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Source characteristics of volatile organic compounds during high ozone episodes in Hong Kong, Southern China

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Abstract. Measurements of Volatile Organic Compounds (VOC) are analyzed to characterize the sources impacting the Hong Kong area. The ratios of different VOC species, m,p-xylenes-to-ethylbenzene, C₆H₁₄-to-toluene and p-xylene-to-total xylenes are used for diagnostic analyses. Photochemical age analysis shows that the sources of reactive aromatics, the most important contributor to the photochemical reactivity, do not appear to be preferentially located in downtown Hong Kong. In addition, they do not appear to be dominated by mobile emissions based on the analyses of speciated VOC data from an earlier study, but related to industrial, waterfront, and fuel-storage activities. The ratios, p-xylene-to-total xylenes and dSO₂/dNO_y, suggest that the anomalously high pollutant concentrations in western Hong Kong in the early morning hours of two episode days appear to have come from transport of urban-type emissions. Comparison of observed ambient ratios of selected VOC and their ratios in the speciated VOC emission inventories for Hong Kong and adjacent Pearl River Delta (PRD) Region gives mixed results. The observed ratio C₆H₁₄-to-toluene is consistent with the speciated version of the VOC emission inventory. The ratios of selected alkanes are not. This may be caused by the inaccuracies in the inventory and/or the speciation method.

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