The authors have conducted inverse modeling to estimate benzene and toluene emissions in PRD and HK for November 2010. The inversion was based on the PRIDE-PRD2010 campaign. They extrapolate the November estimate to the annual and compare with existing bottom-up estimates. The paper is well written and considering the limited number of inverse modeling studies focused on these species, I recommend the publication after some minor revisions. I have several specific comments, followed by some minor ones.

Specific comments

Echoing one of the other reviewers, why one measurement site (Heshan) was chosen for inversion, while the other one (Mt. Tai Mo Shan) was used for validation needs to be explained better in the text. I also feel that what is suggested by this reviewer (including both measurements as well as using only the Mt. Tai Mo Shan measurement in inversion) would be extremely helpful for the reader.

Authors have used the term "RCP 3PD", but in my opinion this scenario is better known as "RCP 2.6". I would recommend using RCP 2.6 instead of RCP 3PD in the paper. I believe the authors should also explain why they have chosen this specific scenario versus others (RCP 4.5, etc.). It would also be interesting to check if using different emissions scenarios as their prior has any impacts on posterior estimates, especially because background mixing ratios are considered to be zero. For some species, RCP 2.6 provides the highest emissions estimates in 2010 and that might be the case for the species considered here.

In terms of the prior emissions, why did the authors use the averaged emissions using MEIC v1.2 and Yin et al. (2015) for toluene for the PRD region? Did the posterior emissions change much if only MEIC v1.2 was used instead? And why was this approach not used for benzene? I feel that a similar type of sensitivity analysis using different emissions inventories might be more interesting, in addition to changing simulation length and chemical loss as currently done in the paper.

I am also curious if the inversion is conducted for the two species together or separately. I would also like to see a better justification as to why 100 and 70% were chosen for prior emissions uncertainty for benzene and toluene, respectively. Also, it would be good to include an equation showing how the posterior uncertainty is calculated.

Authors wrote on p. 24848 "Notice that systematic errors in the simulated chemical loss would lead to smaller errors (i.e., compared to the extreme case of no loss) in the a posteriori emissions retrieved by the inversion," but I am not sure where I can see this change in the systematic errors.

The authors mentioned in the introduction that the two major source sectors of benzene and toluene are industry and road transport. Is it possible to assess which

emissions estimates need improvement in the bottom-up estimates from your inversion? Is it possible to conduct inversion at the source sector level?

Minor comments
1. l. 11, p. 24842. "the most the most" → the most
2. The dark blue color used for PRD is very difficult to see on Figure 1
3. The authors state on p. 24849 that "Figure 4 shows the benzene a priori and a posteriori emission fields, their differences and uncertainty reduction. The a priori fields show that emission hot spots are located in Guangzhou, Shenzhen and Hong Kong megacities." I think it would be helpful if you can show these locations on the map.
4. Why is the correlation so much worse for toluene compared to benzene?