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Atmospheric Chemistry and Physics Discussions

Interactive comment on "High solubility of SO₂: evidence in an intensive fog event measured in the NCP region, China" *by* Q. Zhang and X. Tie

Anonymous Referee #1

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This manuscript presents very interesting findings from a field measurement campaign in North China. By analyzing SO2 and CO measurement data for a typical fog event at a surface site in Tianjin, China, the authors found that aqueous reactions of SO2 in the droplets of fogs play important roles to enhance the solubility of SO2, and they proposed an "effective " Henrey Law constant of SO2 for model calculations. This paper is well-written and scientifically important. This referee would like to recommend its publication on Atmospheric Chemistry and Physics if the authors can carefully address the following issue.

Fig.2 shows that an extremely high CO concentration with a range from 2 to 10 ppmv

during the study period. It is difficult to understand that what sources can cause such high CO concentrations but 20∼40 ppbv of SO2 (during non-fog period) in the sub-urban/rural site with a distance about 30 km away from Tianjin. Also, it should be noted that there are some scattered but well-organized data points below the CO time series in Fig.2. Is there a possibility of zero calibration has not been well-corrected? Since the author used CO profiles as an indicator to show that air masses haven't change a lot during the fog event, the data quality should be double checked.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 2931, 2011.