Remote Sensing Submission ID 610334

Karna et al. 'Assessing legacy effects of wildfires on the crown structure of fire-tolerant eucalypt trees using airborne lidar data'

Response to Reviewers

Thank you for the invitation to revise our manuscript. We are encouraged that the reviewers appreciated the work and thank them for their constructive comments that have contributed to improvements in the manuscript.

We have made the minor changes in response to the reviewer's comments with yellow highlighted text in the revised manuscript document, noting that the paper's key findings remain unchanged. We trust that the changes as detailed below fully address the reviewers' comments, and that the paper will now be accepted for publication.

Please note references to line numbers in the reviewers' comments refer to our original submission, whereas line numbers in our responses refer to the revised version. The added texts in the manuscript are written in corresponding responses and kept in the *"inverted commas"*.

Reviewer # 2

The paper is interesting, and it provides a reasonable contribution to the body of knowledge. Nevertheless, it may be improved further:

1-Introduction-The problem is well described, as well as the objectives of the research. Consider adding more relevant references at international level.

Response 1: Thanks, and well appreciated. We have added a few new international references as follows:

- *Line 40 to 41:* Wildfire impacts on forest ecosystems worldwide are predicted to change under fire and climate regimes [1-4], reference 4 a new addition (Lindner., et al. Climate change impacts, adaptive capacity, and vulnerability of European forest ecosystems. Forest Ecology and Management **2010**, 259, 698-709.
- *Line 50 to 52:* Crown damage and loss associated with high-severity fires will impact on tree carbon uptake, influencing stand productivity at least until the functional leaf area is recovered [11,12], reference no 12 a new addition (Lang, A.C.; Hardtle, W.; Bruelheide, H.; Krober, W.; Schroter, M.; von Wehrden, H.; von Oheimb, G. Horizontal, but not vertical canopy structure is related to stand functional diversity in a subtropical slope forest. Ecological Research 2012, 27, 181-189, doi:10.1007/s11284-011-0887-3.)
- *Line 57 to 58:* Fire impacts on tree crowns will likely vary depending on the pre-fire architecture [15], reference no 15 a new addition (Banin, L.; Feldpausch, T.R.; Phillips, O.L.; Baker, T.R.; Lloyd, J.; Affum-Baffoe, K.; Arets, E.; Berry, N.J.; Bradford, M.; Brienen, R.J.W., et al. What controls tropical forest architecture? Testing environmental, structural and floristic drivers. Global Ecology and Biogeography 2012, 21, 1179-1190, doi:10.1111/j.1466-8238.2012.00778.x.)

- *Line 64 to 65:* the contribution of eucalypt crowns versus understorey to these spectral data and [18], reference no 18 a new addition (Latifi, H.; Heurich, M.; Hartig, F.; Muller, J.; Krzystek, P.; Jehl, H.; Dech, S. Estimating over- and understorey canopy density of temperate mixed stands by airborne LiDAR data. Forestry 2016, 89, 69-81, doi:10.1093/forestry/cpv032)
- *Line 94 to 95* This has implications for understanding post-fire recovery of forest productivity [50], reference no 50 a new addition (Hicke, J.A.; Asner, G.P.; Kasischke, E.S.; French, N.H.F.; Randerson, J.T.; Collatz, G.J.; Stocks, B.J.; Tucker, C.J.; Los, S.O.; Field, C.B. Postfire response of North American boreal forest net primary productivity analyzed with satellite observations. Global Change Biol. 2003, 9, 1145-1157, doi:10.1046/j.1365-2486.2003.00658.x.)

2-Justify in a better way, why only 17 sites for the sampling plots of the study. The sampling and data collection process is well described and seems consistent.

Response 2: We have more clearly indicated why our study was restricted to 17 sites, as follows (Line 145 to 148):

Revised text: *"Our study design involved clusters of plots at each of 17 sites to improve sampling efficiencies in the logistically challenging (steep and isolated) terrain. These 17 sites represented the most accessible combinations of the overlap of the wildfire complex with our selected forest type and the lidar-data extent. They …"*
Original text: *We assessed trees at 17 field sites, which were four replicates each of four wildfire severity types …*

3-The methodology is well described as well as the results.

Response 3: Thanks.

4-You may improve the conclusion, as it seems quite small and it doesn't valorise your work.

Response 4: We have further highlighted the importance of our paper in the Conclusion by adding the following text (Line 658 to 661):

"The implications of these legacy effects on, for example, tree productivity and the accuracy of biomass allometric equations warrants further study. Trees are keystone forest structures so improved assessment of changes in tree structure improves understanding of forest landscape processes. Our unique tree-based lidar crown metrics demonstrate" the utility of airborne lidar data for assessing post-fire severity effects on structurally complex tree crowns.