



August 2003 heat wave analysis: Swiss Alpine LIDAR measurements and modeling of the Atmospheric Boundary Layer

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Nowadays the analysis of extreme events as a potential consequence of the unexpected fast and non-linear changes of the Earth climate are needed not only as a pure scientific challenge but also as a tool for rapid and the right political decisions.

In this context, horizontal and vertical lidar measurements of water vapor and aerosol backscatter coefficient at the Jungfraujoch observatory were analyzed together with simultaneous sonic anemometer wind and temperature measurements at the Aletsch glacier from April to August 2003. Using the aerosols and water vapor as tracers of the planetary boundary layer an unusually high (order ~ 5000 m) daytime atmospheric boundary layer (ABL) was observed. The persistence of ABL residual air masses above the Alps during the nighttime is also demonstrated. Regional radio soundings (potential temperature and water vapor profiles) confirmed the LIDAR observations during the extreme event. Model output (PBL height, turbulence parameters, ozone mixing ratio) will also be presented. Supporting sonic anemometer measurements (wind and temperature) taken simultaneously at the Aletsch glacier surface are also used.