

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

### **Anonymous Referee #2**

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Investigation of scale interaction between rainfall and ecosystem carbon exchange of Western Himalayan Pine dominated vegetation

Study tries to show the potential effect of Monsoon and winter rainfall over the carbon exchange in an Himalayan pine forest. Eddy Covariance method is used to derived Net Ecosystem Exchange at ecosystem scale during a period of three years. Authors used wavelet analysis to identify time periods of effect between rainfall and other meteorological variables, as well NEE. Authors explored the effect of rainfall patterns with modeled NEE fluxes at “regional” scale with the use of a global product. The topic in general is interesting (Monsoon rainfall and NEE), however the goal of the article is not

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clear and not easy to understand until the conclusion. There are not clear hypotheses. Authors assumed that carbon fluxes and productivity are controlled by rainfall patterns, however they also described and showed the potential and combined effect of other biophysical factors. There is an overuse of wavelet analysis and potentially many results can be summarized with words, instead to show many graphical sources. There is a mix of elements in the article (e.g., some methods are described in the results apart and in opposite way). A depth and comprehensible discussion is needed. Some conclusions are faraway of the results showed in the article.

Specific comments:

- Why did the authors decide to use CASA-GFED3 to simulate the NEE? The use of this source is not well justified in the introduction and it makes unclear if the authors wanted to upscale the observed NEE with the modeled NEE. In addition, they did not validate potential relationships between modeled and observed NEE. May be is not necessary the use of this source if the authors make clear the goal of the story. - In the measurement detail and data processing, authors did not say what is fetch filter of their EC tower and how potentially can be affected by the topography. This is relevant because after, authors explain the use of a global product and its unknow how spatially are related the tower fetch with the spatial resolution of the global product. - There is a detailed description about the graphs derived from wavelet analysis, however discussion and references are needed around. For example, why did the authors consider the current meteorological variables in the study and why did they not include others (e.g., radiance, PPFD, etc) that could also explain the forest carbon exchange?, Why during winter rainfall in some years does precipitation affect the productivity of the forest and why others years not? Why the modeled NEE (global product) used is not every time related with the observed NEE? The global product is working properly for this ecosystem? What is the goal to include a global product in the study? - Figure 1 and its caption need improvements. Not scale in the first two maps, not legend, not grid. - The main characters of the story are showing until figure 5, potentially authors

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could show the graphs of Figure 5 after Figure 2. - Almost all the captions of the figures are not well explained, and many information of the captions are explained in the main body of the article. It is necessary to improve the Figures captions. - In all the wavelet analysis instead to use DOY in the x-axe, better use regular format date (MM/YYYY)

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