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Interactive comment on "Effects of vegetation heterogeneity and surface topography on spatial scaling of net primary productivity" *by* J. M. Chen et al.

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We appreciate the insightful comments. We agree that the transferability of our scaling algorithm to different landscapes should be concerned and has not been tested in this study based on one watershed. However, our algorithm is designed in such a way that the structure of the scaling algorithm is based on physics so that it has generality for various applications while the coefficients in the algorithm may be determined locally. For example the coefficients Cij in Eq. 8 for scaling between different land cover types are determined by the differences in NPP among different cover types. In the application of this algorithm to a new area, these coefficients may be simply adjusted

according to the mean NPP values of the various cover types. For flat areas, no slope and elevation corrections are necessary, and land cover and LAI scaling algorithms would still be applicable because the principles for these corrections are universal. Soil depth and texture can indeed induce additional spatial variabilities in NPP and could be considered in the scaling to further improve the results. However, soil conditions would influence the vegetation distribution (e.g. pine forests usually grow on sandy soil) and are often associated with topographical locations (e.g. finer textured soil at lower locations). Therefore, we expect that the gain from including soil texture in spatial scaling may be small. Soil depth data are generally lacking and inaccurate, and it would be generally difficult to consider it in scaling. It would be important in watersheds that have a considerable portion with shallow soil that become a limiting factor for plant growth. However, this is not the case in our study area. We appreciate these comments and will add a paragraph in Discussion to this effect.

Figs. 15 and 16 plot soil moisture against slope on the same scale for both 30 m and 1 km resolutions. We will add an explanation on their captions.

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