

Seasonal ozone vertical profiles over North America using the AQMEII group of air quality models: model inter-comparison and stratospheric intrusions

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The manuscript provides multi-model simulations of ozone profiles for a number of observational sites in the United States and Europe and validates the model results. The models seem to underestimate ozone up to 6 km. For stratospheric intrusions, the ozone maxima are also underestimated between 2 and 6 km.

It is difficult to judge where the advances of this study are. There have been numerous modelling efforts for evaluating the ozone budget in the more recent past such as (Stevenson et al., 2006), (Wild, 2007), (Young et al., 2013), or (Knowland et al., 2017). None of these papers are cited or included in the discussion. Spatial resolution is an important issue (e.g., Roelofs et al., 2003; Eastman and Jacob, 2016), and at least a good horizontal resolution of $0.25^\circ \times 0.25^\circ$ is reported. However, no information on the vertical resolution is given in Sec. 2.1. In Sec. 2.2 an interpolation to 18 “standard vertical heights” up to 18000 m is mentioned. This kind of grid does not allow one to resolve narrow atmospheric layers. For this reason, also the value of the figures shown is limited. There is a host of literature on stratosphere-to-troposphere transport after the 2003 review by Stohl et al., in particular from North America, Europe and East Asia (have a look at papers citing the review paper!), also discussing the role of mixing (Trickl et al., 2014; 2016).

In summary, I cannot recommend publishing this manuscript in the current version.

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