



Backward Lagrangian particle dispersion modeling for the high Alpine site Jungfraujoch

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The Swiss high Alpine station Jungfraujoch (3580 m asl) is ideally located to monitor a significant part of central European air pollutant emissions. On the one hand, the station is close enough to major European emission sources. On the other hand, Jungfraujoch is remote enough (high elevation) that it is reached not only by polluted boundary layer air but also, occasionally, by clean background air. The main disadvantage of Jungfraujoch is the complex surrounding topography.

To interpret the Jungfraujoch measurement data we use a Lagrangian Particle Dispersion Model in backward mode, with numerical wind fields from the alpine model (aLMo, 7km x 7km grid spacing) of the Federal Office of Meteorology and Climatology, MeteoSwiss. The particle model (LM-LPDM) is, in forward mode, in operational use at MeteoSwiss and the German Weather Service. We report on the performance of the LM-LPDM for modeling tracer transport to Jungfraujoch. In particular, we consider its sensitivity to various steering parameters, especially the importance of the release and sampling height of the particles, the time spacing of the wind field, and the time over which the particles are traced backward. Comparison of measured and modeled CO concentration time series are presented as well.