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Interactive comment on “The influence of soils on heterotrophic respiration exerts a strong control on net ecosystem productivity in seasonally dry Amazonian forests” by J. R. Melton et al.

Anonymous Referee #2

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Melton et al. investigate the role of soil respiration on the seasonal cycle of net ecosystem production (NEP) in two tropical wet forest sites contrasted by only soil texture and depth. In the context of recent studies that have concentrated on optimizing the seasonal cycle of gross primary production, Melton et al find instead that soil respiration and its seasonality is equally important. The main findings are that for the CLASS_CTEM model, seasonal GPP is relatively well simulated and that soil respiration is sensitive to whether microbial activity is related to soil matrix potential or soil moisture and the respective shape of each response function, and the paper is well written and clear to follow.

The paper provides an important perspective on the seasonality of tropical forest car-
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bon cycling. Main comment is 1) why are the component fluxes from the site eddy flux towers not used, substituting MODIS GPP for GPP derived from the tower measurements introduces a lot of uncertainty, and 2) more discussion on the difference between the tested Rh methods and how this is related to microbial processes at a more detailed level would be appreciated. For example, are there experiments (i.e., drought experiments) where soil chamber measurements have come to similar conclusions about how soil respiration and microbial processes are controlled?

Some minor comments: Intro: The amazon doesn't experience seasonal "drought", please check that "dry season" is specific. Drought is considered an anomalous event. Methods: I appreciate the clarity in explaining the physical equations for soil respiration, but where do the empirical values come from? For example on page 12494, where do the soil respiration parameters come from (i.e., $0.0208 \text{ kgC(kgC)}^{-1} \text{ day}^{-1}$ and $0.6339 \text{ kgC(kgC)}^{-1} \text{ day}^{-1}$)? Methods: Need to describe processing of MODIS and which quality flags were used – this can have effects on the seasonal cycle and introduce bias (see Morton et al. 2014).

Interactive comment on Biogeosciences Discuss., 11, 12487, 2014.

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