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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A parameterisation for the activation of cloud drops including the effects of semi-volatile organics" *by* P. J. Connolly et al.

Anonymous Referee #1

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This manuscript provides a simple extension of two popular aerosol activation parameterizations to account for the enhancement of droplet nucleation by co-condensation of semi-volatile organics. The extension is shown to work well for one parameterization, but not so well for the other. The manuscript is written well, the figures are clear, and the conclusions are backed up with sound science.

Page 14452, line 12. Remove "Both".

Page 14452, line. Replace "rates" with "rate".

Page 14453, lines 4-5. This makes no sense. Please check for typos and then think it through.

Page 14453, lines 8-9. Abdul-Razzak et al. do not neglect the first term in (14). They consider two different limits of behavior, and add them. I would say "Abdul-Razzak et al. (1998) use an approximation for the second term by Twomey (1959) to formulate an analytical expression".

Page 14455, line 10. Replace "the in" with "in the".

Page 14457. Specify how much semi-volatile organic is present.

Page 14458, lines 14-16. This sentence suggests poor performance for all updraft velocities, which is inconsistent with what is stated in the previous two sentences. I see no need for it, so suggest you delete it.

Figure 8. How can the cumulative fraction activated for the Abdul-Razzak and Ghan scheme be greater than zero (and >0.2 with semi-volatiles) when the activated fraction is zero? This seems impossible.

Page 14461. The saturation of activation helps get droplet number correct when the treatment of condensation breaks down, but it doesn't help with wet removal of the semi-volatile organics. Please comment. .

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 14447, 2013.