We thank the reviewer for their helpful questions and comments. The original reviewer questions and comments are shown in italics, while our responses are shown in plain text.

General:
I found the science interpretation of the CHOCHO/HCHO data thin and insubstantial. It was limited to a handful of case studies from which we learnt very little about how we could use the ratio of CHOCHO and HCHO as an effective metric. The section about satellite data was largely unsubstantiated, and the final section provided minimal numerical calculations to support the arguments put forward.

Specifics:

1) Figures S1 and S2 should be in color.

We have altered the figures accordingly.

2) Page 6056, Line 21: reasons for the differences are unclear? Are there really no clues from the wider science efforts in both campaigns?

We did observe large differences in concentrations of BVOC emissions, such as isoprene and MBO, between the sites. We expect R_{GF} to vary between different biogenic VOC mixtures, (e.g, it should be higher at BEACHON than BEARPEX) as MBO, which dominates reactive VOCs at BEACHON for HCHO and Gly has a (relatively) higher Gly and lower HCHO yield than isoprene, which contributes significantly during BEARPEX. We have added text to the manuscript discussing this point. However, due to the limited data, we do not feel it is prudent to hypothesize much further on this point.

Additionally, we adjusted some of the language in this section as 32% average difference between the R_{GF} during these campaigns is not strong enough, especially in comparison to R_{GF} in urban locations, to warrant the previous, stronger language.

3) Page 6057, Lines 1-8. Very vague text. Days in the NE regime were more likely to include transport events? Can the authors provide more information about the meteorology during the campaign?

We thank the reviewer for pointing out this lack of clarity. We have rephrased this section as below to clarify the significance of the different wind regimes. Also, Figures S5, S8, S9, and S10 display the significant meteorological parameters during the days examined in the manuscript.

"Diurnal Gly and HCHO concentrations were higher in the afternoon for the northeasterly regime, while R_{GF} were similar between the regimes (Fig. S4). Thus, the consistent diurnal variability in R_{GF} is possibly due to either a buildup of directly-emitted HCHO into the stable nocturnal boundary layer or preferential dry deposition of Gly over HCHO, though current data is insufficient to verify either of these conclusions."

4) Page 6057. Suggest the authors replace Figure 2 with Figure S5.

We made a conscious effort to place the meteorological data in the supplement to reduce the risk of overwhelming the reader with too much data. As these figures already contain a great number of species, we believe minimizing this allows for greater clarity.

5) Page 6058. To be more precise, CO is a tracer of incomplete combustion.

We thank the reviewer for pointing this out and have corrected it in the manuscript.

6) Page 6058, Lines 1-10. RGF goes up with biomass burning. Explain the significance beyond the numerator becoming larger than the denominator.

The goal of this manuscript is to characterize how changing conditions affect R_{GF} in order to evaluate its use as a tracer of reactive VOC oxidation. Due to the prevalence of biomass burning, we believe that it is significant to note its apparent influence on R_{GF}. More studies of biomass burning emissions are needed, but the data indicates either higher direct emissions of Gly or that biomass burning emissions have a higher Gly yield.

7) Page 6058, Line 11-17. Here, the authors note that the ratio RGF is greater for the first MFI than the second event. Aside from 2 outliers at 19-20 LT on the first day the elevated values are pretty much the same.

We thank the reviewer for pointing out this disadvantage in the representation chosen for Fig. 2. We have added a figure to the supplement (Fig. 12) with higher time resolution data and precision during this time periods from which we believe it is clear that the spikes in concentrations during the first day are not outliers.

Besides even a small change in plume age will lead to large changes in HCHO and CHOCHO.

While this is true for an isolated plume, the typical lack in variability in R_{GF} at both of these sites regardless of plume origin and wind direction (with the exceptions described in the manuscript) suggests this may not be the case at these sites. We believe this is due to the homogeneity of the forests in these regions which allows R_{GF} to come to a rough steady-state due to the aged older emissions constantly mixing with similar fresh emissions.

It would be useful for this reader to provide an indication of the oak trees on the maps provided in the supplementary information.

We thank the reviewer for this suggestion and have added this feature to those figures.

8) Page 6059, Line 1. ??? A influences B but not always noticeably?!

We thank the reviewer for pointing out this language and intended this to discuss the hypothesis of different fire phases. We have adjusted this in the manuscript to read:

"Overall, the MFI events show that biomass burning can influence R_{GF}, but this influence is dependent on environmental factors, possibly including burning vs. smoldering phases."

Contrasting two events on successive days without a more detailed analysis of the emissions, chemistry or the transport is of limited worth. Differences could be simply due to the flaming/smoldering phase of the fire.

We agree with the reviewer that the analysis presented here does not fully characterize these aspects of the fire. Unfortunately, due to limitations in measurements during the BEARPEX campaign, a more detailed analysis of this fire is not possible. We have adjusted the manuscript to reflect the potential effect of flaming vs. smoldering phases:

"Overall, the MFI events show that biomass burning can influence RGF. However, this influence may be dependent on environmental factors, including flaming vs. smoldering phases, which have been shown to exhibit substantial differences in VOC formation rates (Andreae & Merlet, 2001; Koppmann et al., 2005)."

9) Page 6059, Line 23: Tell the reader about OH measurements.

Details on the OH measurements during the BEACHON-ROCS campaign were discussed in DiGangi et al. (2012), and this fact was referenced in the instrumental section.

10) Page 6062, Line 10 onwards. The sharp variations in benzene are also observed in the acetonitrile but on a smaller scale.

Indeed, but on a considerably smaller scale that likely indicates a mere change in airmass, especially given that the lifetime of acetonitrile is on the order of months (Hamm and Warneck, 1990) compared to hours for Gly, HCHO, and their precursors (Atkinson, 2000).

11) Page 6063, Line 3. This statement is not supported by the data analysis shown in the paper.

We thank the reviewer for pointing out the inconsistency of this statement with the tone of the rest of the paper. We agree that further studies are necessary to validate this statement as written, and have rewritten the language to clarify that our evidence suggests, though alone is insufficient to prove, that R_{GF} can be used as a tracer of reactive anthropogenic vs. biogenic influence on VOC oxidation. Further existing language present in the conclusion section reinforces this point.

12) Section 4.1. Very thin analysis. How about plotting timeseries of HCHO and CHOCHO from satellites and surface data?

The reviewer's suggestion is a good idea which we had considered. Unfortunately, for the sites discussed in the manuscript, there are no satellite retrievals available. A satellite/surface intercomparison is a high priority for planned future measurements.

13) Section 4.2. Again, thin analysis.

Our intention in this section was to briefly discuss a crude analysis of RO_2 fate as it relates to the behavior of Gly, HCHO, and R_{GF}, a topic directly relevant to our suggestion that R_{GF} is a tracer of reactive VOC oxidation. As the focus of this work is on the observations during these campaigns, analysis using sophisticated models is out of the scope of the manuscript.