Evaluating the quality and usability of crowdsourced weather data

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In April 2015 the Royal Netherlands Meteorological Institute (KNMI) launched the Weather Observations Website (WOW-NL, https://wow.knmi.nl/) in the Netherlands in cooperation with the UK Met Office, who launched a similar WOW-UK website in 2011. WOW-NL functions as a platform to collect weather data that is measured by amateurs or organizations who own an automatic weather station. Such data can be used to increase the spatial and temporal resolution of existing observation networks. This can be meaningful for better understanding of e.g. urban climate (urban heat islands) and the occurrence of extreme meteorological events.

In November 2015 the number of Dutch participants of WOW-NL was approximately 250. The following meteorological parameters are uploaded to the website every 10 minutes: air temperature, air pressure, rainfall rate, humidity, wind speed and wind direction. To get an idea about the location and environment at which the weather stations are placed, participants are asked to rate their station based on exposure, type of devices used and the level of urbanization. They can also specify the elevation and add a short description of the equipment that is used.

This study examines the quality of the crowd-sourced weather data by using interpolated weather data that is measured at official weather stations that are operated by KNMI. Measurements at amateur stations are compared with the interpolated measurements and differences are explained using the metadata that the participants specified. A number of days is selected where interesting meteorological situations occurred, such as extremely hot weather, cold fronts, rain fronts or heavy winds. Based on this, recommendations are presented about possible applications of crowd-sourced weather data with respect to the quality level.