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Comparison of the mixing layer height by sodar and ceilometer

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The mixing layer height is one of the most important quantities of the atmospheric boundary layer, which is required in dispersion calculations. The mixing height can be determined by a wide variety of remote sensing profilers such as sodar, ceilometers, RASS, Radiometers, and clear-air radars, as well as by in situ measurements (radiosounding, tethersonde and tower). Alternatively, flux–profiles relationship or simple models - usually with only a few parameters as input values, may be used. The mixing height measured may be determined by sodar as the level of most intense backscattered signal. As for lidars and ceilometers, the mixing layer height is retrieved from the maxima of the aerosol cross section gradient.
Determining the mixing height with an automated procedure is not straightforward in both cases, because a wide range of scenarios may occur, making it difficult to produce a universal calibration of the retrieval algorithms.
In this presentation an intercomparison between the sodar and ceilometer mixing height is presented, in order to check the reliability of the techniques under different conditions. This is particularly recommended since these methods use different quantities as proxies for the mixing height estimation. The analysis is based on a set of data collected at the ISAC experimental facility in Rome during summer 2008 and winter 2008/2009.
We find a general good agreement between sodar and ceilometer data. For further comparison, we finally used a simple one dimensional model that needs the turbulence data as input for the mixing height estimation.