### Meteorology and air pollution in an alpine Valley during two striking different winter periods

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**Introduction**

During winter essentially, Alpine valleys are frequently prone to enhanced air pollution inducing serious im-

- **Threshold exceedances**
  - **Summary of daily means (2005/2006)**
  - **Summary of daily means (2007/2008)**
  - **Emissions 2005/2006 (NO2)**
  - **Emissions 2007/2008 (NO2)**
  - **Vertical temperature gradient 2005/2006 [100m]**
  - **Vertical temperature gradient 2007/2008 [100m]**

**Climatology**

The climatological analysis of the data from Innsbruck shows, that the two investigated periods were completely different regarding the meteorological parameters. Compared with the climatological long-term means (1971-2000), the winter 2005/06 (from December to the End of February) was 1.5°C colder, the number of days without a temperature < 0°C was higher (15.4°C) and there was a long-lasting snow cover, which lasted until Easter. The sum of the precipitation slightly exceeded the long-term mean. In contrast, the temperature during January and February 2007 was 2.8°C warmer and the mean and it was too dry (18.7% mm rainfall).

**Weather type classification**

The investigation of the weather types after the scheme of Steinacker (1991) exhibits, that the relative distribu-

- **Summary of daily means of emission (NO2) in the valley cross-section**
  - **Figure 2.2**: Local variability - NOx-passive samplers

**Summary and Conclusion**

The weather-type analysis showed almost the same distribution of the larger scale atmospheric patterns during both periods. There were even more high pressure events in winter 2005/06, but in 2007/08 the values of air pollution were considerably higher than in winter 2007/08. This difference was based on the lower emission rates during the high pressure events in Dec/07 and on the long lasting snow cover over 2005/06. The induced rather stable layering in the lower atmosphere during winter 2005/06, whereas due to the lower albedo run. mean 2008 the atmosphere could be heated and mixed more efficiently. To be added, there were more southerly flows in 2005/06, causing more days with foehn events than in 2007/08. However, during both periods we found higher values of NOx at the sunny slope than at the opposite slope of the valley. This was a result of the different stability at the slopes, normally the shady side was more stable.

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**References**