We would like to thank both Paulo Artaxo and anonymous referee #2 for their careful reading of the manuscript and positive response. We will respond to each of their suggestions in turn below.

Response to Referee #1 – Paulo Artaxo

RC: This is a very comprehensive overview paper on the results of the OP3 project. Important experiment, very well planned. Extensive ground based and state-of-the-art airborne measurements adds great value to the experiment. It have measured very low levels of organic aerosols, VOCs, NOx and other species in the free troposphere. The levels of organic aerosols of 60 ng/m3 were extremely low, much lower than measurements in South America and Africa without impact of biomass burning emissions. As the biogenic aerosols are generally comprised of about 60-70% of organic components, and this means a total fine mode aerosol loading of less than 100 ng/m3, that is really hard to believe. I found these very low values hard to understand, because ground level values were smaller but similar to measurements in Amazonia, and with the strong convection in these regions, the organic aerosol concentration should have been 300-800 ng/m3 at least. I do not think that removal mechanisms could be much stronger in Borneo than in other tropical regions.

AR: Professor Artaxo suggests our measured values of organic aerosol to be low in comparison to free tropospheric measurements made above regions of South America and West Africa respectively. We have searched the literature for these measurements, but cannot find the values he refers to and therefore cannot comment on these specific values. If the free troposphere (FT) values of organic aerosol reported in our work are less than those observed over the Amazon and West Africa, as Prof Artaxo suggests, it is likely that this reflects the more maritime nature of the tropical Pacific Rim where our observations were made, compared with the extensive continental land masses that dominate the injection of air from the BL to the FT above Amazonia and Sahelian West Africa. FT aerosol (< 5μm) mass volumes of 0.1 μm^3 cm^{-3} to 2 μm^3 cm^{-3} were obtained in the FT over the Pacific region during the PEM Tropics experiments (Clarke et al., 2002), the lower values representing more maritime air masses and the upper bounds reflecting more continentally influenced air masses. Converting the aerosol mass reported in our work to volume concentrations, using organic and inorganic densities from the literature (Cross et al., 2007), gives a value of 0.19 μm^3 cm^{-3}. This is within the range reported in PEM Tropics (Clarke et al., 2002), whereas those above the Amazon and West Africa more reflect the continental FT observed above Amazonia and West Africa. On the basis of this, we believe our observations are consistent with our understanding of aerosol sources and concentrations in the FT.

Without the published free tropospheric measurements to refer to we do not feel we are able to include a statement to this effect in the revised manuscript.

RC: I think the main issue that the manuscript could be improved is to have more comparisons of the measured values with previous studies in Africa (AMMA) and

South America (LBA). Certainly, the individual papers will do this job properly, but as this is the main paper with an overview, it also could improve our knowledge of aerosol and trace gas chemistry if a detailed comparison of OP3 findings versus LBA and AMMA could be done.

AR: As the reviewer points out, the individual papers contained within the special issue will make detailed comparisons with measurements from other tropical regions, where these are available. However, we fully agree that it is appropriate to make some comparisons with previous campaigns within the overview paper. We will do this where we have reported the values in the text.

Response to Anonymous Referee #2

Anonymous referee #2 recommended some minor grammatical and typographical amendments, all of which we have implemented within the revised manuscript.

References

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