

Interactive comment on “Changes in carbon stocks of *Fagus* forest ecosystems along an altitudinal gradient on Mt. Fanjingshan in Southwest China” by Qiong Cai et al.

Anonymous Referee #2

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The manuscript could a contribution of interest for Biogeosciences and in principle within its specific scope but it is not suitable for publication in this form. The Authors have made a great effort in collecting many data, but the experimental design is not appropriate to the proposed objectives. In addition, statistical analysis of data is poor and misused because the statistical results do not confirm what the Authors reported as main findings. The Authors have completely neglected spatial variability in both soil and forest cover. Organic carbon content in soils is strongly dependent on the soil properties and particularly, on soil texture. The Authors should provide at least the main soil properties of the nine areas to show their homogeneity. Such an implicit assumption of homogeneity cannot hold with no information on soil properties. The nine

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stands are not comparable because they have different ages (ranging between 44 and 185 years), density (ranging between 1483 and 2350 stems/ha). How do the Authors think possible to evaluate the key driving factors of altitude gradient in vegetation carbon storage? To separate the elevation effect from other attributes, it is requested to have homogeneous stands in which the only variable factor is elevation.

Results are not supported by statistical analysis. The changes in vegetation carbon storage along the elevation gradient makes no sense (Fig. 1). A simple visual inspection of Fig. 1a for trees data, shows a regression line through two cluster of points and reporting significant coefficient of determination has no statistical meaning. The same occurred for the aboveground vegetation (Fig. 1b). Shrub and herb have no gradient (Fig. 1a): the regression line is almost horizontal. Similar comments can be made for Fig. 2. Litter and fine wood debris (FWD) have no gradient with elevation (Fig. 2a and b) whereas coarse woody debris (CWD) if has a gradient, it is not linear. In Fig. 2b, CWD shows only scattered points. Figure 4a shows no relationship between stand age and elevation: points are too scattered. Even Fig. 2b shows no real relationships between carbon storage of the different components and stand age.

Many other comments could be made on the manuscript but I would point out only the main weaknesses.

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