Supplementary material for the source apportionment of primary $PM_{2.5}$ in an aerosol pollution event over Beijing-Tianjin-Hebei region using WRF-Chem, China

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In order to better prove the effect of simulation, we provide more comparison between simulated $PM_{0.625}$ and observed PM_1 composition data (including SO_4, NO_3, NH_4, OC) in Beijing. The observed PM_1 data was measured by using a high-resolution time-of-flight aerosol mass spectrometer (HR-ToF-AMS; Aerodyne Research Inc., Billerica, MA, USA; DeCarlo et al., 2006). The details of HR-ToF-AMS operation and data analysis have been reported elsewhere (Zhang et al., 2014) and it has been widely used (Zhang et al., 2015). The observed site is located in Beijing (39°58′28″N, 116°22′16″E). The source-appointment method is based on MOSAIC 4bins(0.039—0.156μm, 0.156—0.625μm, 0.625—2.5μm, 2.5—10μm). So we compared simulated $PM_{0.625}$ and observed PM_1 in Beijing. Fig.1(a-c) shows that the concentration of SO_4, NO_3 and NH_4 in $PM_{0.625}$ is near in PM_1. But Fig. 1(d) presents that the concentration of OC in PM_1 is much higher than $PM_{0.625}$, the possible reason is that the relevant calculations on secondary organic aerosols being not included in MOSAIC. Therefore, the simulated OC in $PM_{0.625}$ is only primary organic aerosols. And the OC in observed PM_1 is total (primary organic aerosols and secondary generated organic aerosols). Furthermore, in Fig.1d, the tendencies between the observed OC in PM1 and simulated OC in PM0.625 are similar, In general, the result of comparison is realistic.

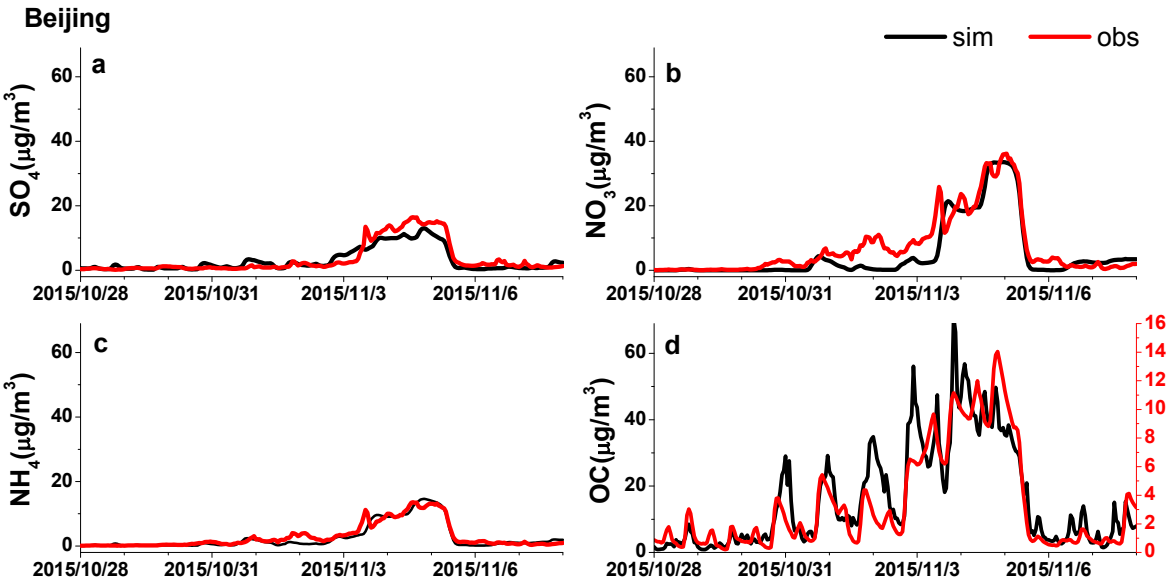

Fig. 1. a-c)Time series comparisons between the observed PM_1 and simulated $PM_{0.625}$ composition (SO_4, NO_3, NH_4), d) Time series comparisons of the tendency between the observed OC in PM_1 and simulated OC in $PM_{0.625}$

Reference

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