



Influence of meteorological variability on the concentration of traffic air pollutants in the River Inn valley over the course of one year

R. Schnitzhofer, J. Dunkl, J. Beauchamp, A. Wisthaler, A. Hansel

Institut für Angewandte Physik und Ionenphysik, Leopold Franzens Universität Innsbruck,
Technikerstraße 25, 6020 Innsbruck, Austria

To complement the routine data acquisition of NO , NO_2 , CO and PM_{10} at an environmental monitoring station in the River Inn valley at Vomp (Austria), measurements of certain volatile organic compounds (VOCs) were carried out at this location between February 2004 and May 2005. In addition, meteorological data (wind, vertical temperature profile, etc.) were used to gain an understanding of dispersion and dilution of pollutants in the local valley atmosphere. Furthermore traffic abundance was used to determine the emission-strengths of certain compounds.

Daily variations of pollutant levels arise from both traffic abundance and meteorological influences: On the one hand they are due to variations in emission-strengths (heavy duty vehicles ban during the night, rush-hour traffic); on the other hand they result from changing dispersion and dilution conditions for pollutants, such as during nighttime when a low inversion layer develops, that subsequently breaks-up during the day. Fortunately dispersion and dilution conditions are mostly well developed during times of high emission strengths. Only in the morning and evening do high emissions occur when there is a poorly developed air exchange, resulting in maximum pollutant levels during these times.

VOCs are important precursors in tropospheric O_3 production. Moreover many VOCs can have serious repercussions on health: Benzene, for example, is known to be a carcinogenic agent. Due to this effect a target value for benzene of 1.5 ppbV as an annual mean was introduced by the EU, to be met by EU member states by 2010. The annual value (1.4.2004 - 31.3.2005) measured in Vomp was 0.6 ppbV and thus below the guideline limit, whereas PM_{10} and NO_2 were found to exceed the EU guideline limits.