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Alpine Space

Interreg III B

ALPNAP

Monitoring and Minimisation
of Traffic-Induced Noise and Air Pollution
Along Major Alpine Transport Routes

www.alpnap.org

ALPNAP

Traffic induced Air pollution in the Inn valley

Field campaign - concept

GENERAL OUTLINE:
In the frame work of ALPNAP a field campaign in the Inn valley is currently underway. It lasts from November 2005 to January 2006 and focusses on air pollution (AP) and noise strain in the lower Inn valley. The target area is centered around Schwaz / Vomp, where threshold exceedances of nitrogen oxide and PM_{10} are frequently recorded.

AIR POLLUTION CONCEPT:
From the viewpoint of air pollution induced by inneralpine traffic the most important goals for the field campaign are outlined below:

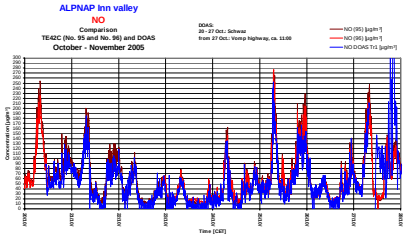
- Study the AP spatial variation including the distribution with height and in a cross-section including the northern and southern slopes
- Determine the dependance of this variation on meteorological parameters like wind, stability / mixing height etc.
- Evaluate the representativity of the permanent AP network for the whole area as a function of distance to the main sources and height
- Evaluate the best use of an existing temperature profile for mixing height and stability analyses

EXPECTED OUTCOME:
- Case studies
- Three months climatology
- Information to set up the models
  (background concentration, initialisation)
- Model validation (profiles, path-averaged and point measurements)
- Demonstration of the usability of a cross section of meteorological sensors: location, sensors

Comparison / calibration before Field campaign

OBJECTIVE:
Different measurement techniques are used to measure air pollutants as NO and NO_2. These techniques are in situ devices and open-path DOAS (Differential Optical Absorption Spectroscopy). The systems are placed at different sites: in situ measurements at the ground and the slopes of the valley as well as path-integrated measurements across the highway.

RESULTS:
An example of comparison of the measurement results of NO by in situ devices and DOAS at the ground of the valley during some days in October 2005 in well mixed air is shown. The deviations are in the order of the measurement accuracies of the systems as it was expected.

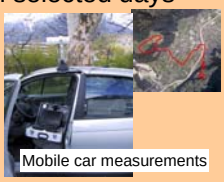


Set-up of instrumentation

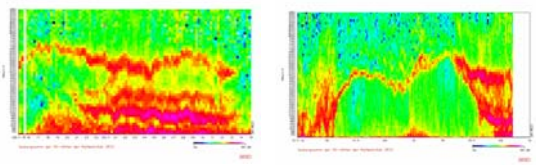
1. Permanent Nov 05 – Jan 06

2. Additional measurements on selected days

During interesting weather episodes specific measurements to get the vertical structure and a more detailed spatial distribution of meteorological parameters and fine dust will be performed.
This includes canister sampling of volatile organic compounds.



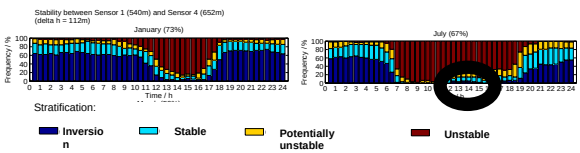
Data analysis and first results



Acoustic remote sensing with a sodar detects the vertical stratification and vertical wind profiles. Inversions are shown which limit the vertical pollutant transport and serve as reflecting layers of noise propagation.

Left-hand Figure: backscatter intensity (blue and green: low, yellow and red: high) from November 8 to 9. Inversions (ground-based, at 150 m, 300 m and 600 m above ground) are distinguished which are formed in a clear, dry night due to interacting down-slope and down-valley winds.

Right-hand Figure: backscatter intensity from November 13, 1200 GMT to November 15, 1200 GMT. One inversion is visible meandering between 360 m and 660 m above ground for about 24 hours marking the top of a fog layer which persisted for more than one day.



Evolution of monthly mean stability in the lower Inn valley as measured by temperature sensors (Hobos) at southern slope between the valley bottom and 112 m above in (a) January, (b) July from Jan 2002 to Jan 2005:
- 60 % inversions overnight; appr. 80 to 90 % stable
- mixing due to solar radiation: July starting from 6 CET, Jan late morning
- seemingly more stable stratification in the afternoon: sensor location

→ to be compared to field campaign data

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