

# ***Interactive comment on “Carbon uptake and water use in woodlands and forests in southern Australia during an extreme heat wave event in the ‘Angry Summer’ of 2012/2013” by Eva van Gorsel et al.***

## **Anonymous Referee #1**

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This study details the the ‘Angry Summer’ of 2012/2013 in Australia from a FLUXNET perspective. I have a few sundry comments (listed below) but my main issue is one of narrative. I am missing some grand notion of what we’ve learned from this that we did not already know. We already knew, as an example, that extreme events alter the energy balance. We might have guessed that AU-Tum, as a forest with relatively deeper roots, would have a different LE response. Removing some of the verbosity might help polish the storyline, e.g., the site characteristics can be readily outsourced to a table in the appendix. Also, with your HW1 and the HW2 you are set up to talk about legacy (or memory) effects, but that word appears nowhere in the study. Finally,

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your "Although all observed ecosystems remained carbon sinks through the duration of the heat wave" bit in the Conclusions is different that the expectation that extremes flip carbon status (sink to source). Using that as a framing piece would help the narrative I believe. In any event, as is I am at a loss as to what the main take-ways of this study are (other than different sites responded slightly differently, which is a given a priori).

Please use unique line numbering (do not reset to 1 every page). L5 is rather ambiguous here.

Re: "While climate change generally increases the sink strength of terrestrial ecosystems through carbon dioxide and nitrogen fertilisation" The authors need to rethink this. There have been several recent papers that read as an active debate on this assertion. See e.g., van der Sleen et al 2014 & Smith et al 2015. Plus there is more to climate change than C and N fertilization.

Re: "BIOS2" comes out of the blue here. In the abstract you mention CABLE?

Re: "Discussion" But you have not done anything with BIOS2 as of yet? Or if you have it is not clear what? Was it just to gapfill meteorological time series? In the appendix you have skill metrics for various fluxes but I cannot find a reference in the paper that these were ever used?

Figure 2: Why is precip different by panel? The same sites and times are shown in each one? Also, what of the background shading? I would put the legend outside of the plot as well.

Figure 3: This needs a legend for the symbols that is not in the caption.

Figure 4: What are "Flier points"?

Figure 5: (And this applies to the other figures as well.) Could you look into visually more distinct colors?

Figure 7: BHG? Why not show the differences wrt the background to declutter?

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## Table 1: Is it not Plains?

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