



*Supplement of*

**Measurement report: Airborne observation of CO<sub>2</sub> and CH<sub>4</sub>  
in the urban atmospheric boundary layer in Eastern China**

**Jun Wang et al.**

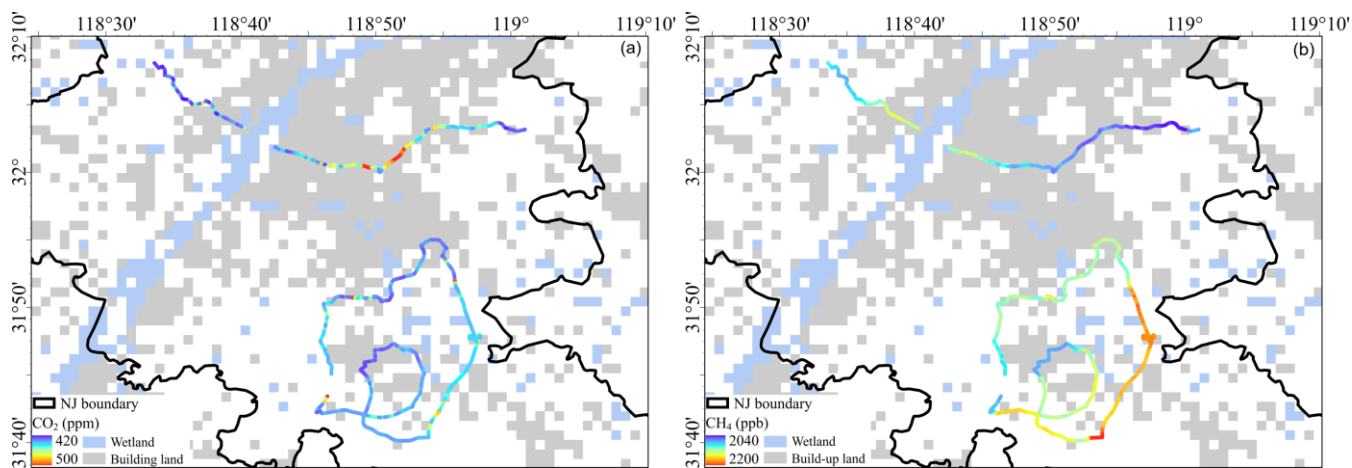
*Correspondence to:* Wei Xiao ([wei.xiao@nuist.edu.cn](mailto:wei.xiao@nuist.edu.cn))

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10 **Supplement**

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**Figure S1: CO<sub>2</sub> and CH<sub>4</sub> concentrations from vehicle-mounted observation in Nanjing. The basemap shows wetland and build-up land according to Gong et al. (2019).**

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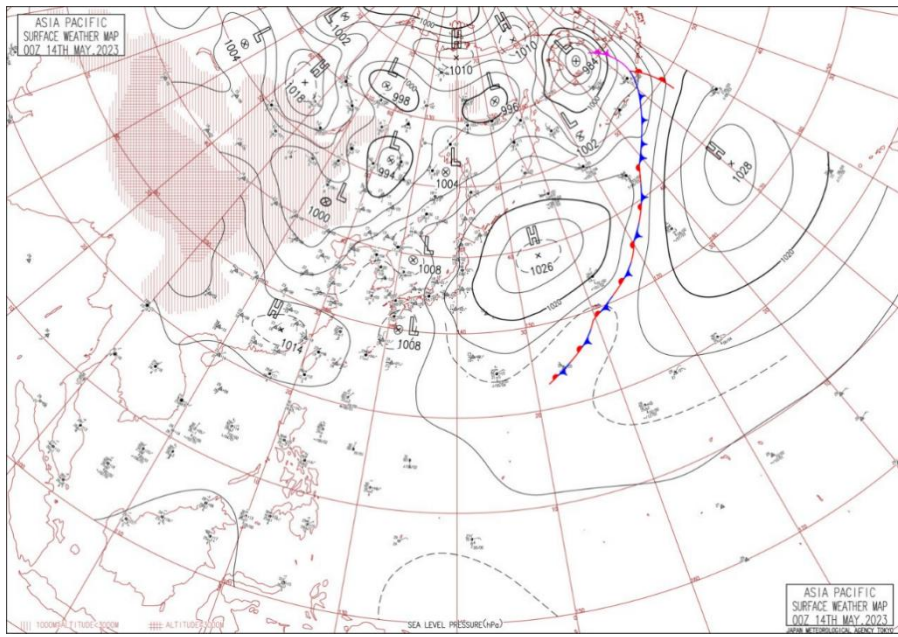
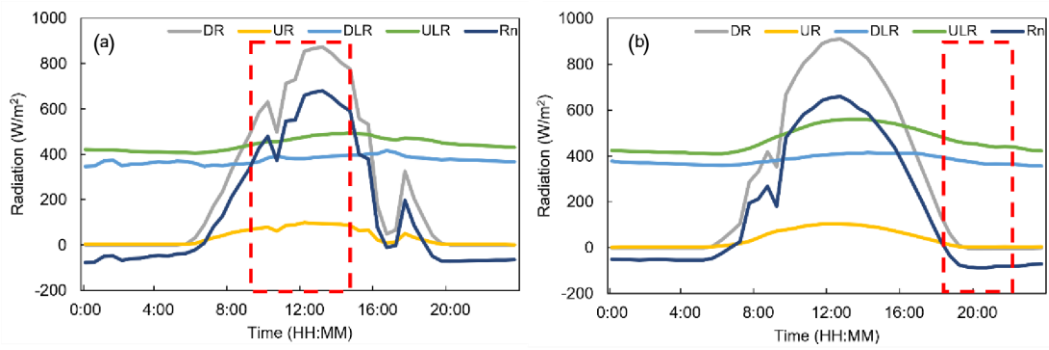
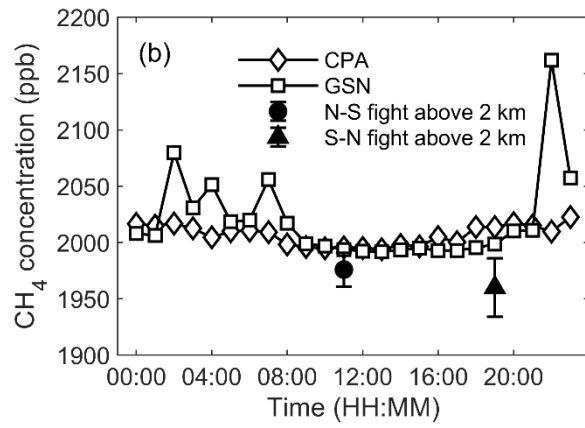
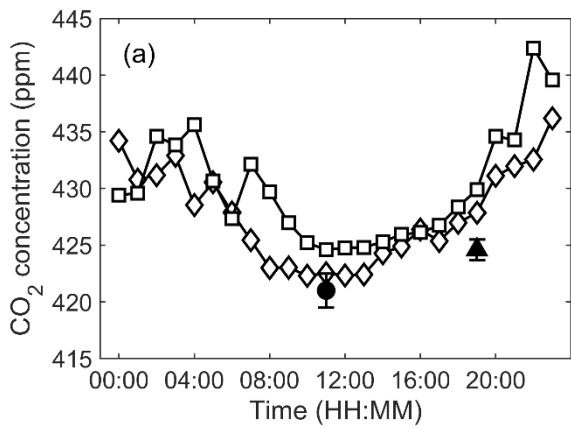


Figure S2: Surface weather map on 14 May 2023. Map source: Japan Meteorological Agency (JMA), <https://www.jma.go.jp/>

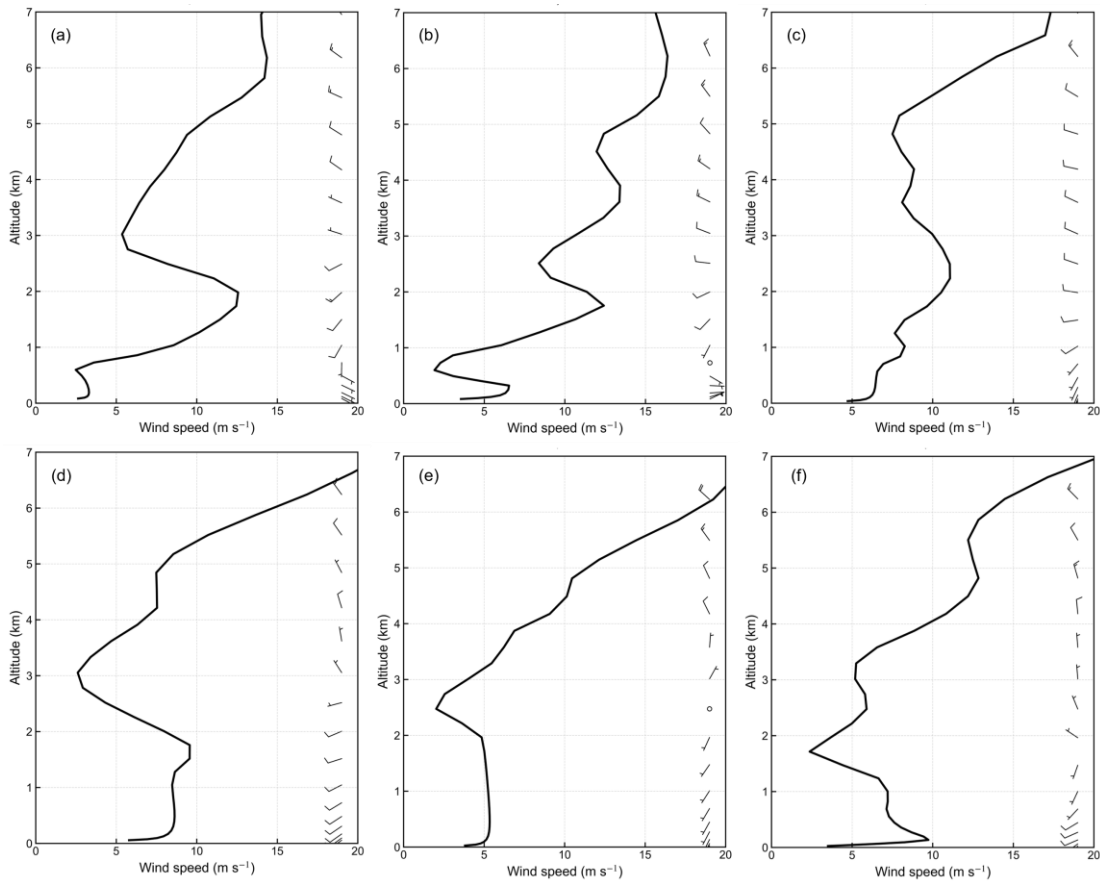


25 **Figure S3: Half-hourly time series of four radiation flux components at Beijing Meteorology Tower site (a) and at Nanjing University of Information Science and Technology site (b) for the day of the experiment.**

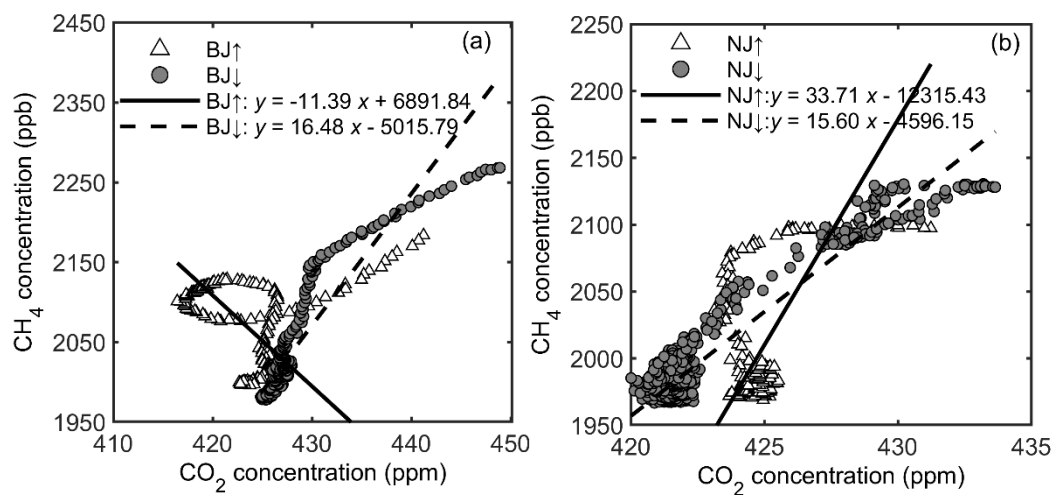


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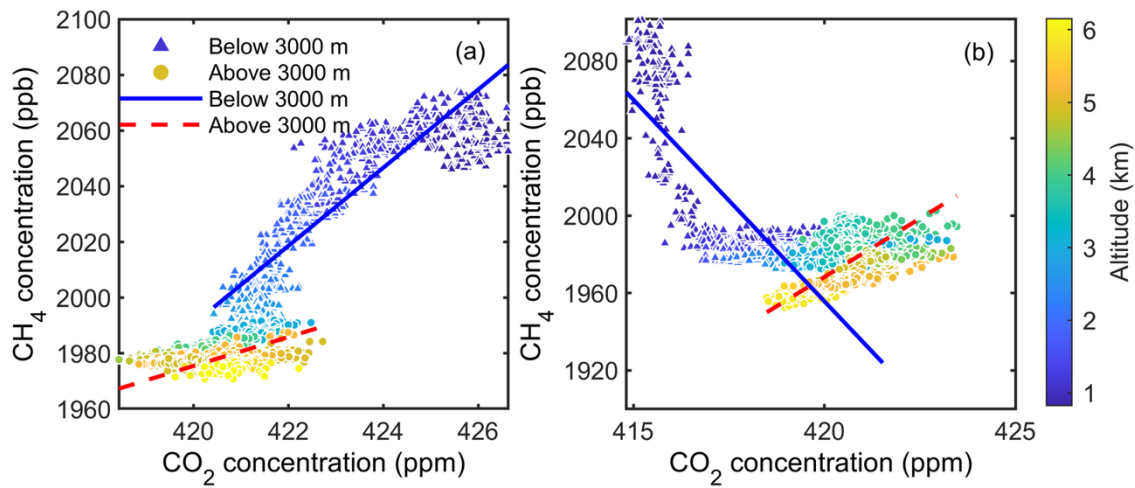
Figure S4: Comparison with background CO<sub>2</sub> and CH<sub>4</sub> concentrations.



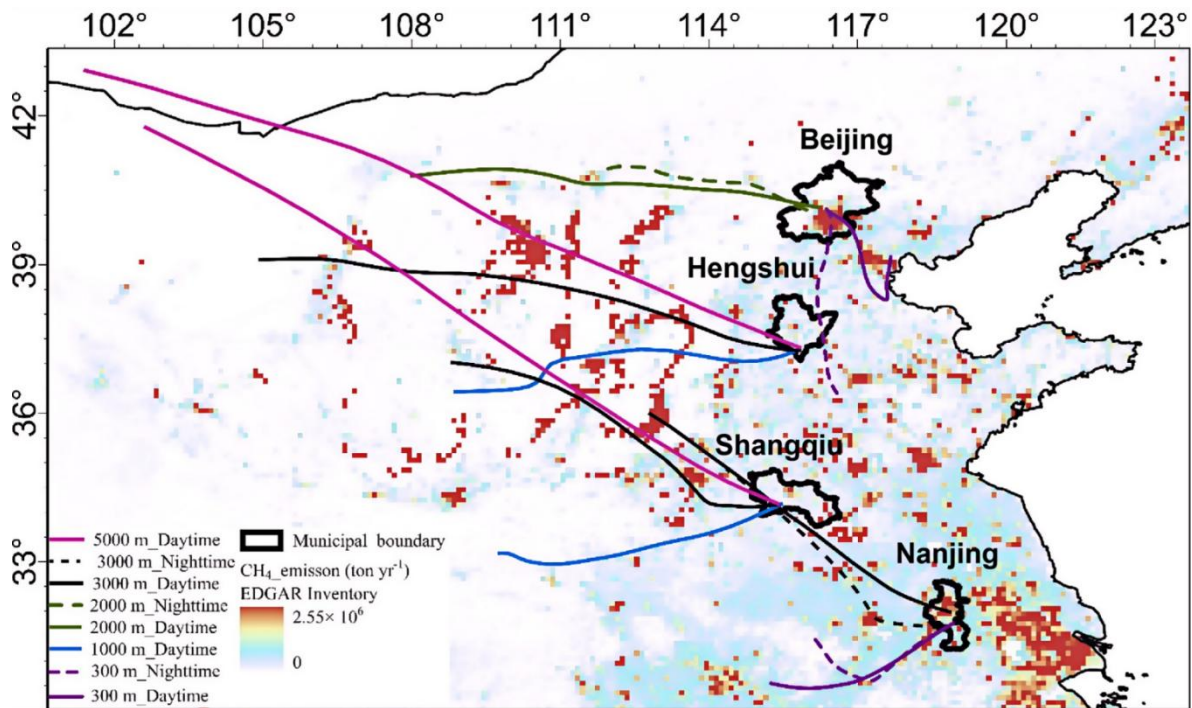
35 **Figure S5: Wind profiles over the four cities (a: Beijing-daytime; b: Beijing-nighttime; c: Hengshui; d: Shangqiu; e: Nanjing-daytime; f: Nanjing-nighttime) These profiles were simulated with the WRF model. A two-domain nested setup (27 km and 9 km resolution, 49 vertical levels, with the model top at 50 hPa, model domain centered at 40.00 N and 115.00 E.) was used. The lateral boundary conditions were prescribed with ERA5. Spin-up time was 48 h.**



40 Figure S6: Correlation between CO<sub>2</sub> and CH<sub>4</sub> concentrations above the ABL (a: Beijing; b: Nanjing)



**Figure S7: Correlation between CO<sub>2</sub> and CH<sub>4</sub> concentrations measured above Hengshui (a) and Shangqiu (b). Data points are 1 Hz observations.**



**Figure S8: Backward trajectories of air mass at different end heights. Background map shows the EDGAR CH<sub>4</sub> emission inventory with the color scale indicating annual emission amount per 0.1° by 0.1° grid. Trajectory length is 24 h.**