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Interactive comment on “Aerosol fluxes and dynamics within and above a tropical rainforest in South-East Asia” by J. D. Whitehead et al.

Anonymous Referee #2

Received and published: 29 June 2010

This is an interesting report on the mechanics of aerosol exchange between air trapped under the canopy of a tropical rainforest and the atmosphere above. The methodology adopted is correct, and has been generally successful in identifying the most important aerosol sources and behaviour. The paper merits publication following attention to the following points:

1. Perhaps the observation of a lack of new particle nucleation should be more carefully considered; no information is provided concerning calibration or cut-off point verification of the CPCs used, in light of which the observation cannot be considered reliable.
2. No consideration has been given to the influence of the extremely long inlet systems to (a) the APS and DMPS, and especially (b) the AMS bag samples. The length of the

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main inlet pipe to system (a) is not stated in the Methods section, but I assume it was about 33m. The sampling height needs to be stated in Section 2.3. Potential losses of aerosols in the various tubes of the complex inlet system need to be considered, not least since plastic pipes can eliminate a fraction of very small as well as large aerosols. A solution could be measurements at the same height with/without the inlet (experiments conducted in the UK would probably be sufficiently convincing – providing differences were minimal). In case (b), the 40m/0.25 inch OD inlet line is incredibly long. What were the losses / size shifts / compositional changes incurred during transit through the inlet (note: at quite a slow flow rate of 10 L/min)? It is not sufficient merely to consider the losses once the aerosol had arrived in the bags.

3. “Above canopy” measurements using the APS, DMPS and PVM were conducted at heights lower than the average canopy height (35m). What therefore is the influence of the different canopy heights here and at the within-canopy site? How are different canopy top heights (for example 25m and 45m, the stated min and max range) likely to affect aerosol production and exchange?

4. I wasn’t entirely happy with the proximity of the sonic anemometers to the trunk of a large tree. How far were they from the tree, and what was the influence of this large object on the measurements?

5. The calibration data for the Grimm monitors is incomplete. Calibrations (slopes) should be reported for each of the 15 size channels. At least ranges of slopes for individual channels should be stated.

6. The discussion of particle growth (Section 3.4) is not clearly presented. Please clarify whether the aerosols exhibiting growth originated above or below canopy top.

7. Evidence for the time delay between phenomena observed at the tower and in-canopy sites is poor. Sometimes there was a delay, at other times not. Figure 9 presents data for only one day to support this assertion, which is not enough. Overall, for the full campaign, what was the frequency of the time delay?

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