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Detection of aerosol layers with ceilometers

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The characterisation of the planetary boundary layer is one of the questions which might be answered partially with ceilometers. Aerosol layers must be first detected and than interpreted as mixed and residual layers. Clouds, growing processes of particles or smoke plumes are some examples of additional layers which may preclude a positive solution or at least constrains the interpretation. Several algorithms have been suggested to evaluate data of the existing instruments. At the same time processing power and memory of embedded computers are grown and facilitate the operation of complex algorithms and larger datasets even inside an instrument.
None of the existing ceilometers is designed as a mixed depth meter in the first place – if such a thing exists at all. The Jenoptik CHM15k ceilometer uses a narrow bandwidth solid state laser source and an advanced detection system to find even very thin cirrus clouds during day and night time. This high sensitivity for aerosols makes it an ideal instrument for the detection of aerosol layers. The progress in the mixed layer depth algorithm development will be shown in this contribution.