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Ceilometer Firmware Intercomparison at the Met Office, UK

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Ceilometers are a type of low cost lidar that are used mainly for reporting cloud base height. The Met Office has been looking into the usefulness of the vertical profiles of attenuated backscatter for many applications including forecasting, monitoring, model validation and data assimilation.

The Met Office UK network of ceilometers includes both Vaisala CL31 instruments and Lufft (formerly Jenoptik) Nimbus (CHM15k) instruments. These instruments diagnose cloud base height (CBH) while delivering attenuated backscatter vertical profiles. The manufacturer software delivered with each instrument is known as firmware and it determines how the signal is reported to the user. In close collaboration with the manufacturers of these instruments, the Met Office has been trialling different firmware versions in order to understand how the firmware affects CBH and the attenuated backscatter profiles.

The Ceilometer Firmware Intercomparison (CeFIn) took place over a six month period starting in September 2016. Three Vaisala and two Lufft instruments were used to take observations at the same location, at the Met Office atmospheric observatory in Exeter, UK. The long time period allowed the instruments to sample a range of weather phenomena. We will present the differences between the CBH measured using different firmware and the profiles of attenuated backscatter both qualitatively and quantitatively. Termination hood measurements were also taken and used to correct the profile data for CL31 instruments. Calibration was also performed on the instruments using the liquid cloud calibration method (O'Connor, 2004).