboo patches (living and dead) in the SW Amazon. The authors then estimate patch age based on change over time and test the 'bamboo-fire hypothesis' by comparing presence of dead bamboo to active fire maps from MODIS. Overall I think that this is an interesting and well researched exploration of an important and understudied part of tropical forests - the presence of large patches of bamboo. My main criticism, however, is in the overall clarity of the description of analyses and results - as I note specifically below, there are many places where it is not clear, at least to me, whether the analysis is at the single pixel, pixel over time, or patch scale, what certain terms mean, and how the analyses support or do not support the conclusions. One other general comment is on the use of active fire detection to conclude that 'most

bamboo corhorts did not burn after die-off' (abstract). While this may be the case, this conclusion is based on the assumption that the MODIS Aqua satellite detects 100% of pixels on fire, while in reality it's likely that fire in some pixels was blocked by clouds, was too small to be detected by MODIS, or wasn't burning as the satellite passed overhead. I'm not sure if/how these uncertainties were incorportated into the INPE database, but this source of uncertainty should at least be acknowledged.

Specific comments:

p. 1 lines 1-5: I don't think it's necessary to describe this other study in the abstract. I would just cut the sentences "In southwest Amazon...quantities of necromass." p. 1 line 8: "the fire hypothesis" -> "the bamboo-fire hypothesis" p. 1 line 9: "the MODIS thermal anomalies product" p. 2 line 7: I'm not an expert in Amazon landforms, but I think this should be 'terra firme' throughout (not 'terra fime') - if 'terra fime' is right it probably deserves a short definition since this appears to be an uncommon land type. p. 2 line 20: "In the region" which region is being described here? p. 2 line 22: "in" -> "as" p. 2 line 28: "forming a small" -> "forming small" p. 2 line 30: "maximize once in a lifetime chance..." - I read the Carvalho paper but I still don't totally understand how a temporal offset would maximize the chance of cross pollination. p. 4 line 21: it's helpful to refer to the actual MODIS codes, like MC19A1 (v006, I assume) for consistency p. 4 line 22: Do you actually use all of these bands in the analysis? p. 4 line 28: How did you handle the daily vs 8 day product mismatch? p. 5 line 4: Awesome that this was done in R! Is the code available? section 2.2.2: More detail would be great in this section - did you use 1 image per year? p. 6 line 22: What is a 'percentile' in this context? I've tried pretty hard to figure it out, but I really don't get it, and it's pretty critical to the rest of the manuscript. Is it based on the distribution of values in a pixel? in a patch? This term is also not used in the Carvalho paper. p. 6 lines 26 - 29: What are these distributions telling us? Again, in a given pixel across time? or...? section 2.2.4: as mentioned above, can uncertainty be quantified in the fire data? p. 7 line 13: not sure what Y=x means here. p. 7 line 23: are 'geolocations' the patches of

5 pixels? if there are 390 here, why are there fewer in Fig 4c and d? (I think these should be the same?) p. 7 line 30: "it" = "a bamboo dominated pixel" (I think?) p. 8 line 24: 'geolocations' = 'patches'? pixels? random samples? p. 9 line 27: 'followed a normal distribution (p=0.33)' -> this is a K-S test, right? if yes, 'did not significantly differ from normal' would be more clear, I think. Figure 3 caption: "(hatched)" -> "(hatched in Figure 1)" section 3.2.3: I'm having a hard time grasping exactly how this cohort age analysis using NIR reflectance fits with everything else, especially given that the results differ when different bands are used... (Figure 7) and the accuracy seems low (p 13 line 10)? Is this meaningful? If patches of dead bamboo are being mapped visually, is this fitting necessary to estimate future dieoff? Figure 5: These colors are really hard to see even for a non visually impaired person -> check out colorbrewer2.org for color schemes that are colorblind friendly. p. 17 line 15: 'did show' what? p. 17 line 19: "...in dead and live bamboo" in non drought years? p. 18 line 3: 96.95 to 99.89% of what? p. 18 line 6: "that" -> "where" p. 18 line 9: "The presence of canopy trees could explain why the tree cover is so high." I'm not sure what this is saying that isn't obvious? p. 21 line 29: it seems like there also might be some interesting carbon cycle implications to this work? p. 21 line 32: I don't know if Keeley and Bond would insist on ALL patches burning to confirm the bamboo-fire hypothesis p. 22 line 35: "nearby" -> "near" p. 23 line 11: "not fully supported"? not at all supported, right? I think the uncertainty in the fire observations is an important caveat here, but these results really refute the bamboo-fire hypothesis at least in this setting.

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