

Interactive comment on “Impacts of transported background pollutants on summertime Western US air quality: model evaluation, sensitivity analysis and data assimilation” by M. Huang et al.

Anonymous Referee #2

Received and published: 19 July 2012

Dear Editor,

After carefully reviewing “Impacts of transported background pollutants on summertime Western US air quality: model evaluation, sensitivity analysis and data assimilation” by M. Huang et al., I recommend it for publication in Atmospheric Chemistry and Physics with minor revisions.

Overall, the manuscript presents a careful analysis of global inflow to the Western United States, using a regional model (STEM) with a variety of boundary conditions and configurations; ground based, aircraft, ozonesonde, and satellite measurements; and a wide range of analysis techniques including the application of an adjoint model,

C4819

data assimilation, and trajectory analysis.

A number of valuable and interesting findings emerge, including the 1) sensitivity of policy relevant ozone metrics (MDA8 and W126) to model resolution, associated resolution impacts on agreement with observations, and urban vs. rural performance for these metrics; 2) The impact of boundary conditions vs. North American biogenic and biomass emissions on MDA8 and W126, and the difference among model resolutions; 3) The impact of land cover on sensitivity to boundary inflow; 4) The linearity of the response of MDA8 and W126 to boundary layer perturbations; 5) Transport of trajectories into the boundary layer using both an “Impact Probability” metric and adjoint sensitivities; 6) Model improvement using data assimilation. There were additional issues, but these were the points that struck me.

While the work is important and carefully done, I am left with the feeling that the paper combines 2 or 3 strong manuscripts into a single paper. If the authors choose to keep the manuscript as written, my minor change would be to clarify how breadth of data, models, simulations, and analysis methods unite to create a single study. This clarification would benefit the abstract, introduction, and conclusion. How do the results from different sections relate to each other?

As an alternative, the authors could consider breaking the manuscript into 2 or 3 shorter papers, each of which has a more defined focus.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 15227, 2012.

C4820