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Long-term calibration of ceilometer Jenoptik CHM 15k using an automatic and non-supervised Rayleight fit

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Abstract

Active remote sensing has been consolidated as a very useful tool to study the atmosphere. Particularly, the use of lidar systems has been mainly extended for determining aerosol optical and microphysical properties, whereas ceilometers has been used mainly for detecting cloud base height due to their lower signal-to-noise ratio compared to lidar systems. However, the potential spatial distribution of ceilometers is considerably higher than lidars as well as their temporal resolution. Thus, the calibration of ceilometers for determining aerosol optical properties would help to improve the spatial and temporal resolution already reached using lidar systems. This work shows a methodology for the calibration of a ceilometer Jenoptik CHM 15k that consists on applying a Rayleigh fit in an automatic and non supervised way to 1-hour mean profiles during day- and night-time. Results show the calibration factors retrieved with a 1.5 year measurement database performed at the Granada EARLINET station (Granada, Spain). The monthly mean calibration factor is stable during the study period not showing a seasonal dependence and obtaining a mean and standard deviation for the calibration factor of 18.8$\pm$2.2 km3•sr.

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