

Interactive comment on “Secondary Organic Aerosol Production from Local Emissions Dominates the Organic Aerosol Budget over Seoul, South Korea, during KORUS-AQ” by Benjamin A. Nault et al.

Anonymous Referee #2

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Nault et al. present the findings of organic aerosol measurements collected during the KORUS-AQ field campaign. The work finds that the secondary organic aerosols (SOA) formed in Seoul are predominantly formed from SOA precursors emitted locally. This conclusion is supported by back trajectory modeling, measurements of other secondary species (e.g. formaldehyde), airborne oxidation flow reactor measurements, and box model simulations. The paper is generally well written and the work provides valuable insights into SOA. I recommend the paper be accepted with a few minor revisions detailed below.

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General Question: Perhaps this is beyond the scope of this work, by do you have insights into why more SOA is formed from Seoul compared to other cities presented in Fig. 4? Is it just more reactive since other rapidly oxidized species follow a similar trend (Fig. 7) or are there more SOA precursors in Seoul or perhaps something else entirely which is unique to Seoul?

Line 137: Add "is" after "aerosol load"

Line 256: Remove "much" and change "for several hours" to "after several hours"

Line 264: Change "allows the measurement of" to "measures"

Line 511: It's unclear how the dilution rate is used to calculate the 60 ppbv of $CO_{foreign}$. Perhaps this is covered in one of the other studies referenced?

Lines 520: Hemispheric background not being included in the figure is a bit misleading since it is included in 2b and 2c. Presumably, the exclusion applies only to 2a and 2d but this is not apparent in Line 520.

Line 526: Is "background subtracted CO" not the same as " $CO_{SouthKorea}$ "?

Line 529: I may be misinterpreting this, but because $CO_{foreign}$ is both in the numerator and the denominator, $OA_{background}$ would simply equal OA, which doesn't seem right.

Line 530: How were the fractions of HOA, LO-OOA, and MO-OOA determined?

Line 539: I had a hard time following this part of the sentence. I believe what's plotted is the FLEXPART NO_2 but the "sampled from aircraft position for contributions to" part is unclear.

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