# Characteristics of Atmospheric Photochemical Pollution at a Comprehensive Site in Guangzhou, China

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Guangzhou, one of China’ s megacities, is beset with frequent occurrence of atmospheric photochemistry events. In this study, online instruments were used to simultaneously monitor NMHCs, NO*x* and $O_3$ at Guangzhou Panyu Atmospheric Composition Station (GPACS) of the China Meteorological Administration (CMA), from June 2011 to May 2012, in order to obtain their characteristics, NMHCs reactivity and the control strategies for atmospheric photochemistry. The results showed that during the observation period, the seasonal variation of $O_3$ mixing ratio was lower in spring and winter compared to summer and autumn, which was opposite that for NMHCs and NO*x*. $O_3$ mixing ratio began to show a net increase at 8:00LT, likely due to the breakup of the nocturnal boundary layer and increased photochemistry, while a net decrease in $O_3$ mixing ratio occurred at about 15:00LT, due to the fact that sunlight and its associated photochemistry begin to decrease, leading to low OH radicals and the titration of $O_3$ by emissions of NO*x*. In terms of NMHCs, aromatics had the largest $O_3$ formation potential, among which toluene, xylenes, ethylbenzene, 1,2,4-trimethylbenzene and 1,3,5-trimethybenzene were the most important species, with a total contribution of about 44%. Weekday/weekend $O_3$ differences in the morning and at midday largely depend on how much the $O_3$ precursors are affected by the different intensity of anthropogenic activities. Although the increase of biogenic NMHCs emissions at midday reverses the sensitivity of $O_3$ production from NMHCs-sensitive to NO*x*-sensitive, high-reactive NMHCs and NO*x* control can be effective for reducing peak $O_3$ mixing ratios in Guangzhou. Further investigation based on numerical models is required to reach more robust conclusions.

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