

## ***Interactive comment on “Australian vegetation phenology: new insights from satellite remote sensing and digital repeat photography” by Caitlin E. Moore et al.***

**Anonymous Referee #2**

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### GENERAL COMMENT

1. The manuscript presents a very interesting overview on the phenology of Australian ecosystems tracked from MODIS EVI and phenocam GCC. Potential and opportunities related to overstorey and understorey GCC analysis as well as comparison between GCC and ecosystem productivity are illustrated and discussed. Moreover the growing and promising Australian phenocam network is presented together with important recommendations on data standardization and sharing. The topic is relevant, timely and can be of great interest to the growing community of sites and researchers using phenocam for phenological and ecological monitoring

I only have one criticism related to EVI trajectories discussion in section 3, 4 and figure C1

1. EVI trajectories in fig1B and 1E does not look like “constant moderate to high EVI with relatively little temporal variability” (fig1 caption). Or at least I would not define 1B and 1E with little temporary variability and 1F with “a seasonal component” (fig1 caption). Qualitatively evaluating annual cycle amplitude looking at fig1, it can not be stated that site F is different from E and B. Mean EVI values are different between the 3 sites but mean annual amplitudes are quite similar. I think that saying that B and E does not show a season cycle is not correct. Moreover fig1 caption (little temporal variability at point B Cape Tribulation and point E) and p7 l13-14 are in contrast with section 3 p7 l3-4 and p7 l26-27 “(location E) show a strong seasonal cycle”. A more quantitative approach to define what is high, low and null seasonal variability is needed. This can be quite easily done computing mean annual EVI amplitude. Section 3, section 4.1.1 (p9 l3) 4.1.2 (p10 l4) need to be modified accordingly.

I recommend manuscript publication after the above mentioned point and the following specific comments are addressed.

### SPECIFIC COMMENTS

p7 l10-11 this sentence should go before the previous paragraph, where fig1 is mentioned.

p7 l14-15 within year patterns (e.g wet season) are difficult to see in the current plot. From the lower panels it's almost only possible to see inter-annual patterns rather than events occurring in specific period of the year e.g. “maximum EVI in the late dry season”. Even if not extremely appealing, a vertical dashed grid at x axis ticks could help

p7 l23 I admit that I could be biased, but maybe adding months in parentheses, (e.g. winter (jun-sep)), should help readers from the northern hemisphere.

p8 l4-5 reference formatting issues

p8 l18-25 phenocam QA/QC is a relevant topic that is worth to be raised, but this paragraph is a bit misleading as mentioned references are not related to phenocam

QA/QC that to my knowledge are still missing. Please reformulate.

p8 l30 which R package? Or simply R software?

p8 l29-30 check figure numbering

p8 l32-33 Phenocam data normally need to be filtered using approaches a bit more sophisticated than daily averaging. Please comment on this in the light of commonly used filtering procedures (e.g. Sonnentag et al. 2012, Filippa et al. 2016).

p9 l6-7 & l31 how can you say that "GCC fluctuated in line with leaf shedding and flushing". I guess shedding and flushing were evaluated by visually inspecting the images. If yes you should mention it.

p10 l7 & l19 insert the month when the onset of the wet season and onset of the dry season occur. Probably Oct-Nov and Mar-Apr?

p10 l5-l17 MODIS EVI and understory GCC show pronounced seasonal cycles, whilst overstory GCC did not. Which is the overstory fractional cover? Can low fractional cover be the reason to explain why MODIS EVI matches understory phenology rather than overstory?

p10 l24-l33 Are those longer term phenological patterns (fire and cyclone activity) detectable from EVI timeseries?

p11 l2-l24 In these paragraph it seems like temperate evergreen forest, wet sclerophyll ecosystem and eucalypt forest are used as synonyms. Is this correct? Try to be more consistent or make a short introduction in the paragraph to help readers not familiar with Australian ecosystems.

p11 l22 fig1 E?

p11 l1-l7 and fig5. Greening ramps of the two ROIs from late nov to late dec, show approximately a 1 month lag. Could this be related to understory phenological variability? Are the two ROIs looking at the same individuals?

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p12 l7-8 here you refer to the site as an "evergreen dry sclerophyll woodland" while in fig 6 caption "temperate eucalypt woodland" is reported. Is it the same? Be more consistent.

Fig1 and caption. Consider the idea of plotting phenocam site whose date are used in paper (e.g. AU-How, presented in the paper differently from phenocam site not used).

Fig2 Does different green intensity has a meaning?

Fig4&6 legend. What does L and R means? It indicates left and right y axes? If yes it's not needed.

Fig4 pics in the lower panel: are these the ROIs used to compute overstory and understory GCC?

Fig3-5 including ecosystem type in figure caption or plot titles consistent with 4.1 paragraph titles (tropical rainforest, tropical savana, temperate evergreen) will help the reader.

Cited references

Sonnentag, O., Hufkens, K., Teshera-Sterne, C., Young, A. M., Friedl, M., Braswell, B. H., ... Richardson, A. D. (2012). Digital repeat photography for phenological research in forest ecosystems. *Agricultural and Forest Meteorology*, 152, 159–177. <http://doi.org/10.1016/j.agrformet.2011.09.009>

Filippa, G., Cremonese, E., Migliavacca, M., Galvagno, M., Forkel, M., Wingate, L., ... Richardson, A. D. (2016). Phenopix: A R package for image-based vegetation phenology. *Agricultural and Forest Meteorology*, 220, 141–150. <http://doi.org/10.1016/j.agrformet.2016.01.006>

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