



An Examination of the Quality of Wind Observations with Smartphones

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Over the last years, the number of devices connected to the internet has increased significantly making it possible for internal and external sensors to communicate via the internet, opening up many possibilities for additional data for use in the atmospheric sciences. Vaavud has manufactured small anemometer devices which can measure wind speed and wind direction when connected to a smartphone. This work examines the quality of such crowdsourced Handheld Wind Observations (HWO). In order to examine the quality of the HWO, multiple idealised measurement sessions were performed at different sites in different atmospheric conditions. In these sessions, a high-precision ultrasonic anemometer was installed to work as a reference measurement. The HWO are extrapolated to 10 m in order to compare these to the reference observations. This allows us to examine the effect of stability correction in the surface layer and the quality of height extrapolated HWO. The height extrapolation is done using the logarithmic wind profile law with and without stability correction. Furthermore, this study examines the optimal ways of using traditional observations and numerical models to validate HWO. In order to do so, a series of numerical reanalysis have been run for a period of 5 months to quantise the effect of including crowdsourced HWO in a traditional observation dataset.