

THE OVERVIEW OF ROAD FORECAST ACTIVITIES AT SLOVAK HYDROMETEOROLOGICAL INSTITUTE

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The road forecasts at SHMÚ are based on the chain of operationally exploited physical and statistical models. The methodologies takes into account various time and spatial scales of meteorological phenomenon responsible for high impact weather. The forecast longer than 12h is based on products from local area model ALADIN with spatial resolution 4.5km and 63 vertical levels. Model suite is computed 4 times a day and it includes surface assimilation of local observations. The forecast up to 12h is based on nowcasting and high resolution analysis system INCA. It corrects the products of model ALADIN using all available local surface observations of temperature, humidity, wind, precipitation, cloudiness and solar radiation using statistical-empirical approach. Corrected forecasts are then used as an input to METRo model. We further postprocess road forecasts using Kalman filter in order to reduce systematic errors.

In order to compute whole forecast chain on time, we must exploit high performance computing systems. Currently we are using two cluster with 10 and 12 computing nodes based on PowerPC architecture.

Our activities related to road state forecasting (RF) started in 2012. The first operational products from model METRo were produced during winter 2012/2013 for the National Highway Company (NHC) together with the companies BOSCHUNG Mecatronic A.G., Nope a.s. and Spinet a.s. (Slovak VAISALA partner).

The RF activities started in 2006 when the first impulse was given by project INCA-CE. Further improvement was implementation of the project METRoSTAT under Eureka-Eurostars initiative. It started in 2012. We investigate solar flux blocking by the terrain using high resolution DEM. This development was made available to whole community and it was implemented into official version of model METRo.

The road forecast post processing is based in Kalman filter approach used to remove biases of the 2m temperature in locations of road weather stations.

5.4 Scheme of Data flow of roadcast system

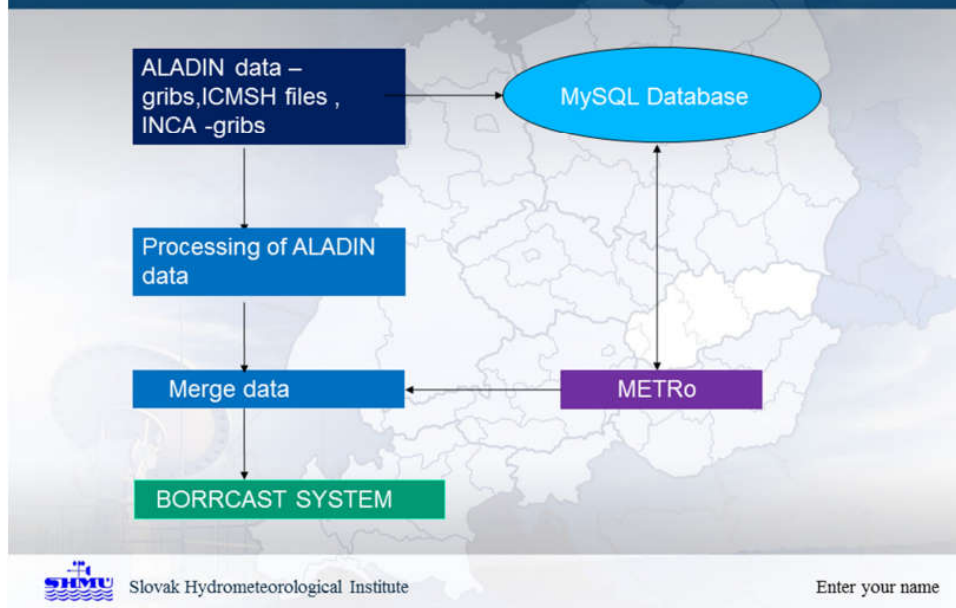


Fig. 1. Operational Expert System.

SURFEX model is currently being implemented to analyse and nowcast surface parameters (surface temperature, snow cover, deep soil temperature) that are relevant for improvement of METRo model products. We are also preparing the upgrade of high performance computing system in order to increase available CPU performance 30-40 times in order to allow assimilation of all local radar data and move to spatial resolution approx. 2.5km with 90 levels and mode to rapid update cycle mode (model ALADIN will be computed every 1-3 hours). These steps will allow us to significantly improve quality of road forecast in near future.

References:

1. Habrovský, R., Tarjáni, V., Bujňák, R., Vivoda, J., **2015** Application of a road weather forecast model at Slovak Hydrometeorological Institute *Meteorological Journal (Slovenský hydrometeorologický ústav)*, Vol. 18, 9-14.