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Diagnosing ozone–NO_x–VOC sensitivity and revealing causes of ozone increases in China based on 2013–2021 satellite retrievals

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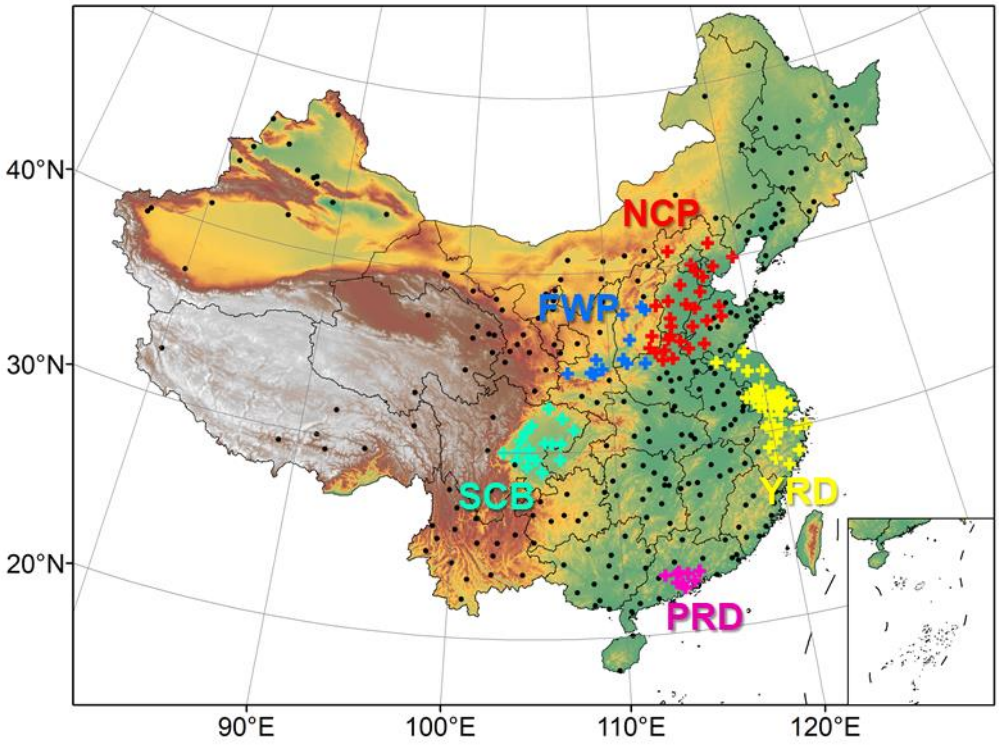
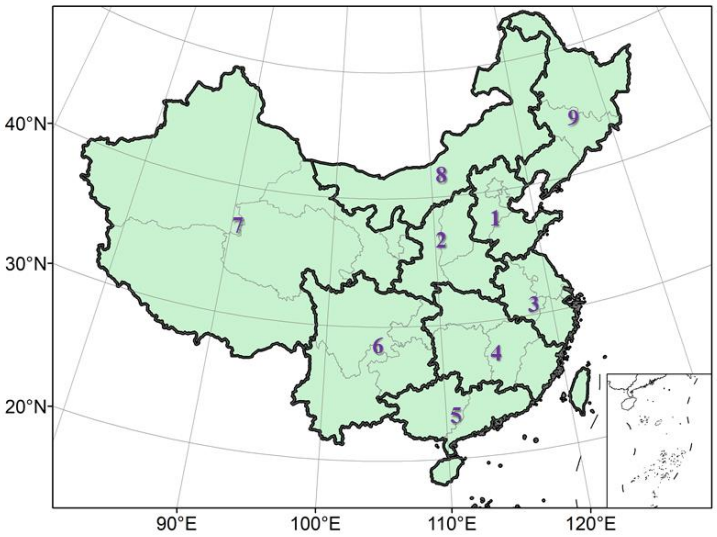


Figure S1. Location of cities and key regions, including city clusters of North China Plain (NCP), Yangtze River Delta (YRD), Fenwei Plain (FWP), Sichuan Basin (SCB), and Pearl River Delta (PRD).



No.	Region
1	Beijing-Tianjin-Hebei-Shandong
2	Shanxi-Shaanxi-Henan
3	Shanghai- Jiangsu-Zhejiang-Anhui
4	Jiangxi-Hubei-Hunan-Fujian
5	Guangdong-Hong Kong-Macao- Guangxi-Hainan
6	Sichuan-Chongqing- Guizhou-Yunnan
7	Gansu-Ningxia-Qinghai-Tibet-Xinjiang
8	Inner Mongolia
9	Heilongjiang-Jilin-Liaoning

Figure S2. Map of the nine regions into which China is divided in this study.

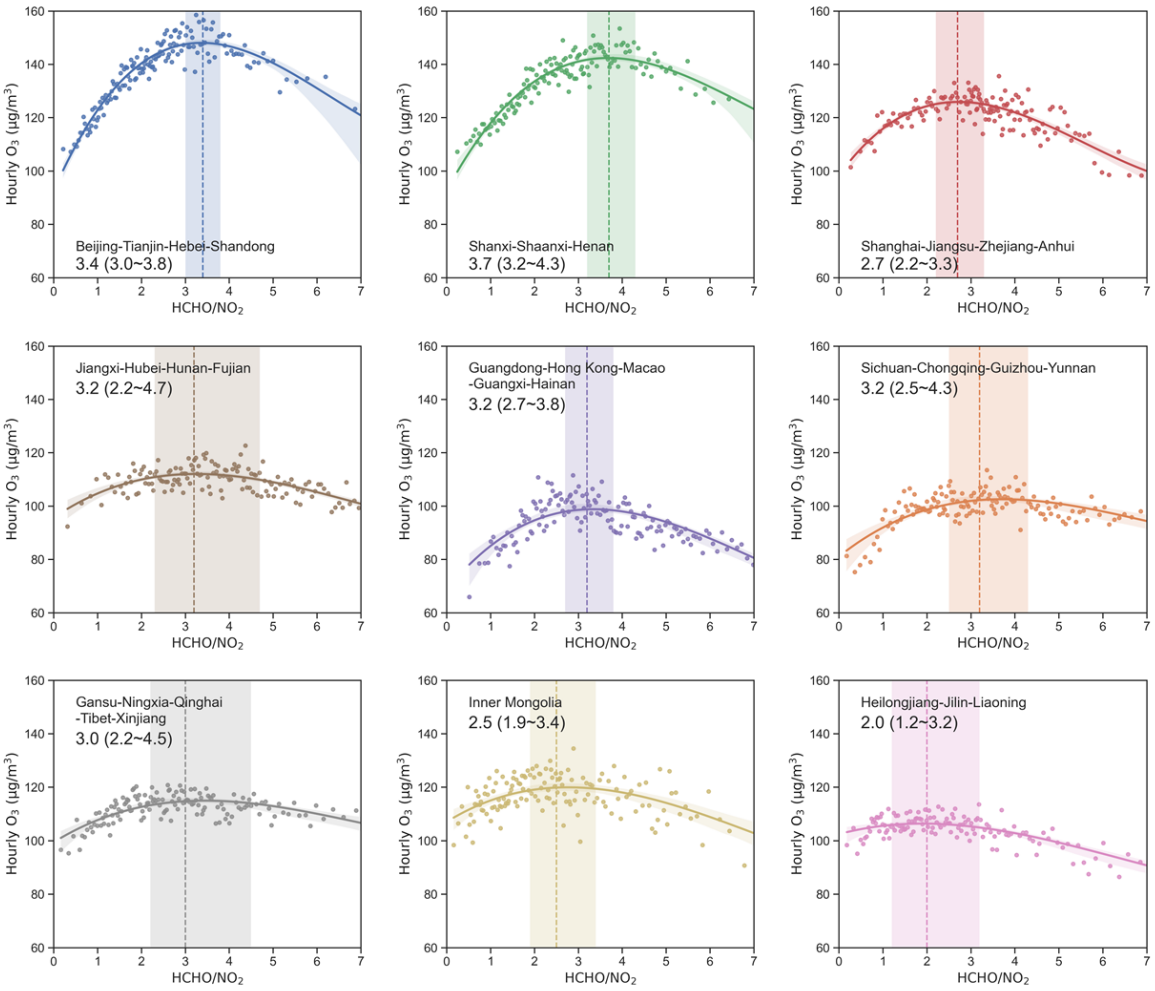


Figure S3. The same as Figure 3b but plotted with individual panels for nine regions in China.

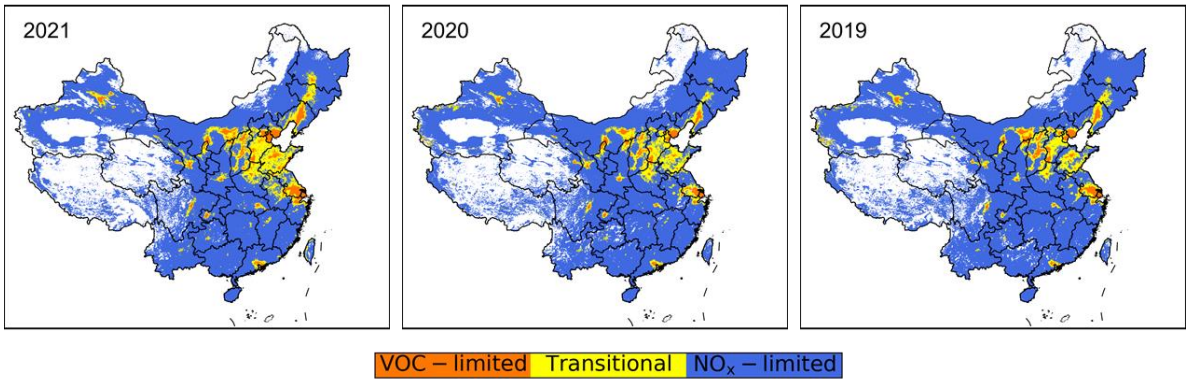


Figure S4. Ozone sensitivity classification over China from April to September 2019–2021 using the same HCHO/NO_2 threshold across China. Only polluted regions are displayed (defined as average TROPOMI NO_2 columns higher than 1.0×10^{15} molecules/cm^2).

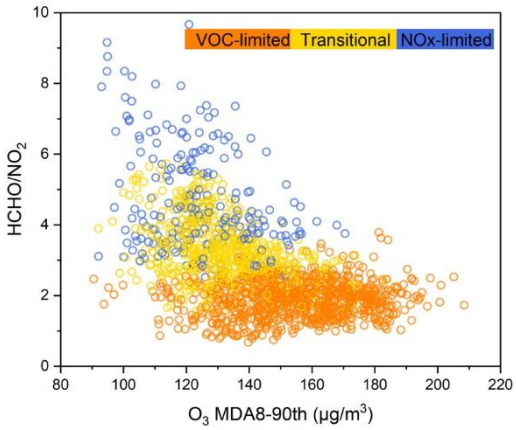


Figure S5. The 90th percentile of MDA8-O_3 and ozone sensitivity regime for all monitoring sites in 2021

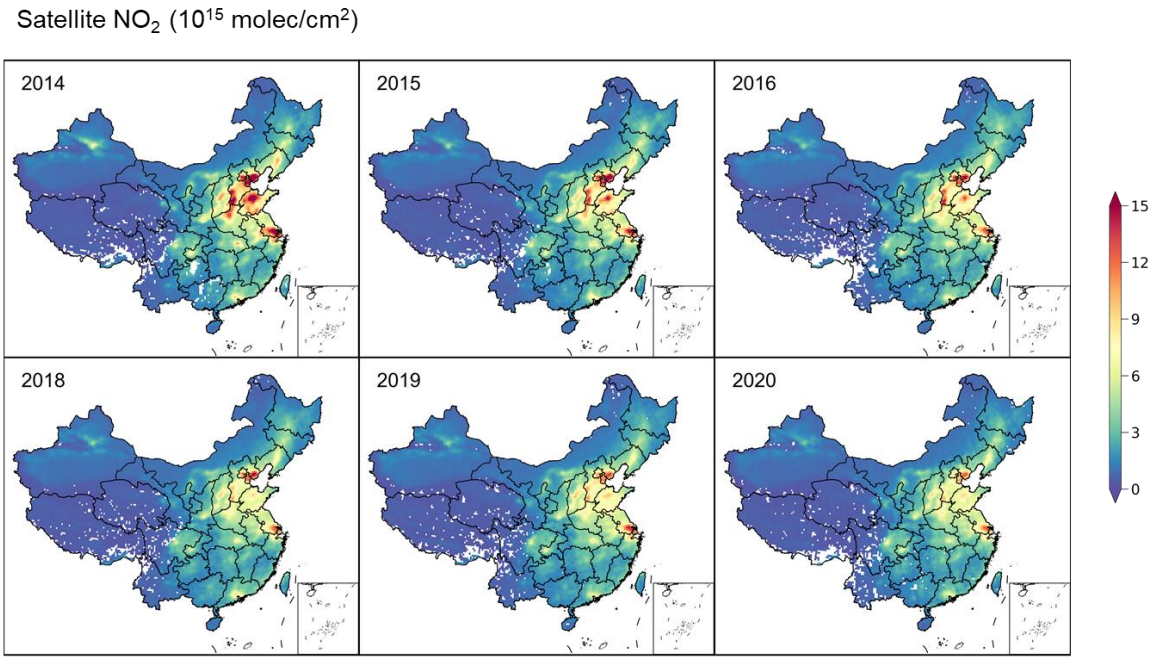


Figure S6. The same as Fig. 5a but for 2014-2016 and 2018-2020.

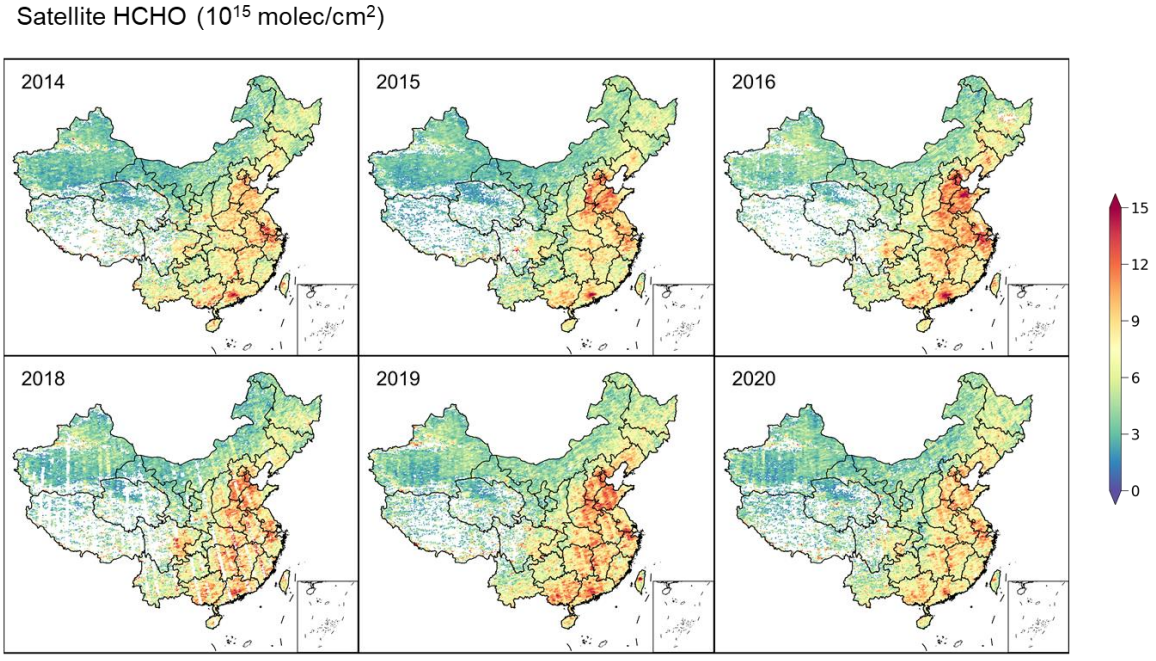


Figure S7. The same as Fig. 6a but for 2014-2016 and 2018-2020.

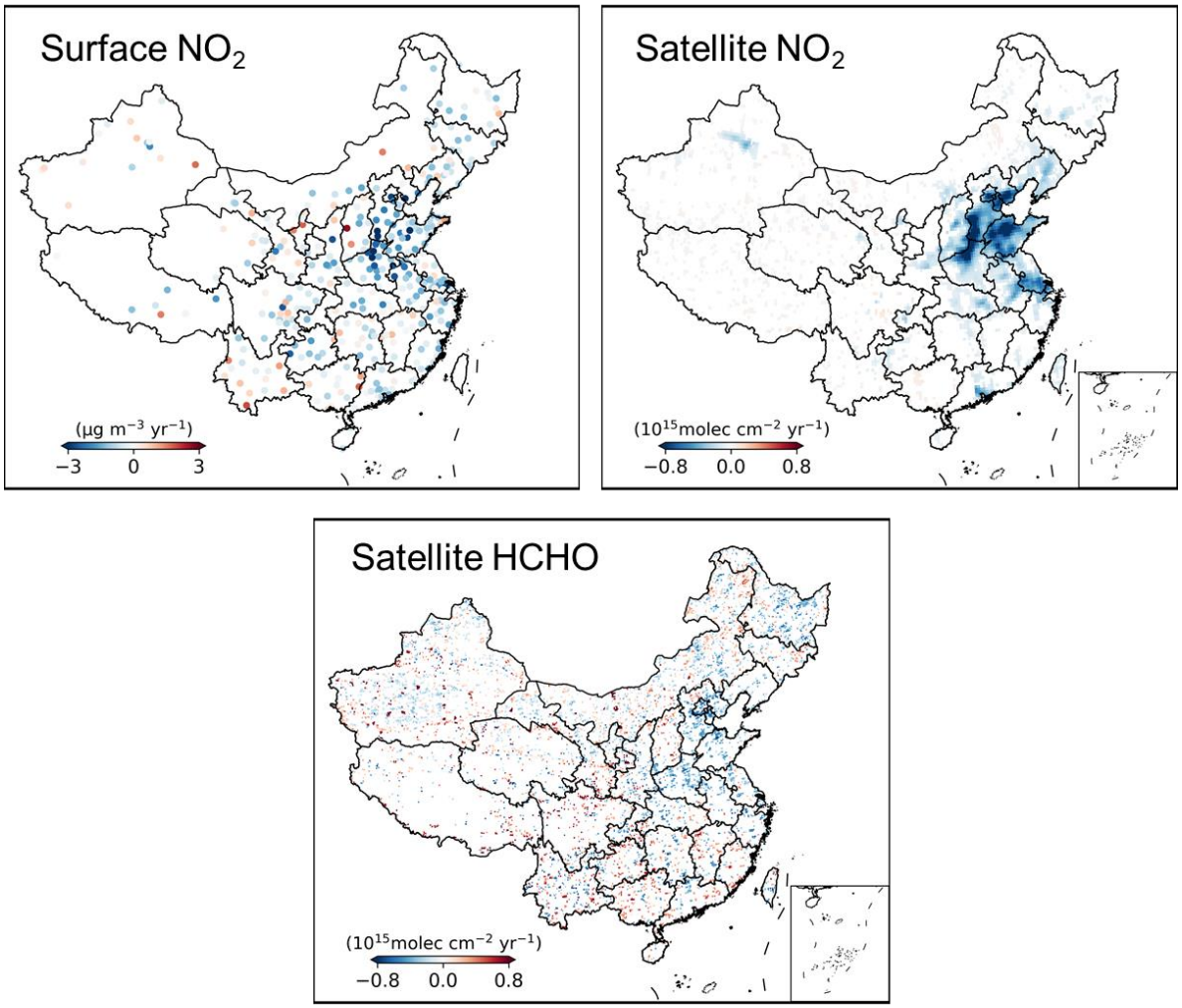


Figure S8. Trends in April-September average surface NO_2 concentrations in 2015-2021, and trends in April-September average satellite NO_2 and HCHO columns in 2013-2021 with $p < 0.05$.

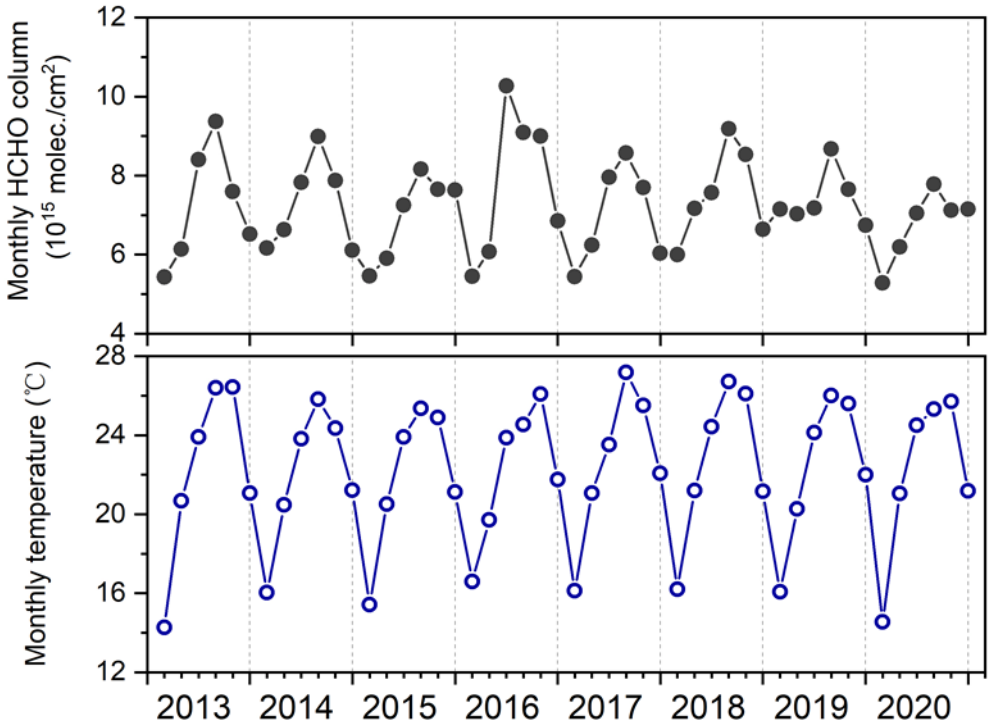


Figure S9. Time series of monthly mean HCHO columns and temperature in eastern China from April-September 2013-2020.
(Temperature data source: Yearbook of Meteorological Disasters in China**)**

Table S1. Proportions of O_3 sensitivity regimes in four megacity clusters[a] from April to September of 2021

Region	NCP	YRD	PRD	SCB
VOC-limited	59.2%	23.5%	8.0%	4.3%
Transitional	26.7%	31.4%	11.0%	27.4%
NOx-limited	14.1%	45.1%	81.1%	68.3%

[a] The four megacity clusters are NCP (Beijing, Tianjin, Hebei, Shanxi, Henan, and Shandong), YRD (Shanghai, Zhejiang, and Jiangsu), PRD (Guangdong), and SCB (Chongqing and eastern Sichuan).