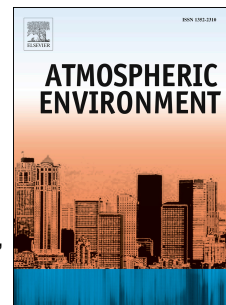


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1 Ground-level ozone pollution and its health impacts in 2 China

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12 **Abstract.** In recent years, ground-level ozone pollution in China has become an increasingly prominent
13 problem. This study simulated and analyzed spatiotemporal distribution of ozone and exposure level by
14 the Weather Research and Forecasting (WRF)-Community Multiscale Air Quality (CMAQ) models and
15 monitoring data from 1516 national air quality monitoring stations in China during 2015. The
16 simulation results show that the Sichuan Basin, Shandong, Shanxi, Henan, Anhui, Qinghai-Tibetan
17 Plateau, Yangtze River Delta (YRD), Pearl River Delta (PRD) and Beijing-Tianjin-Hebei (BTH) region
18 had relatively high average annual concentrations of ozone. The regions with more than 10%
19 nonattainment days of $160\mu\text{g}/\text{m}^3$ (daily maximum 8-hour) are mainly concentrated in BTH, Shandong
20 Peninsula and YRD, where large seasonal variations were also found. Exposure levels were calculated
21 based on population data and simulated ozone concentrations. The cumulative population exposed to
22 daily maximum 8-hour concentration greater than or equal to $100\mu\text{g}/\text{m}^3$ was 816.04 million, 61.17% of
23 the total. Three methods were used to estimate the mortality of chronic obstructive pulmonary disease
24 (COPD) attributable to ozone. A comparative study using different exposure concentrations and
25 threshold concentrations found large variations among these methods, although they were all
26 peer-reviewed methods. The estimated mortality of COPD caused by ozone in China in 2015 ranged
27 from 55341 to 80280, which mainly distributed in Beijing, Shandong, Henan, Hubei and Sichuan
28 Province, the YRD and PRD region.

29 **Keywords:** Ground-level ozone, Exposure, WRF-CMAQ, COPD, Mortality, China

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