

Determination of mixing-layer height by ground-based remote sensing

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Different ground-based remote sensing methods are today available to profile the boundary-layer and to derive such information as vertical layering and mixing-layer height (MLH).

A SODAR detects the vertical profile of temperature fluctuations and gradients. By an algorithm which uses the acoustic backscatter intensity and the variance of the vertical velocity component estimates of the MLH can be made.

A ceilometer detects the vertical distribution of aerosol particles and water droplets. By an algorithm which uses the vertical gradient of the optical backscatter intensity estimates of the MLH can be made.

A RASS directly detects the vertical temperature profile and therefore allows for a direct measurement of MLH by analysing the vertical temperature gradient.

In this presentation MLH determination from all three instruments will be compared and a few applications in the fields of air quality and wind energy will be presented. Limitations and restrictions of the different methods will be discussed.