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Model performance of the 2 m temperature forecasts considering the demands of energy supply

I. Bonta (1), T. Hirsch (2), A. Mesterhazy (3)

(1)Hungarian Meteorological Service (HMS), Budapest, Hungary

bonta.i@met.hu

(2)Hungarian Meteorological Service (HMS), Budapest, Hungary

hirsch.t@met.hu

At HMS, besides the media and transportation, the most important clients are the energy suppliers. Natural gas has an extremely high portion (40 %) in the Hungarian energy balance. The change of natural gas consumption during the winter period strongly depends on air temperature, therefore the reliably predicted temperatures play an important role.

As all forecasters know, the weak point of the models is inversion situation during winter. According to our regular verification, in inversion situations the models very often are not able to capture the lower cloudiness and fog leading to an overprediction of diurnal temperature (underestimation of minimum and overestimation of maximum temperature). The different types of inversion situation can be classified taking into account the predictability of the situation. In persistent inversion situations the forecasters are able to improve on the model results significantly, because it is easy to know the behaviour of the models day by day. The most complicated situations connected with inversion are those when the inversion develops unexpectedly from one day to the other and it is uncertain, whether the solar radiation or the fresh wind are able to break up the relatively thin inversion or not. According to our investigation, it seems that even if the models are able to capture lower cloudiness or fog, the breaking of the inversion is too early in the model comparing to the reality. Summing up the inversion situations it can be said that in these cases, the model results need to be modified by the forecasters.

Regarding temperature forecasts for medium range, the ensemble mean of ECMWF and NCEP model were compared. According to our investigations, the ECMWF model produces better results for all forecast ranges. Taking into account only the large errors, the advantage of the ECMWF model is even more remarkable. Considering the comparison of the deterministic model and the ensemble mean of ECMWF, it can be said that the ensemble mean has higher skill after day four to five.