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Interactive comment on "Investigation of scale interaction between rainfall and ecosystem carbon exchange ofWestern Himalayan Pine dominated vegetation" *by* Sandipan Mukherjee et al.

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This article explores the mutual relationship between rainfall, air temperature, and VPD and CO_2 exchange by a Pine forest over the Western Himalayan foothills in India using wavelet analysis technique. The authors have established the cause-effect relationship between rainfall and ecosystem CO_2 exchange using wavelet coherence and cross-spectra. Overall, this article is well written and addresses a problem less explored in the scientific literature so far. It should be accepted after revisions. Following are my comments to improve the paper.

1. Why only the 3-hour scale was considered while downscaling the CASA-GFD3

NEE output which was subsequently used for wavelet coherence with the measured NEE? Is there any natural process associated with this scale that the authors want to probe specifically?

2. In Figures 4, 6 and 7 different scales are used in different panels (a, b, c) such as, in Fig. 4a and 4b wavelet power vary between [1/64,64] and in Fig. 4c between [1/32,32]. These should be uniform for better understanding.

3. The colour scale used in the lowest panel of Fig. 5 should be explained in the figure caption. 4. Why is such a strong seasonality observed in the LAI, between 0.8 $m^2.m^{-2}$ in January and 2.5 $m^2.m^{-2}$ in late July-early August, given the fact that the forest studied here is an evergreen coniferous one?

5. The authors show that the carbon assimilation rate subsided with the air temperature and VPD. But as we know the NEE increases initially with air temperature and VPD and decreases later at very high values with air temperature and VPD, after stomatal closure. The authors need to address this point.

6. Why is the NEE CWT markedly different in 2014 compared to the other two years?

7. Can the authors provide the uncertainty estimates in their NEE, GPP, and RE budget?

8. We know that the land-surface temperature gradient during the pre-monsoon and monsoon drives the Indian summer monsoon. However, the authors state that the early monsoon 16 days rainfall band precedes the temperature enhancement. What is the physical mechanism behind this?

9. How is the RMS error in NEE attributed to the rainfall variability?

10. The authors have used the term 'phase-locked' multiple times in the text to explain the results without much explanation. It should be defined and explained clearly.

11. There are many typos and grammatical mistakes in the manuscript such as "...and controls of forest ecosystem exchnage" in Sec. 1, "...The fraction of explained variance (...) for both 2014 and 2015 was found to be 0.08 represents a generic under prediction of NEE variability by the model." in Sec. 3.5 etc. This list is not exhaustive. These should be carefully examined and corrected.

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