

Dear editors,

Thank you very much for your advices. We have carefully redo statistics and resubmit in the revised manuscript and marked every change in red.

1. The changing in the manuscript follows the calculation results below:

The standard error of mean is calculated by the following formula:

$$s(\bar{x}) = \sqrt{\frac{1}{n(n-1)} \sum_{i=1}^n (x_i - \bar{x})^2}$$

The averaged HCHO VCDs at three periods were changed to retain a decimal.

Thus

Pre-APEC:

averaged HCHO VCD, marked as a = 9.7×10^{15} molecules cm^{-2} with standard error of mean 0.8×10^{15} molecules cm^{-2}

During APEC

averaged HCHO VCD, marked as b = 6.0×10^{15} molecules cm^{-2} with standard error of mean 0.5×10^{15} molecules cm^{-2}

Post- APEC

averaged HCHO VCD, marked as c = 8.6×10^{15} molecules cm^{-2} with standard error of mean 0.9×10^{15} molecules cm^{-2}

Since the reduction of Pre-APEC and APEC is calculated as following:

$$U = (a-b)/a$$

$$\text{Averaged reduction } U = (9.7-6.0)/9.7 \approx 38\%$$

The relative uncertainty of reduction is

$$\begin{aligned} \frac{\sigma_u}{u} &= \sqrt{\left(\frac{\sigma_{a-b}}{a-b}\right)^2 + \left(\frac{\sigma_a}{a}\right)^2} = \sqrt{\frac{\sigma_a^2 + \sigma_b^2}{(a-b)^2} + \left(\frac{\sigma_a}{a}\right)^2} \\ &= \sqrt{\frac{0.8^2 + 0.5^2}{(9.7-6.0)^2} + \frac{0.8^2}{9.7^2}} \approx 27\% \end{aligned}$$

Then the uncertainty of reduction is

$$\sigma_u = u \times \frac{\sigma_u}{u} = 38\% \times 27\% \approx 10\%$$

So the difference of Pre-APEC and APEC is $U + 2\sigma_u = 38\% + 20\%$ calculated at 95% confidence limit.

As the same method, the averaged reduction of Post-APEC is 30%, and the Uncertainty(σ_u) is 12%,

So the difference of Post-APEC and APEC is $\sim 30\% \pm 24\%$ calculated at 95% confidence limit..

Changes in manuscript:

P2L1: During the period of the APEC conference, the average HCHO VCDs were $\sim 38\% \pm 20\%$, and $\sim 30\% \pm 24\%$ lower than that during the pre-APEC and post-APEC periods calculated at 95% confidence limit, respectively.

P14L3-4: The average HCHO VCDs were 9.7×10^{15} , 6.0×10^{15} , and 8.6×10^{15} molec cm⁻² before, during, and after APEC, with fitting errors of 9.4%, 10.1%, and 9.7%, respectively. A noticeable decrease of $\sim 38\% \pm 20\%$, and $\sim 30\% \pm 24\%$ during APEC was found compared with before and after APEC, which was calculated at 95% confidence limit.

P19L19-20: During the period of the APEC conference, the average HCHO was 6.0×10^{15} molec cm⁻², which was $\sim 38\% \pm 20\%$, and $\sim 30\% \pm 24\%$ lower than that during the pre-APEC and post-APEC periods calculated at 95% confidence limit, respectively.

2. And according to Figure 16(a), I changed the correlation coefficient R^2 in P2L5 to 0.68.

Changes in manuscript:

The HCHO VCDs of the CAMS model and MAX-DOAS were generally consistent with a correlation coefficient R^2 greater than 0.68.

3. The Author contribution was added before the acknowledgements in the manuscript.

Changes in manuscript:

Author contributions

XT, PX and JX contributed to designed the research. JX and AL designed the installation location of the MAX-DOAS instrument and installed it in the UCAS. ZH and QZ downloaded and extracted HCHO VCDs data from ECMWF. XT performed the data analyses and wrote the manuscript. FW and CL provided suggestions for the manuscript. PX, JX and YW edited and developed the manuscript.

Thank you for taking care of our manuscript.

Kind regards,

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