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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Source attribution of Bornean air masses by back trajectory analysis during the OP3 project" *by* N. H. Robinson et al.

Anonymous Referee #1

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This paper reports a comprehensive analysis of the likely sources of aerosol particles, carbon monoxide and halocarbons observed at a protected rainforest in Borneo, South East Asia. This analysis was primarily based on back trajectory analysis with ECMWF backwards air mass trajectories. The conclusions are reasonable and well described. After considering the following suggestions, I think the paper is suitable to be published in ACP. 1. Line 25, Page 15164. "Such a set of trajectories was calculated originating at four pressure altitudes ... Little qualitative change in trajectory was observed for sets from different pressure altitudes and all analysis presented was performed with the 950 hPa set." It is obscure to argue like this that the trajectories at different pressure altitudes had identical paths. How the difference would influence the subsequent analysis should be evaluated with more details here. 2. Line 7, page 15166. "all grids presented here used a cell size of $0.1^\circ \times 0.1^\circ$". Compared to the resolution of ECMWF wind fields

($1.125^\circ \times 1.125^\circ$), the definition of a cell, which is used as a unit for the subsequent statistics, seems to be too small. Would the accuracy of the back trajectories modeled meet the requirement of statistics based on such fine cells? 3. About "Residence time analysis" (Section 2.2.1). The residence time is calculated by counting the number of trajectory data points in each cell. However, if a trajectory data point is at a high altitude beyond the boundary layer, the surface source emissions in this area cannot contribute significantly to the air mass concerned. How did the authors treat this issue in their residence time calculation? 4. Figure 1. There is no unit with the color bar. 5. Figure 6. Since PMF was based on high-resolution AMS measurements, it is more suitable to provide factor spectra with high resolution MS data. Like Figure 3 in Aiken et al. (2009) (Atmos. Chem. Phys., 9, 6633–6653).

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