Review comments on a GeoHealth submission 914954, entitled “Implications of Mitigating the Ozone and Fine Particulate Matter Pollution in the Great Bay Area Using a Regional-to-Local Coupling Model” submitted by Zhang etc.

General comments: In this study, the authors presented a modeling study on assessment of impact of reduction in anthropogenic emissions (i.e., traffic and industrial) on predictions of several key air pollutants (i.e., NO2, O3, and PM2.5) on a street scale. They proposed to use a coupled regional-to-street-scale air quality modeling system (i.e., CMAQ-ADMS) rather than a regional model to assess such an impact since they suggested that fine-resolution simulations were more helpful for policy-makers to develop or refine anthropogenic emission control strategies for protection of human health. They suggested that developing a more stringent VOC control measure, especially through reduction in industrial sector emissions was more efficient to reduce ambient levels of O3 and then frequency of O3 episode occurrence in the Great Bay Area in China. Overall, the manuscript is well written and organized. However, more details of the model description and in-depth discussion are required. Please see the comments below.

Major comments.

1. The authors claimed that a coupled regional-to-local-scale modeling system is used in this study (Lines 45-46). Meanwhile, they pointed out that the CMAQ outputs are used to drive the ADMS-Urban dispersion model (L194-195). Thus, term “coupled” is a little bit misleading. I am not sure both CMAQ are ADMS are really coupled together as an integrated modeling system even though it is in an offline mode. Some clarifications are helpful. Especially, a flow chart of the CMAQ-ADMS coupling system is helpful.
2. It is not clear how the ADMS-Urban dispersion model calculates the concentrations of gas-phase chemical species like O3 and NO2, and aerosol species like PM2.5. Does it include a gas-phase chemical mechanism for gas-phase species and an aerosol module for aerosol species as CMAQ does? Or the ADMS model treats individual species as a tracer no matter it is gas or aerosol species? Some clarifications are necessary.
3. Figure 1: Why did the author not show a Base case in a), the difference between the Half Traffic and Base cases in b), the difference between the Half Industrial and Base cases in c), and the difference between the Both Control and Base case in d)?
4. Figure 8 shows a comparison of CMAQ- and ADMS-predicted daily maximum hourly NO2, daily maximum 8-hr average O3 and daily average PM2.5 at the three selected urban sites in Guangzhou. Please have a double check that the three sites are situated in the inner most domain D4 rather than in domain 3 (Figure S1) since the CMAQ inner most domain, D4 only cover southern part of Guangzhou.
5.

Minor comment or technique issues