Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2018-73-RC2, 2018


Biogeosciences Discussions
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# *Interactive comment on* "Ecosystem responses to elevated $CO_2$ using airborne remote sensing at Mammoth Mountain, California" *by* Kerry Cawse-Nicholson et al.

**Anonymous Referee #2**

Received and published: 18 June 2018

This is an interesting study using a purported natural CO2 enhancement gradient to understand ecosystem scale responses to elevated CO2. The authors use a linear regression model to control for a couple of covariates to discern the effect of eCO2 on structure and process.

Overall, the empirical model results in confusing results, which the authors try to explain by referring to similar studies in other naturally enhanced CO2 systems. I find the discussion quite speculative and have two concerns on the study and the usefulness of volcanic-CO2 seepage as an experimental setting.

1) The authors argue that the Mammoth Mt region is very well studied and that vari-



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ability in CO2 over time and space is minimal, and that the ecosystems in the area are in some equilibrium with the seepage. But even ignoring variability before measurements began, the Figure 1 shows very high variability since measurements first started. I don't think we can say with any confidence what the CO2 exposure has been over time and space, and whether the current study reflects the equilibrium conditions to eCO2. 2) The authors focus only on eCO2 as a driver of variability in structure and processes. Soil conditions (physical and chemical) are overlooked and it is quite possible that some sort of chemical toxicity is interacting with plant growth and causing the unusual 'eCO2 responses' that the team finds.

Minor comments: - Define MASTER and ASO when first used - Effect of canopy height model (selecting tallest pixel in each 1 m2 grid cell) will likely bias the biomass estimate to outliers, why not use percentiles, i.e. 90th, to avoid this artefact? - Please discuss a bit more the sample size used to develop the plant traits models with AVIRIS.

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