



## **Mobile thermal and friction mapping: New means for the verification of road weather forecasts**

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Road slipperiness is a common notorious phenomenon in wintertime Finland. The main road network of the country covers hundreds of road weather stations alongside roads to measure the road condition and the surface temperature. Traditionally, these instruments are planted into the asphalt. Novelty remote instruments (e.g. Vaisala DSC/DST 111) have been developed utilising optical sensor technology to determine the road surface temperature, as well as the friction and the thickness of potential water, ice or snow layers on the surface. Such devices can conveniently be attached to vehicles, enabling mobile measurements.

A three-year national collaborative research project, ColdSpots (presented under ECAM/AM1), was initiated to study the causes of, and distinguish regions (i.e. road stretches) susceptible for slipperiness, as well as to refine and further develop available road weather forecasting tools. Measurements based on the new mobile thermal and friction mapping instruments were utilised for the analysis of the present state of the underlying road surface and, second, for the verification of the newly developed point-wise road weather forecast model output. Road stretches along two major highways in Southern Finland were selected as test sites much because they are occupied with a dense network of traditional road weather stations. These stations were used as reference data in the experiments. However, the spatial representativeness of fixed roadside observations is, even at best, very sparse compared to continuous mobile measurements. Contradictory, the remote mobile instruments can provide only instantaneous observations at a single site (unless cruising vehicles with instrumentation are many). The surface temperature and friction can vary drastically even within very

short distances depending much on the prevailing weather situation. In addition, much of the observed variations are caused by environmental circumstances like topography, nearness of waters, openness of the road etc. Verification statistics often strongly reflect the origin of the observations (remote, fixed) and, hence, it is necessary to take this into consideration when depicting the verification results.