Manuscript:

Road surface temperature forecasting for gritting routes

Due to local effects road surface temperatures can differ several degrees over a very short distance. In order to get more insight in the local temperature behaviour of a road and to develop safer gritting routes, Meteogroup has developed a system for route based temperature forecasting.

Our standard road model is able to create a forecast for one specific location. From infrared measurements, we know that large local differences in road surface temperature can exist on a route. Differences can be up to 5 degrees Celsius over a distance of several hundreds of meters. Based on these measurements, the idea came up to develop a system that forecasts road surface temperatures and conditions for an entire route: route based forecasting. The route is split up into sections with equal properties. For each road section a surface temperature and condition will be calculated.

The main factors that influence the road surface temperature are modelled in this forecasting system:
1. The local weather conditions: temperature, dew point, wind, precipitation, weather type, cloudiness.
2. The sky view: a very sheltered place will receive less radiation during daytime and will emit less radiation during nighttime. For a very open spot, the effects are reversed.
3. The solar view: a road section with trees on the southern side, will receive less solar radiation during daytime than a section without trees on the southern side.

The route based forecast shows, by means of a Google Maps presentation, which sections will be slippery at what time during the coming night. The final goal of this type of forecast, is to make dynamical gritting possible: a variable salt amount and a different gritting route. This will contribute to safety on the roads (colder spots will be treated earlier) and it is also financially interesting (less salt necessary and fewer kilometers to drive).

Autohors:

Msc. Ingeborg SMEDING-ZUURENDONK
Msc. Marcel WOKKE
Msc. Jelle WISSE

Biographical note:

Authors are all meteorological researchers from the Meteorological Research and Development (MRD) section of Meteogroup based in Wageningen, Netherlands. Authors specialize in research and management of all road weather modeling, network forecasting and Model Output Statistics weather forecasting for all major European countries.