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# Usage of crowd-sourced meteorological car data for new real time road weather forecast

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## Abstract

New mobility approaches like autonomous driving require high precision weather solutions, such as real time weather maps and warnings. The development of such demanding products is becoming possible due to different emerging technologies like Internet of Things, 5G mobile networks and the growing availability of high resolved meteorological data from automobiles. So, the Flotten-Wetter-Karte (FloWKar) project, a joint work of the German Meteorological Service (DWD) and the car manufacturer AUDI AG, explores how environmental data from car sensors, can be used within DWD's forecast system, respecting data protection regulations. As the standard assimilation systems cannot achieve the needed exceptionally fast assimilation cycles, an ultra-rapid data assimilation (URDA) method is developed. URDA achieves an update rate of the order of minutes, using only a reduced version of the state variables in an existing model forecast and different kind of observation data available. However, the meteorological data collected by moving vehicles suffer from errors and an almost real time improvement is needed. Thus, a series of quality control and bias correction algorithms has been built for the correction of the raw observations, employing among others artificial intelligence techniques. The corrected measured variables of the mass-produced vehicle-based sensors match well with the 'ground truth' and real time maps can be produced after the assimilation of the high resolved project data.

**Keywords:** crowdsourcing, ultra, rapid DA, AI approaches

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