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Characteristics of trace gaseous pollutants at a regional background station in Northern China

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Abstract. Measurements of trace gaseous pollutants were taken at the Shangdianzi site, a WMO Global Atmosphere Watch (GAW) background station in Northern China. The results are presented for the period from September 2003 to December 2006. Seasonal and diurnal variations of the O_3 , NO_x , SO_2 , and CO concentration are characterized and possible causes for them are discussed. The observed levels of the trace gases are comparable to those at some other background sites in polluted regions inside and outside of China. It was shown that the seasonal variation of O_3 can change slightly from year to year due to the year-to-year alternation in the meteorological conditions. Higher CO concentrations were observed in some warmer months, particularly in June and July, 2006. Intensive biomass burning in the North China Plain region, in combination with the transport of regional pollution by more frequent southwesterly winds, is believed to be responsible for the elevated CO concentrations. The diurnal variation of O_3 , with delayed peaking times, suggests that the transport of photochemical aged plume is an important source for O_3 at Shangdianzi. The diurnal variations of SO_2 in all seasons show higher values during daytime, contradicting the common view. An explanation for this unusual phenomenon is hypothesized. To gain an insight into the impact of transport on the trace gases levels at Shangdianzi, air mass backward trajectories were calculated and analyzed in combination with corresponding pollutant concentrations. The results indicate that the transport of air masses from the North China Plain region and from the major coal mining regions west of Shangdianzi is responsible for the high concentrations of the gaseous pollutants.

[Final Revised Paper](#) (PDF, 423 KB) [Discussion Paper](#) (ACPD)

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