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Interactive comment on "Characterization of aerosol and cloud water at a mountain site during WACS 2010: secondary organic aerosol formation through oxidative cloud processing" *by* A. K. Y. Lee et al.

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The manuscript is of great interest, providing an indepth analysis of cloud processing and its impact on SOA formation. I only have a few minor comments here. Please correct me if I'm wrong.

(1) Page 6033-6034, Sec.3.5. The authors indicated that large mass reductions were observed for both glyoxal and methylglyoxal in the OH-oxidation experiments. Glyoxal in the aqueous-phase reacts with OH forming glyoxylic acid and finally oxalic acid. Ox-

alic acid has low volatility and an OH lifetime of at least a few days (assuming [OH]=10ˆ-12 M, according to Lee et al 2011b). If this is the case, we don't expect such significant mass loss. The rapid mass loss, as seen in Fig 6b, is more likely due to the reaction with H2O2. Lee et al (2011) used H2O2 as the source of OH, with an initial conc. of 13.3 mM. Under this condition, glyoxal and glyoxylic acid may predominately undergo H2O2 oxidation (leading to the formation of HCOOH), rather than reacting with OH. In cloud droplets, H2O2 level is usually much lower compared with the experiment condition, and the majority of OH in cloud water is from phase-transfer. The experiment described in Lee et al (2011) created cloud-relevant OH level but probably a much higher H2O2 level. Therefore Fig 6b may not be entirely appropriate to represent the impact of glyoxal (and methylglyoxal) on SOA formation, via cloud processing.

(2) Page 6033, line 24-27. I don't quite understand this: even if cis-pinonic acid were fully retained in the droplets, extra organic material could still accumulate in the aerosol, right? Why the accumulation of organics in the aerosol requires cis-pinonic acid to be partially evaporated?

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