

Review of Park et al., An evaluation of O₃ dry deposition simulations in East Asia

This study evaluates and compares two dry deposition schemes used for model simulations of atmospheric ozone. Considering that dry deposition is a very important process affecting ozone levels and also the fact that relatively little studies in the literature have focused on ozone dry deposition, I think this is a topic suitable for publication at ACP. I would recommend publication of this MS after the authors address some relatively minor issues –

1. L194-196, “Herein, we only considered the measured dry deposition velocities in the range 0 to 2.0 cm s⁻¹, which is a typical O₃ dry deposition velocity range in the literature (Padro, 1996).”

So do you mean that the measurement data for dry deposition velocities outside of this range is unrealistic? I think better clarification/justification is needed here.

2. L275-282 on the discussion of the feather that the largest differences in O₃ dry deposition velocity over the continents do not result in the largest differences in ozone concentration there but rather over the downwind ocean, the authors attribute this to the efficient export of O₃ from the polluted continent. I think it would be more clear if the authors can show the ratio plots for O₃ concentrations as well as the dry deposition velocities (i.e. similar to Fig. 1c and 3c, but shown as ratios instead of differences). In addition, I’m thinking perhaps the changes in O₃ precursors (I assume the two dry dep. schemes were applied to not only O₃ but other species in the model) also contribute to this?

3. L37-38, “the model was considerably sensitive to the input parameters, which indicates a high uncertainty for such O₃ dry deposition simulations.” –

It is unclear to me how can we reach this conclusion, please clarify here.

4. Some edits/proofreading is needed for this MS; I only tried on the 1st few pages as shown below for examples, but I think the authors need to check throughout their MS –

1). L45 O₃ tropospheric → tropospheric O₃

2). L65 air quality sources → air pollution sources

3). L76 in the most widely → in two of the most widely

4). L79 as well as two → as well as the two

5). L85 assessing O₃ spatial and temporal distribution and contribution from a source → assessing the spatial and temporal distribution of O₃ and the contribution from a specific source

6). L233-235, "The dry deposition velocity domain mean difference between the two methods is 0.14 cms-1, which is 1.4 greater than the M3DRY method domain mean dry deposition velocity (0.10 cm s-1)"

This sentence is very confusing and need rewriting.

7). L261. 4. O3 concentration spatial and diurnal patterns in East Asia → spatial and diurnal patterns of ozone concentrations in East Asia

8). L557 Table 1 lists not only "Physics" parameters but also Chemical mechanisms, so I would suggest changing to "Model set up for the WRF-Chem simulations"