Enhancing Finland's ceilometer network

Authors

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Abstract

The Finnish Meteorological Institute (FMI) ceilometer network now has about 40 ceilometer stations across Finland that report the full vertical profile of attenuated backscatter profiles, which are processed and displayed in real time on a dedicated website (ceilometer.fmi.fi). This data is also forwarded to E-PROFILE, part of the surface observation network in Europe coordinated by EUMETNET.

The primary objective of ceilometers is for measuring cloud base, but, with the improvements in the sensitivity of the ceilometers now available, it also possible to diagnose the presence of aerosol, precipitation, and differentiate between liquid and ice clouds. For Finland, one important achievement of the ceilometer network is the reliable identification of supercooled liquid layers. This has led to the development of an 'icing' product which highlights the likelihood of icing (e.g. for trees, masts, aircraft) and has been used to evaluate the icing forecast generated by FMI in conjunction with in-situ measurements of ice accretion. Other products are also being developed (such as fog forecasts) for re
al time generation and display.

Recently, the FMI ceilometer network has been augmented with 5 ceilometers having depolarisation capability (Vaisala CL61). The performance is such that episodes of dust, pollen and smoke are readily identifiable at the nominal instrument resolution without further averaging. In addition, it is also possible to distinguish between solid precipitation (ice and snow) and freezing rain, which has proved extremely useful for aviation forecasters.