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# Transport of gaseous $NO_2$ and $SO_2$ by MAX-DOAS in Beijing and surrounding area

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With the development of industry and urbanization, regional pollution is increasing seriously, and the cross influence between cities is becoming more frequently. Multi Axis Differential Optical Absorption Spectroscopy (MAX-DOAS) has been successfully applied in the remote sensing of gaseous pollutants during the past decade, it is based on scattered light of the sun, and can measure spectral in different directions, measure tropospheric and the whole atmospheric column densities of trace gases combining with radiative transfer model (RTM). This approach is very useful for the investigation of the main path of air pollution transportation. Fifteen MAX-DOAS stations which are in urban and in the path of pollution transport are set up in Beijing and surrounding area including Tianjin and Hebei province to observe the spatial and temporal distributions and regional transport of gaseous $NO_2$ and $SO_2$. The $NO_2$ VCDs and profiles and $SO_2$ VCDs are obtained. The results show that the $NO_2$ column densities in urban are higher than surroundings, it shows that the $NO_2$ in Beijing is mainly from the local; The $SO_2$ column densities in other cities to the south of Beijing are obviously higher than in Beijing, so regional transport from the south of Hebei province will have a significant impact on Beijing. From the results of $NO_2$ and $SO_2$, the whole pollution process including incubation, generation, duration, and dispersion was observed. The vertical distribution show that $NO_2$ concentration is mainly near the surface from 0 to 400m, and $SO_2$ is higher in the transport process.