Biogeosciences

Discussions

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Interactive comment on "Using Moran's I and GIS to study spatial pattern of forest litter carbon density in typical subtropical region, China" *by* W. J. Fu et al.

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Reviewer #2: This manuscript is generally clearly written, the length is appropriate for the amount of novel content and the conclusions are consistent with the results. I have two major comments on the ms. Once these comments have been addressed, I think this article will make a useful contribution to the literature on carbon storage in forest litter. Our response: We appreciate the positive comments from Reviewer #2. Both of her/his comments were carefully answered as detailed information as follows:

1. I felt there was a lack of a strong argument for the need to describe spatial patterns in forest litter. In particular, it's not clear to me how Moran's I, and the nugget and sill

from variograms will help inform management for high litter storage. To me it looks like these analyses have been included not because there is a strong theoretical reason for it, but because the data are suited to this and one of the authors has expertise in these analyses. To avoid this impression it would be good for the authors to provide concrete arguments for including these analyses in the abstract and first paragraph of the intro.

Our response: This is a good point to improve our manuscript. Actually, for the spatial pattern study of forest litter carbon, we have put some words in the introduction section to explain its importance, now, we added more information in the introduction section as follows. Necessary change in the abstract section was also made. "Accurate assessment of the spatial patterns and stocks of forest ecosystem including forest litter carbon, especially at national and sub-national scales, is an indispensable step when evaluating sequestration potentials (Liu et al., 2011). To acquire accurate estimate of forest litter carbon, reliable datasets providing information on forest types of sites within the entire region are required, as FLC density varies from place to place, controlled by a series of environmental factors at different spatial scales (Sainju et al., 2008; Wang et al., 2009). To better understand the FLC reservoir, it is necessary to update regional FLC information with intensive sampling and to apply spatial analysis methods to produce integrated distribution map."

2) The authors note that "the definition of weight function, data transformation, and existence of extreme values" affect Moran's I, and that "these factors were taken into consideration in order to obtain reliable and stable results". However, I didn't see any details on how this was done. They mention a Box-Cox transformation, which I suppose takes care of the extreme values, but what about the other factors? How did they choose their weight function? How do we know what effect this choice had on results.

Our response: we added necessary information in the Spatial autocorrelation analyses in Materials and methods section. Please see the detailed information as follows. "For the definition of weight function, the best distance band was obtained based on the largest global Moran's I value, indicating the strongest spatial autocorrelation of forest

litter carbon density. In this study, this distance band was 36 km, which was further used to study spatial clusters. Meanwhile, the Box-Cox transformation (Box and Cox, 1962) was performed on raw data sets as it did not follow a normal distribution. The transformed data can also eliminate the effect of extreme values on the spatial clusters analysis."

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