



## **Source contributions to secondary organic aerosol in Beijing urban area during summertime**

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Quantification of local and outside source contributions to particulate matter is key issue to improving air quality in large urban areas, but few studies have focused on secondary organic aerosol (SOA) source contributions in a large area, especially in China. In this study, we extended the Comprehensive Air Quality Model with Extensions (CAMx) version 5.4, replacing the two-product approach by the volatility basis-set (VBS) approach, with updated SOA yields based on smog chamber studies. The modules related to the computationally efficient particulate source apportionment technology (PSAT) used in CAMx v5.4 were extended based on the volatility basis set (VBS) approach. The updated version of the CAMx model was then used to calculate the local and outside source contributions to SOA in Beijing for the first time. The results indicated that the VBS approach substantially improved hourly, daily, and monthly SOA simulations, compared with the two-product approach and the observations. In August 2007, the local source contributions to anthropogenic and biogenic SOA in Beijing were 20.9% and 12.6%, respectively; outside sources dominated for both anthropogenic and biogenic SOA in Beijing: Northern Hebei, Middle Hebei, Northeast China, Inner Mongolia, Shandong, and Tianjin (including Xianghe) contributed 4.8% to 18.3% to anthropogenic SOA in Beijing; whereas, Inner Mongolia, Northern Hebei, and Northeast China contributed 19.0%, 14.8%, and 12.2%, respectively, to biogenic SOA in Beijing. Additionally, other areas outside China respectively contributed 6.2% and 15.5% to anthropogenic and biogenic SOA in Beijing; this could be related to strong summer monsoon.