The authors have done a good job of addressing my key concerns and those of the other reviewer. They have extended their analysis, substantially improved the interpretative aspects of their discussion, and tidied up the introduction and conclusions to improve the focus and value of the study. The net result is a manuscript which gives a more focussed and coherent description of the studies undertaken, and provides a clearer insight into the strengths and weaknesses of the models involved. The written style remains a little weak in places and would benefit from some final polishing, but in other respects is generally satisfactory. There are a number of inconsistencies and minor issues that need to be resolved, after which the paper should be suitable for publication in ACP.

We thank the reviewer for their remarks.We have addressed the reviewer's comments below. We have improved the text in several places and corrected various typos, mis-formatted citations etc.

Specific Comments:

P.2,l.17 (and p.24,l.8): The conclusion regarding ESMs performing similarly to CTMs isn't very useful given that they are run at a similar resolution in the atmosphere and that there is little opportunity for other parts of the earth system to influence the results in these constrained studies addressing anthropogenic sources. Do the coarse resolution models actually perform as well as the fine resolution models such as WRF-Chem?
Authors' reply: We have removed this conclusion from the Abstract and clarified this point in the Conclusions. We wanted to make the point that global Earth System models evaluated in this study perform as well as the global Chemical Transport Models. We find this encouraging given that it is the ESMS which are used to examine impacts including chemistry-climate feedbacks. We already make a point about the need to run models at higher resolution.

p.3, para 1: This introductory information is useful but is not well balanced, as it focusses almost exclusively on climate impacts. Air quality impacts are only mentioned in the final sentence, even though they are of much greater concern to residents in East Asia, and are the main motivation for emissions mitigation here, not climate.
Author's reply: We have added several sentences to the text to address this point:

p.4,l.13: add "due to their coarse spatial resolution", as this aspect isn't introduced earlier.
Authors' reply: the sentence has been added to the text.

p.5,l.2: from Shanghai? In other respects this sentence appears to contradict the earlier statement that the monsoon brings cleaner air from the Pacific.
Authors' reply: Monsoon flux brings cleaner air from the Pacific but also transport polluted air from coastal cities to inland ones. The sentence has been rewritten as follows: "The monsoon flux also induces transport of high ozone concentrations inland from coastal city emissions (He et al., 2008)*".*

p.11,l.15: This sentence states that data are binned from 500 to 2500m, but Figure 6 shows data from 200 to 2200m if the labelling is correct.
Authors' reply: The text has been corrected accordingly.

p.13,l.15: Low O3 and high NOx at night may also be due to insufficient PBL mixing. The cause is as likely to be dynamical as chemical, so perhaps add "and transport" after "processing"?
Authors' reply: The following has been added to the text: "... and possibly boundary layer mixing, ..".

p.14,l.8: This chemical explanation for low CO may be correct, but excessive OH also leads to faster

VOC oxidation which provides a source of CO, dampening this effect. Uncertainty in emissions and differences in vertical transport may still be important here.
Authors' reply: We agree with the remark that VOC oxidation can lead to CO production, a point noted earlier in section 3.6. However, it may also lead to additional HOx production.

Fig 2: It would be helpful to the reader to shift the lower panels one place to the right, so that specific models are aligned the same across Figures 2, 3 and 4.
Authors' reply: We have updated Figure 2 accordingly.

Throughout the paper there are places with sequential or nested parentheses, often associated with incorrectly formatted citations, which need to be cleaned up.
Authors' reply: We have corrected all the typos listed below. The text has been carefully checked and the format of the citations has been corrected.

Typos, etc. :
P.2,l.6: divergences -> differences? (also p.21,l.30)
p.3,l.2: "and" missing before "non" (or add "methane, and" and remove the following sentence).
p.4,l.34: remove "whilst"
p.5,l.9: "the Beijing province" -> "Beijing Municipality" (also p.7,l.21)
p.6,l.3: missing ")"
p.6,l.10: add "a" before "large"
p.6,l.11: years -> year
p.7,l.22: remove "showing, for example," Please check text here.
p.8,l.9: "e.g." to precede citation
p.9,l.24: add "in" before East
p.11,l.25: add "is" before "more"
p.12,l.14: "CO The" -> "CO. The"
p.13,l.9: "NONOx" NO or Nox?
p.13,l.11: citation missing
p.13,l.17: modeled -> model
p.13,l.18: remove ")"
p.15,l.8: white -> blue
p.22,l.1: "excessive/lacking" Please rephrase this sentence to make the meaning clear.
p.22,l.13: "high oscillations" Is the intended meaning "a large variation", or is there really a periodic component?
p.22,l.19: add "the" before Olympic
p.24,l.14: "which" -> "and this has" (or replace has with have)