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Assessing the impact of local meteorological variables on surface ozone in Hong Kong during 2000–2015 using quantile and multiple line regression models

Wei Zhao, Shaojia Fan, Hai Guo, Bo Gao, Jiaren Sun, Laiguo Chen



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1 Assessing the impact of local meteorological variables on surface ozone in Hong Kong
2 during 2000-2015 using quantile and multiple line regression models

3 Wei Zhao^{a,c,*}, Shaojia Fan^{a,**}, Hai Guo^d, Bo Gao^{b,c}, Jiaren Sun^c, Laiguo Chen^c

4 ^a School of Atmospheric Sciences, Sun Yat-sen University, Guangzhou 510275, China

5 ^b Shanghai Key Laboratory of Atmospheric Particle Pollution and Prevention (LAP³), Department of
6 Environmental Science & Engineering, Fudan University, Shanghai 200433, China

7 ^c South China Institute of Environmental Science, MEP, Guangzhou 510655, China

8 ^d Department of Civil and Environmental Engineering, The Hong Kong Polytechnic University, Hong
9 Kong

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11 **Abstract**

12 The quantile regression (QR) method has been increasingly introduced to atmospheric environmental
13 studies to explore the non-linear relationship between local meteorological conditions and ozone mixing
14 ratios. In this study, we applied QR for the first time, together with multiple linear regression (MLR), to
15 analyze the dominant meteorological parameters influencing the mean, 10th percentile, 90th percentile
16 and 99th percentile of maximum daily 8-hour average (MDA8) ozone concentrations in 2000-2015 in
17 Hong Kong. The dominance analysis (DA) was used to assess the relative importance of meteorological
18 variables in the regression models. Results showed that the MLR models worked better at suburban and
19 rural sites than at urban sites, and worked better in winter than in summer. QR models performed better in
20 summer for 99th and 90th percentiles and performed better in autumn and winter for 10th percentile. And
21 QR models also performed better in suburban and rural areas for 10th percentile. The top 3 dominant
22 variables associated with MDA8 ozone concentrations, changing with seasons and regions, were
23 frequently associated with the 6 meteorological parameters: boundary layer height, humidity, wind
24 direction, surface solar radiation, total cloud cover and sea level pressure. Temperature rarely became a
25 significant variable in any seasons, which could partly explain the peak of monthly average ozone

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