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## Seasonal and diurnal characteristics of water soluble inorganic compounds in the gas and aerosol phase in the Zurich area

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**Abstract.** Gas and aerosol samples were taken using a wet effluent diffusion denuder/aerosol collector (WEDD/AC) coupled to ion chromatography (IC) in the city of Zurich, Switzerland from August to September 2002 and in March 2003. Major water soluble inorganic ions; nitrate, sulfate, and nitrite were analyzed online with a time resolution of two hours for the gas and aerosol phase. The fraction of water soluble inorganic anions in PM<sub>10</sub> varied from 15% in August to about 38% in March. Seasonal and diurnal variations of nitrate in the gas and aerosol phase were observed with more than 50% of the total nitrate in the gas phase during August and more than 80% of nitrate in the aerosol phase during March exceeding the concentration of sulfate by a factor of 2. Aerosol sulfate, on the other hand, did not show significant variability with season. However, in the gas phase, the SO<sub>2</sub> concentration was 6.5 times higher in winter than in summer. Nitrous acid (HONO) also showed a diurnal variation in both the gas and aerosol phase with the lowest concentration (0.2–0.6 µg/m<sup>3</sup>) in the afternoon. The primary pollutants, NO, CO and SO<sub>2</sub> mixing ratios were often at their highest between 04:00–10:00 local time due to the build up of fresh vehicle emission under a nocturnal inversion.

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