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**PROCEEDINGS OF THE 20TH SIRWEC CONFERENCE,
DRUSKININKAI, LITHUANIA (14-16TH JUNE 2022)**

ROAD WEATHER FORECASTING SYSTEMS IN CZECH REPUBLIC

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Summary

The forecast of road surface temperature is crucial for winter road maintenance and safety on frozen roads. We present results of two forecasting systems for the main Prague roads – ICEWARN and the main Czech highways – FROST. Both systems are based on the FORTe forecasting model and forecast road surface temperature and condition along a given road. Both systems use measurements from road weather stations, numerical weather prediction from ALADIN model and utilize detailed topography (parameters of buildings, woods, orography etc.), which can influence direct solar radiation. The innovation of the FROST system is the application of time-extrapolated satellite cloud measurements as a forecast of cloud cover for the first three hours.

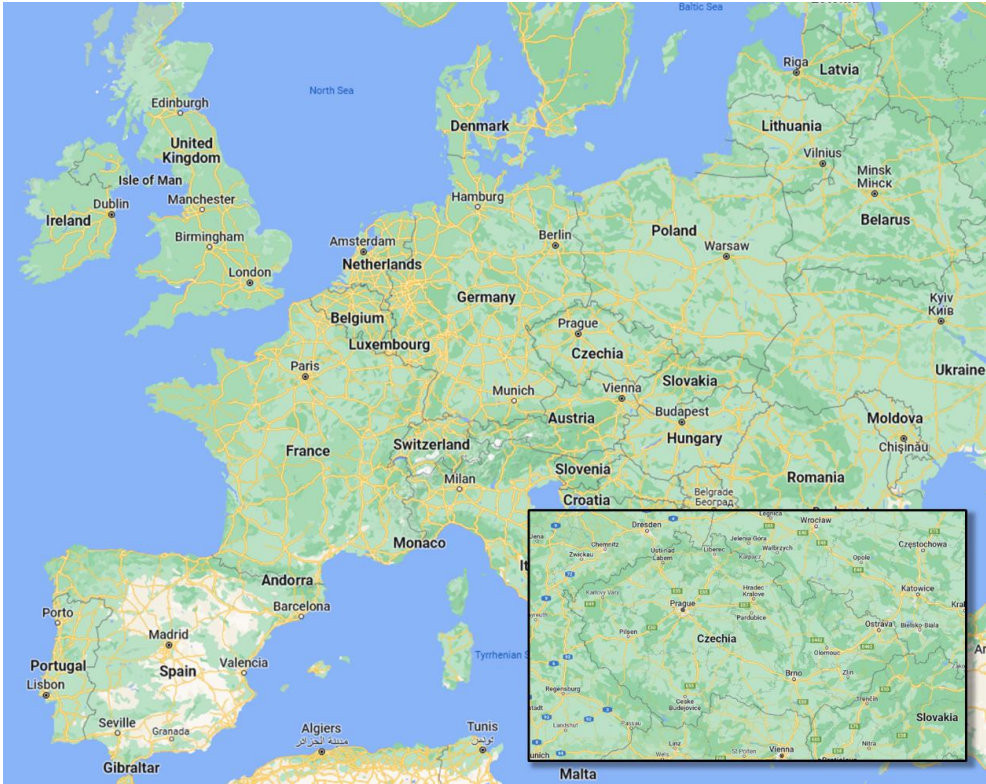


Fig 1: Map of Central Europe with zoomed Czech Republic (Czechia). Map source: maps.google.com.

ICEWARN

Forecasting system ICEWARN produces linearly continuous forecast for the main Prague roads with winter maintenance priority. Road weather data are provided by Technical Administration of Roadways of the Capital of Prague and Road and Motorway Directorate of the Czech Republic. The roads were selected to have at least two road weather stations and data measured at stations located close to a given road were interpolated into this road (see fig. 2). The road was divided into points with measurements and points without measurements where the measured data were interpolated. The ALADIN forecasts are interpolated to each selected point on a given road.

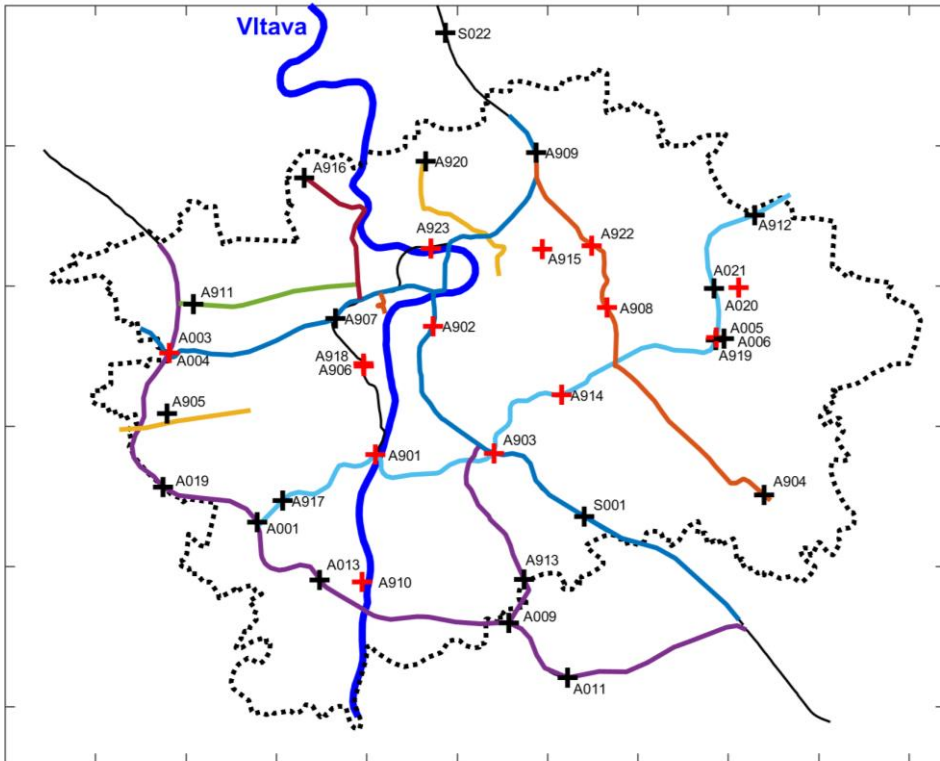


Fig 2: Selected Prague roads (colour lines, thick blue line is Vltava river) for ICEWARN computation with road weather stations marked. Red crosses represent bridges.

FROST

Forecasting system FROST is going to produce linearly continuous forecast for Czech highways. The system, which is very similar to ICEWARN, uses time extrapolated satellite cloud measurements for cloud cover forecast. When verifying the results of the ICEWARN forecasts, we found that the quality of the cloud cover forecast strongly affects the resulting road surface temperature. The ALADIN model sometimes underestimates low clouds or fog, which results in excessively high afternoon temperatures. This

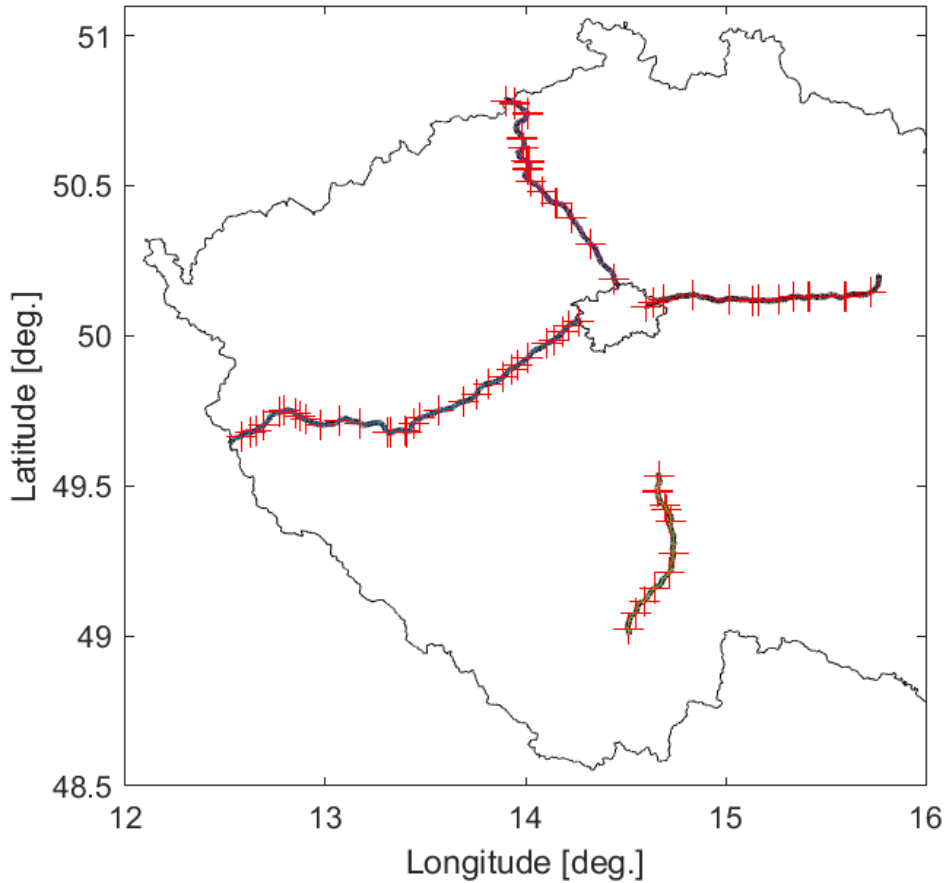


Fig 3: Selected Czech highways (black lines) for FROST computation with marked road weather stations (red crosses).

is a reason why we try to utilize the time-extrapolation of cloud cover for the first three hours of forecasts. The detailed description is in the article Bližňák et al (2022 – this issue).

Acknowledgements

This work was supported by the Technology Agency of the Czech Republic under the CK01000048 project "Forecasting system of road surface condition and temperature of the Czech highways". Road weather data was provided by Technical Administration of Roadways of the Capital of Prague

and Road and Motorway Directorate of the Czech Republic. ALADIN model data was kindly provided by the Czech Hydrometeorological Institute.