

Biogeosciences Discuss., referee comment RC1
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Comment on bg-2022-115

Anonymous Referee #1

Referee comment on "Tropical cyclones facilitate recovery of forest leaf area from dry spells in East Asia" by Yi-Ying Chen and Sebastiaan Luyssaert, Biogeosciences Discuss.,
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This study used an "unbiased data-set" to explore the relationship between typhoons and forest leaf area in East Asia and reported that near 1/3 of the typhoons had positive effects on leaf area due to increased water availability. It is true that the selection of typhoons in this is not biased toward intense ones and as such represented an overall assessment of typhoon effects on forest leaf area. It is also somehow true that the positive effect of typhoons on leaf area is surprising (counter intuition). Although I think this is an informative study, there are several points need to be clarified.

- It is true that most studies of cyclone (typhoon) disturbance effects focused on major cyclones such that the effects of typhoons on ecosystems are disproportionately derived from studies of these major typhoons. However, I do not think that researchers assume that their studies represent the overall effect of typhoons on ecosystems. I think the studies tried to show that major typhoons could have large impact on ecosystems. With some exceptions, intense typhoons generally caused greater damage. Naturally weak typhoons (e.g., category 1) are unlikely to cause large canopy damage. Thus, I think one piece of information that needs to be added to the manuscript is the proportions of typhoons of different intensity categories for the typhoons passed the selection in this study. Related to this, I would also suggest break the analysis by intensity categories of typhoons. If the patterns stay the same (i.e., 30% typhoon did not cause detectable canopy damage) among all categories, that would be a much more interesting finding. If on the other hand, the proportion of no-damage concentrated among weaker typhoons, the results would basically confirmed the findings of previous studies. Also related to this is the definition of the width of the cyclone track area. I wonder if a more conservative definition is used, would the results stay the same. Because wind velocity decreases with increasing distance from the typhoon eye. A liberal definition is likely to include areas with not strong winds and as such it is not surprising to see limited typhoon impact on forest leaf area. It is important to note that in situ wind speed experienced by the forests could be very different from that of the global dataset.

- The use of images two months following typhoon disturbance bothers me. In tropical and subtropical region, plant growth could be very quick so that leaf area could increase substantially in two months, with and without typhoon disturbance. Even for late typhoons the phenological change could be substantial because most of the affected areas are in the subtropics with long growing season. Thus, I am concerned that the seemly positive effect of typhoon on forest leaf area could be an artifact of the long duration between typhoon passage and image acquisition.
- The most interesting finding of this study is the positive effect of typhoon on leaf area which was attributed to increased water availability. I have several concerns on this finding. First, as described above most of the increase in leaf area could be from weak typhoons. In this case, it is not surprising because weak typhoons are not expect to have major impact on forests. This has been reported before. Second, also as described above the use of a liberal definition of typhoon track width could also lead to this positive effect because the wind velocity is naturally low in parts of the affected area. Third, the two months interval between typhoon passage and image acquisition described above could also lead to the positive effect. A combination of weak intensity, liberal definition of track width and long duration between typhoon passage and image acquisition makes the claim of positive effect of typhoon on forest leaf area problematic. I am not saying that the finding is not true but the above possibilities must be excluded before such a conclusion can be made with confidence. I would also like to see the changes in leaf area in the reference areas during the same period. If leaf area also increased at the similar magnitude, then attributing the effect to typhoons needs more explanation.
- The definition of a reference area of less than 0.5 unit different in leaf area form the affected areas need to be put in the relative leaf area context. What are the range of leaf area? This is important because 0.5 for a leaf area index of 7.0 means very different from 0.5 for a leaf area index of 4.0. In other words, it could be reasonable difference to ignore for a forest with leaf area index of 7.0 but a substantial difference for a forest with leaf area index of 4.0.
- The figures are mainly about the statistical results. I do not see any results on the actual leaf area and it changes. Thus, the paper is more statistical than ecological/biological.
- I am not all convinced that less than 1/3 of the typhoons passed the quality control check is representative of the overall typhoons in the region.