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Title: (OA16) Ozone Pollution in the Atmospheric Boundary Layer of China: Chemical and Dynamic Processes in Ozone Formation and Implications for management strategies

Abstract: Ozone (O3) in the troposphere is of great interest to atmospheric scientists and policy makers. At high concentrations, O3 harms human health and vegetation; it controls atmospheric oxidizing capacity and affects climate change. In urban and industrialized areas, elevated O3 in the boundary layers is primarily produced by chemical reactions involving volatile organic compounds (VOCs) and oxides of nitrogen (NOx). Meteorological conditions are important in the formation and distribution of O3 and its precursors. In spite of a huge volume of research on O3 pollution and major control efforts implemented in the developed countries, high concentrations of ground-level of O3 remain an unsolved environmental issue. Compared to the western countries, much less is known about ozone pollution in China – the spatial and temporal nature of this pollutant, the interplay of emission, chemistry, and meteorology in different regions, and local versus regional contributions. The limited knowledge of ozone pollution is due in part to a lack of atmospheric data on ozone and its precursors, particularly in large areas outside urban centers. In the recent years, we have measured O3, its precursors, and many other related gases in suburban, rural, and remote locations of different parts of China. In this paper, we will first give an overview of the measurement programs. We will then provide detailed analysis of ozone pollution in eastern and southern China. The data revealed region-scale pollution which may have negative impact on human health and agriculture crops. Results also indicate large differences in emission and interactions of meteorology with chemistry in the two regions. Average ozone concentration peaked in early summer in eastern China, as opposed to in autumn for the southern region. It was also found that burning of biomass and biofuel is an important source for many trace gases which could produce elevated ozone concentrations in rural areas. Back trajectories driven by high-resolution (spatial and temporal) meteorological data and chemical models are used to examine the transport patterns and the chemical processes controlling ozone formation. The results imply that emissions in rural areas should be considered when formulating abatement policy to control ozone pollution in major urban areas and that air-quality management program also tackle inter-city transport of pollution to the occurrence of high ozone concentrations in a given urban area. References [1] T. Wang, Vincent T. F. Cheung, M. Anson, and Y. S. Li, Geophys. Res. Lett. 28, 2373-2376 (2001) [2] T. Wang, Y. Y. Wu, T. F. Cheung, and K. S. Lam, Atmos. Environ. 35, 3203-3215 (2001) [3] T. F. Cheung and T. Wang, Atmos. Environ. 35, 4947-4958 (2001) [4] T. Wang, Vincent T. F. Cheung, Y. S. Li, X. Yu, and D. Blake, J. Geophys. Res. 107, 10.1029/2001JD000724 (2002) [5] T. Wang, C. N. Poon, Y. H. Kwok, and Y. S. Li, Atmos. Environ. 37, 3539-3550 (2003) [6] T. Wang and Joey Y. H. Kwok, J. Appl. Meteor. 42, 404-416 (2003)

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