
Long-term assessment of Doppler lidars for an operational use in a future network

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Abstract

Fibre-optic based Doppler wind lidars (DL) are widely used for both meteorological research and in the wind energy sector. These compact systems are able to obtain vertical profiles of the mean horizontal wind vector from the atmospheric boundary layer as well as from optically thin cloud layers in the free troposphere with high spatio-temporal resolution. It is therefore likely that especially short-term forecasting would benefit from assimilating their data. However, their potential is currently not yet employed operationally. Here, we present results from a long-term assessment of DLs at Lindenberg, starting in 2012, in the context of the DWD's effort to evaluate ground-based remote sensing systems for their operational readiness, called "Pilotstation". The tests focus on aspects such as technical reliability, uncertainty characterization, scanning strategies, and the verification of the retrieved mean wind speed and direction with the help of independent reference data from a 482 MHz radar wind profiler and 6-hourly radiosonde ascents. Through this assessment, we developed a standardized retrieval assuring a high quality Level-2 product, which is compatible with the EUMETNET's E-PROFILE observation program. Further, a software implementation of the retrieval is freely accessible and continuously improved to account for different scanning strategies and additional products.

Keywords: Doppler lidar, long, term assessment, operational network

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