Ensemble forecast for road weather in France

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During winter, snow or ice presence on the road might have serious consequences on road traffic and security. For example, in big urban areas several centimetres of snow are sufficient to stop totally road traffic and limit consequently economical activity. So this is a major problem and consequently many efforts were done in Météo-France for several years to develop decision-making tools for road management in winter.

As an input for these decision-making tools, Météo-France uses in an operational way specific numerical road models (the ISBA-Route road model and the ISBA-Route/CROCUS road model including an explicit snow scheme) which permit to simulate the behaviour of a road under the influence of atmospheric conditions and the behaviour of the snow deposited on the road and its characteristics (height, density, liquid water content,. . .). Since 2012, road models are forced by human expertised atmospheric forecast instead of a direct coupling with numerical weather prediction models. This systems, called PEIR (Expertised Predictions for ISBA-Route), is the basis of road conditions forecasting products for french road managers. It is used to predict road surface temperature, water and ice content and to provide additional information concerning snow events: snow occurrence, height and type (dry, moist, wet, frozen) on road at the France scale.

Since the begining of operational road weather forecast in Météo-France, all the products were based on deterministic forecats, however since 2018/2019 winter, a new approach, based on ensemble forecast, was implemented . The ISBA-Route road model is forced by all members of the convection-permitting ensemble prediction system AROME-EPS (2.5-km grid) to produce an ensemble of road forecast (road surface temperature, water and ice road content) on a 2.5 km grid. Specific algorithms for post-processing of the road surface fields are currently tested to develop specific operational warning systems for road managers based on probability of occurence of severe winter events (ice presence on road for example). Concerning snow, the ensemble system for the ISBA-Route/CROCUS model was not operationnaly implemented, but some tests were performed for significant snow events occuring in France.

After a reminder concerning current road weather forecasts, first results concerning this new road weather forecast system based on an ensemble approach will be presented here, with some way of improvement to develop specific products tailored to road managers end-users.