



Boundary layer heights from ceilometer data

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Ceilometers are instruments to measure cloud base heights by means of a low power lidar. These instruments are optimized to detect the strong return signal of the laser pulse from the cloud base. Nevertheless it is possible to identify the boundary layer and structures therein. Since the instrument works continuously it might be a powerful instrument to understand the diurnal course of the boundary layer.

Modern ceilometers deliver the backscatter coefficient as a function of height. Within the boundary layer concentrations of aerosols and relative humidity are higher than in the free atmosphere above. Thus the backscatter coefficient drops at the top of the boundary layer and a gradient detection algorithm finds the top of the boundary layer. In the presence of clouds signals become very noisy and smoothing techniques have to be applied. Methods for the detection of the height of boundary layer and residual layer are presented. Abilities and limits of the technique are discussed.