Reply to the editor

We thank the editor for his careful review of our paper. We appreciate all his feedback and we have addressed the comments individually below.

*) Line 189: I believe the authors are aware of the difference between "concentration" and "mixing ratios." "Concentrations" are wrongly used throughout the manuscript (multiple times). You should correct this.

Reply: We apologise for the wrong usage of 'concentration'. We have changed this to 'mixing ratios' where required.

*) Line 257: Do you mean "slope of the linear fit" when you mention the word "gradient"?

Reply: Yes, we are referring to the 'slope of the linear fit'. We have made changes in the text to clarify this.

*) Line 266: Please use "model results" (throughout the manuscript) instead of just "model" when referring to the numerical data obtained from the simulations.

Reply: Thank you for noting this. We have made the corrections and used 'model results' where necessary.

*) Line 276: "As shown in Tab. 3, carbon monoxide [...]"

Reply: We have included the phrase 'As shown' to the beginning of of the sentence as suggested.

*) Line 280: "Failure" is probably incorrect. Do you mean "divergences" or "differences" of the model results compared to observations?

Reply: Yes, we are referring to the 'differences' of the model results compared to observations. We have made the correction in the text.

*) Line 351: A verb is missing in this sentence ("points"?)

Reply: We have included the verb 'points' in the sentence.

*) Line 355: This sentence does not seem correct to me. "Large increase" compared to what? From the context, it seems like a resolution issue ("in our high-resolution simulation domain"). I suggest merging this sentence with the following one: "The comparison of ethane and propane observations with model results shows that a large increase in the prescribed emissions of these tracers is necessary, in agreement with previous studies [...]"
Reply: We agree with this suggestion. We have merged the sentences as suggested in the text.

*) Page 17: I don't think "gradient" is the right word here. You probably mean "ratio" or "slope of the linear fit."

Reply: Yes, we mean 'slope of the linear fit'. We have changed this in the text.

*) Line 364: "Large increase" is a bit vague. Are you referring to the "increase with the optimized factors?"

Reply: Yes we are referring to the 'increase with the optimized factors'. We have corrected this in the text.

We have also reviewed the whole manuscript to ensure clarity. We look forward to the final acceptance of our paper for publication. Thank you.