The VERTIKATOR Field Campaign in the Loisach Valley

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Motivation

- Understanding of the local vertical aerosol distributions in view of EARLINET
- Understanding of the efficient vertical transport above Alpine valleys
- Experimental input for improving the description of convection above complex terrain in meteorological models (e.g., in view of better precipitation forecasts)

Previous Knowledge

Lidar measurements in the Loisach valley and the Swiss Mesolcina valley have shown that the orographic wind system in and above Alpine valleys may transport boundary-layer (PBL) air to heights 1 to 1.5 km above neighbouring summits and ridge heights under conditions of moderate humidity (Carnuth et al., 2002; Carnuth and Trickl, 2000, Kreipl et al., 2001; see Figs. 1-4). In the morning, an up-valley flow forms (‘valley wind’) advecting air pollution from outside the valley which is exported from the PBL in the upper parts of the valley. A return flow may form above the PBL. In the deep Mesolcina valley (300 to 3000 m a.s.l.) this return flow was partly channelled and, thus, rather independent of the synoptic wind direction. The export efficiency from the PBL was roughly 80%.

The measurements have hardened the experimental input for improving the description of convection above complex terrain in meteorological models (e.g., in view of better precipitation forecasts)

Conclusions:

The measurements have hardened the existing knowledge about the wind system in the Loisach valley. Since the valley wind was normal on both days the differences between July 8 and 9 are tentatively ascribed to differences in synoptic conditions (W and SW, respectively). The wind data do not suffice to understand all the details presently available. The results are also influenced by the presence of U.S. fire planes above 3600 m. The analysis will go on and also the other days will be examined. However, it is anticipated that further measurements are needed, including more detailed flights in the Loisach valley alone.

References:


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