

## 2.081 Exploring the variations in atmospheric primary and secondary pollutants response to the stringent control measures during the 2016 G20 summit in Hangzhou.

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Abstract:

In September 2016, China hosted the Group of Twenty (G20) summit in Hangzhou, which is an international forum for the governments and central governors aiming at international coordination of economic policy. As the hosted city, Hangzhou, the second largest city located along the mid-Yangtze River Delta (YRD) in the eastern part of China, set rigorous control measures to reduce emissions of local air pollutants and adjacent regions from 24 August to 7 September. The target sources incorporated vehicles, paint and solvent use, steel factories, chemical factories, power plants. In order to evaluate the effectiveness of control measures, we conducted simultaneous measurements of atmospheric gaseous pollutants such as VOCs, PAN, O<sub>3</sub>, and primary pollutants (CO, SO<sub>2</sub>, and NO<sub>x</sub>) and particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>) from 20 August to 15 September 2016. Our results show that significant reductions were found in most VOCs (e.g., alkanes, alkenes, and aromatics compounds), primary pollutants (CO, NO<sub>x</sub>, and SO<sub>2</sub>), and secondary photooxidants (PAN and O<sub>3</sub>) during G20 compared to before G20, followed by apparent enhancements for all species after G20. Furthermore, a box model with MCMv3.3.1 was employed to elucidate the variations in the chemical processes of PAN and O<sub>3</sub> before, during, and after G20. The predominant primary precursors of PAN were acetaldehyde, MGLY, and followed by radical propagation for four episodes, and its secondary precursors were alkanes for the four episodes, aromatics before and during Phase I G20, and alkenes during Phase II and after G20, respectively. For O<sub>3</sub>, its major precursors were aromatics, alkenes, and alkanes, respectively. In addition, we estimated the atmospheric oxidizing capacity by calculating their loss rates of CO and VOCs via reactions with OH, O<sub>3</sub>, and NO<sub>3</sub> for these episodes and found that their corresponding average maximum AOC levels were up to  $5.22 \times 10^7$ ,  $4.25 \times 10^7$ ,  $2.73 \times 10^7$ , and  $4.71 \times 10^7$  molecules cm<sup>-3</sup> s<sup>-1</sup>.