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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Characterizing summertime chemical boundary conditions for airmasses entering the US West Coast" *by* G. G. Pfister et al.

Anonymous Referee #2

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This manuscript gives some interesting and important results by analyzing and simulating ARCTAS/CARB, MOZAIC, TES and ozonesonde data in western United States. This referee thinks that it does add some new values and could be accepted for publication if the following comments/concerns can be well-addressed.

First, the discussion part of this manuscript is probably too long, which makes it less focused and difficult to follow. It will be better if the authors can condense the Section 3.1 (i.e. Section 3.1.1-3.1.5).

Second, the authors used two models to do simulation for the ARCTAS/CARB experiment. The readers should be interested if they also present the WRF-Chem simulation

results in Fig.2, 3, 5, 7 etc or in a new graph. That definitely can give some new information about the uniqueness of a high-resolution regional model in reproducing detailed structure/layers of pollutions, at least in the lower troposphere.

Third, regarding to the discussions on the underestimation of mid/upper tropospheric plumes in MOZART results, the author need to consider the following questions: 1) Was the MOZART model driven by using meteorological data (i.e. NCEP-GFS) with a resolution as high as 0.7 by 0.7 degree (T170)? Please clarify. 2) Does the fire emission inventory (i.e. FINN ver1) used in the MOZART model have a high temporal resolution? It should be noted that in East and North China there are a lot of biomass burnings activities associated with wheat harvest in June and these activities are mostly concentrated in mid-June, i.e. one to two weeks before ARCTAS/CARB experiment. So if only monthly averaged emission data were used, biomass burning influence from these regions could have been underestimated. Also another important thing is that the plume rise of fire weren't considered in the MOZART model. 3) Besides the possible underestimation of fire emission and the numerical plume dissipations of Eulerian models, the convection/cloud scheme of MOZART model could also be a factor. In June, especially during the Meiyu Season, there are a lot of convections along the Meiyu fronts, which generally can last for week(s) and probably lift anthropogenic and biomass burning pollutions from the boundary layer.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 28909, 2010.

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Interactive Comment