Supplement of resonse letter #2

Section S1

As the parameters listed in Table S1 of the manuscript are different in units and magnitudes, which could lead to unstable performance of the training model. Therefore, we standardized all the parameters before using them for model training. The standardized process is expressed as below:

$$D_i = \frac{P_i - \mu}{\sigma} \quad (1)$$

where P_i, μ, and σ are the i-th parameter, the average, and the standard deviation of the training input dataset listed in Table S1 of the manuscript, respectively. D_i represents the standardized value used for model training.

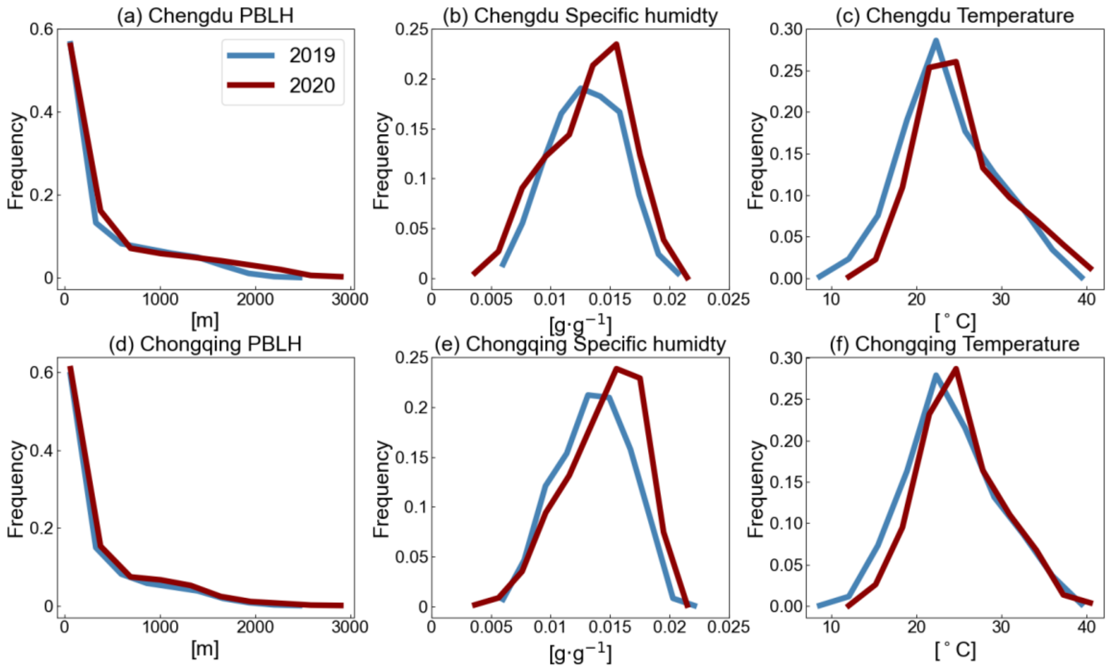

Figure 1. Probability density functions (PDFs) of hourly planetary boundary layer height (PBLH), temperature at 2 m, and relative humidity in the whole 2019 (blue) and May-June 2020 (red) at Chengdu and Chongqing cities over the SCB, from the GEOS-FP meteorology fields that are used to drive the GEOS-Chem model and to train/predict the ozone bias. We group each data to 10 bins, and frequencies are calculated for each bin.

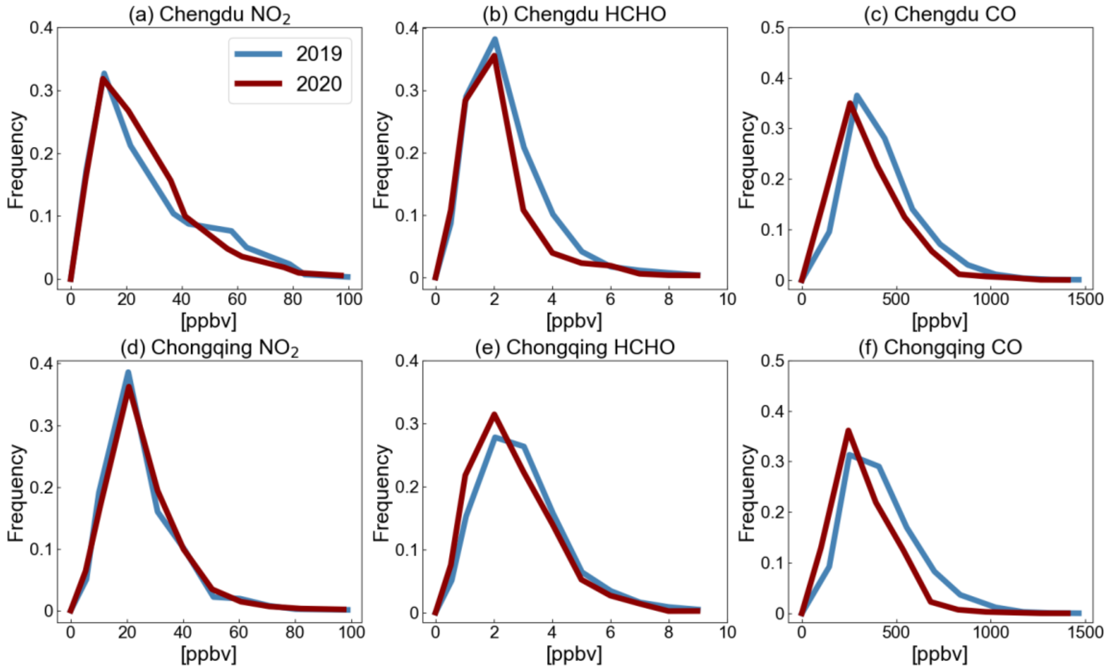

Figure 2. Same as Fig.1, but for hourly concentrations of GEOS-Chem NO_2, CO, and HCHO. The difference between 2019 and 2020 in GEOS-Chem only reflects meteorological effects.

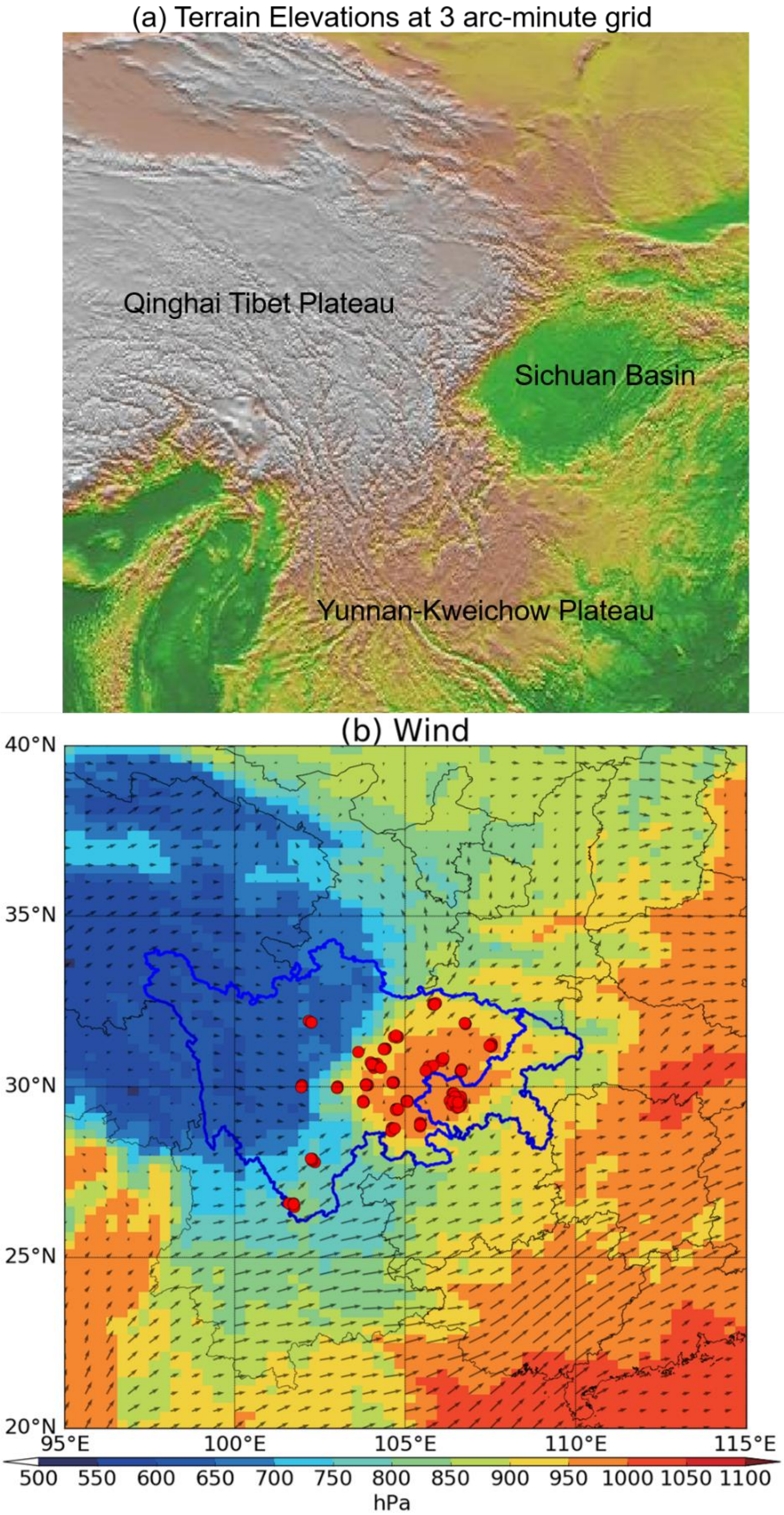

Figure 3 Terrain elevations (a) and surface temperature and wind fields (b) over the SCB and surrounding regions. The spatial resolutions for (a) and (b) are 3 × 3 arc-minute and 0.25° × 0.25°, respectively. The white area in black line is Tibetan Plateau (with altitudes of 4–5 km a.s.l.), the yellow area in red line is the Yunnan-Kweichou Plateau (2–3 km a.s.l), the green area in circle is the SCB (0.5–1 km a.s.l).

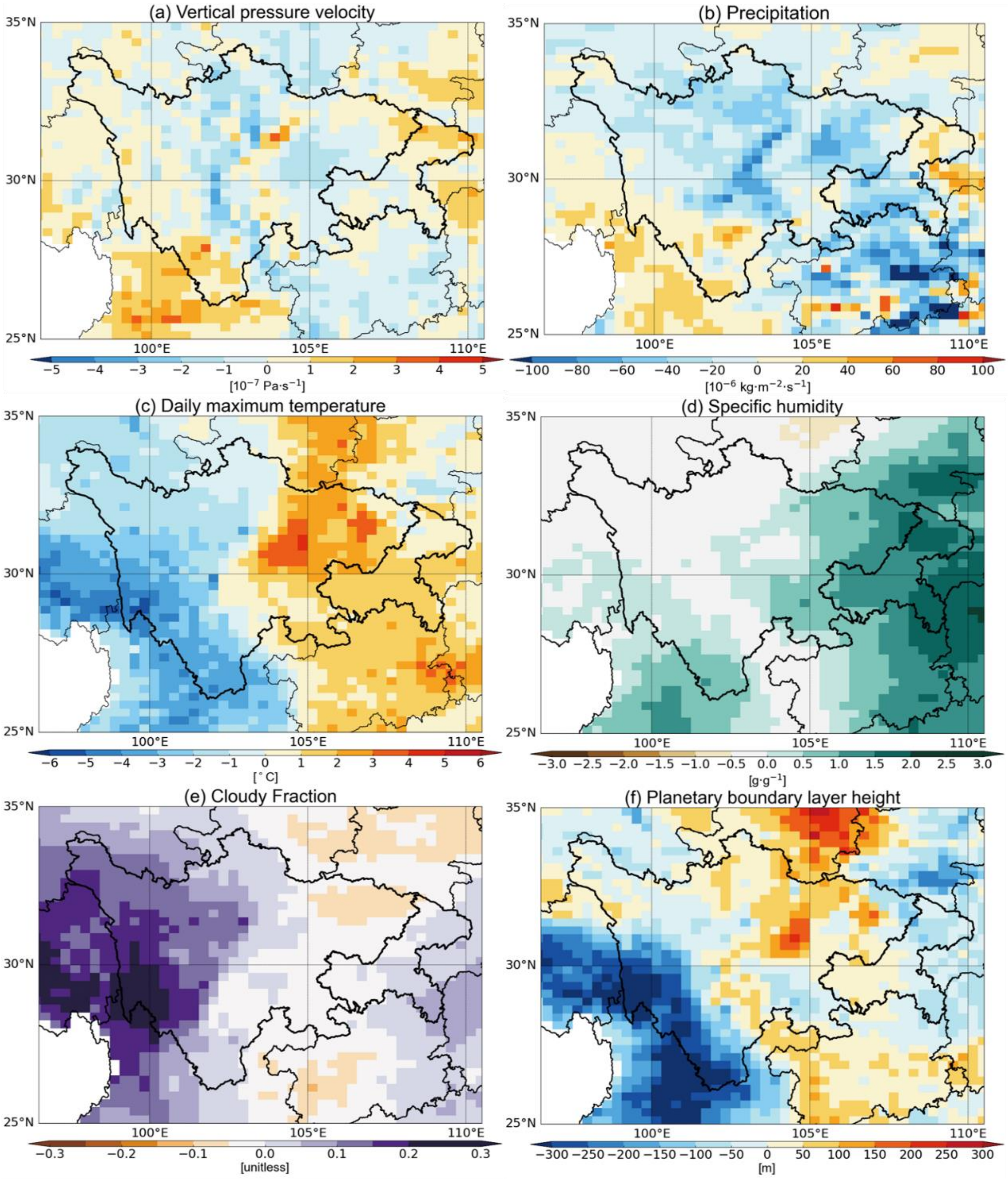

Figure 4 May-June mean differences in vertical pressure velocity (a), precipitation (b), temperature (c), specific humidity (d), cloud fraction (e), and PBLH (f) between 2020 and 2019 over the SCB and surrounding regions. All these meteorological parameters are from the GEOS-FP dataset. The vertical pressure velocity is prescribed at the PBLH and others are at the surface.