Using ECMWF-forecasts (UEF2016)
ECMWF, Reading, UK
06 - 09 June 2016

Deutscher Wetterdienst
Wetter und Klima aus einer Hand

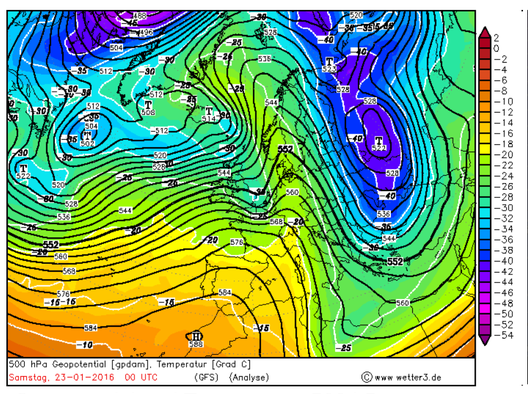
Progress in predicting freezing rain over Central Europe

Thomas Schumann, Senior Forecaster E-Mail: thomas.schumann@dwd.de

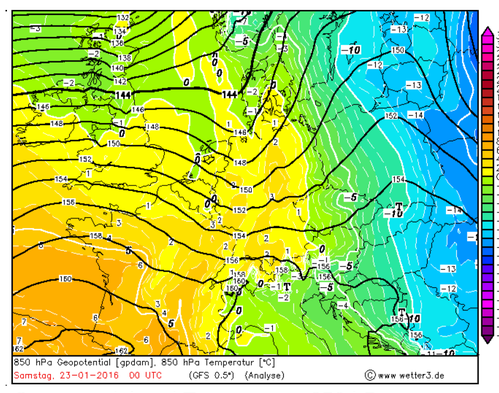
On 8th March 2016 an upgrade of the IFS has been implemented (cycle 41r2). Users got the opportunity to test the performance of the "new" data set well in advance. All meteorological parameters in ecCharts were available in the at this time current model version as well as in the new cycle. Therefore Users enabled to apply the operational model version and the cycle 41r2 on their weather cases of interest.

The winter 2015/2016 was extremely mild, real severe and high-impact weather was quite rare. One of these few cases during the last winter was the freezing rain event, started late evening of the 22th January. This situation caused major traffic disruptions, even the rail network was affected. A precious prediction of freezing rain as far as possible in advance is of vital importance for economy and general public. By improving of the model physics in particular of the lower troposphere and the introduction of tailored surface weather parameters such as precipitation type and -rate these predictions has been made some progress during the last years. MOS as a method of calibration improved the forecast in orographic complex regions. Results of the forecasts of this event by the at this time current model version, the cycle 41r2 and MOS will be presented and discussed.

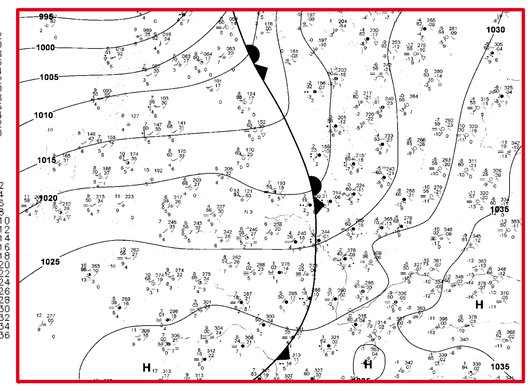
Synoptic situation at 23 Jan 2016, 00 UTC



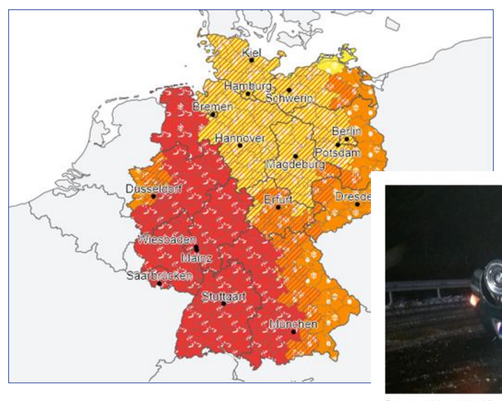
Geopotential and Temperature 500 hPa



Geopotential and Temperature 850 hPa



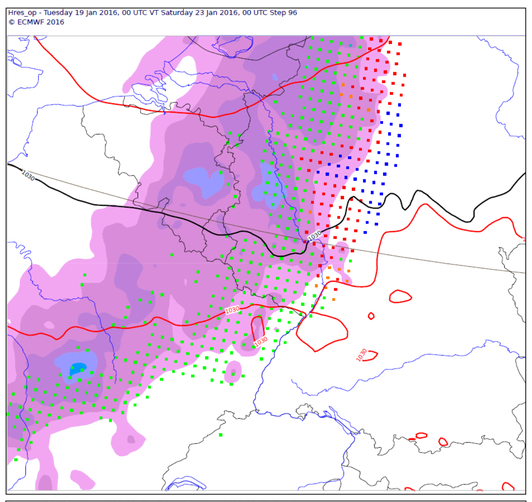
MSLP, section Central- and W-Europe

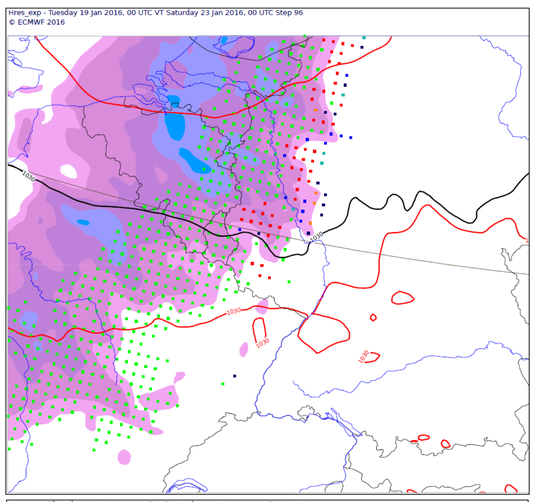


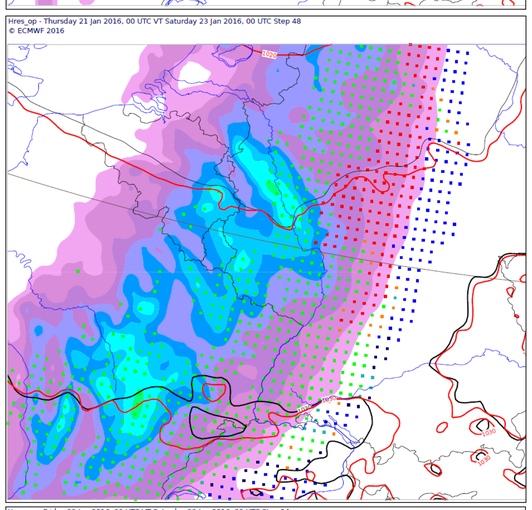
Warning situation, 22 Jan, 8:30 CET
Red: Freezing rain (severe), orange: snow, Hatched: Severe weather prewarning

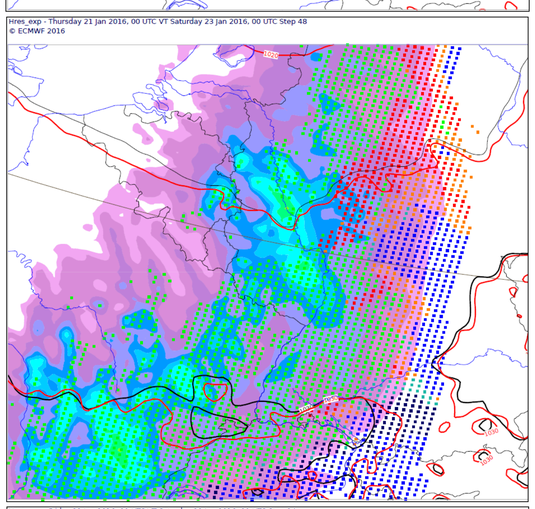
Tumbled car on the highway A5, Hesse (Courtesy of Bild TV News Hesse)

Prediction of the event



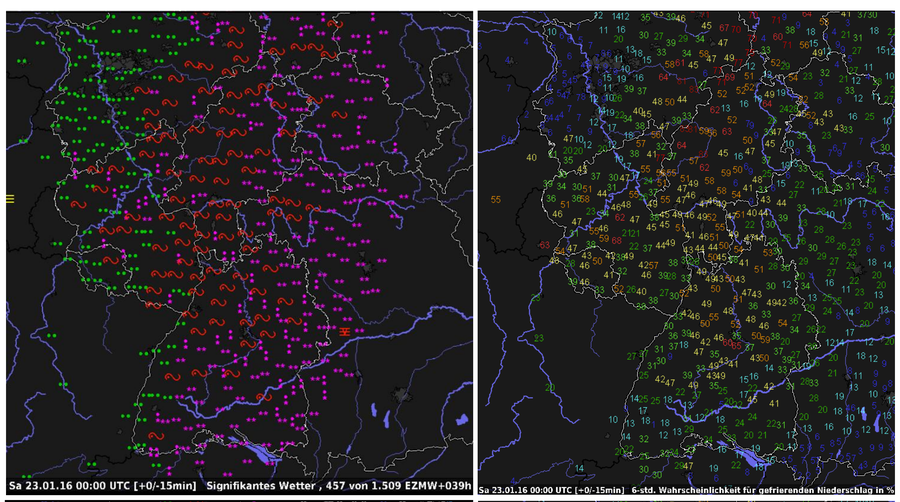




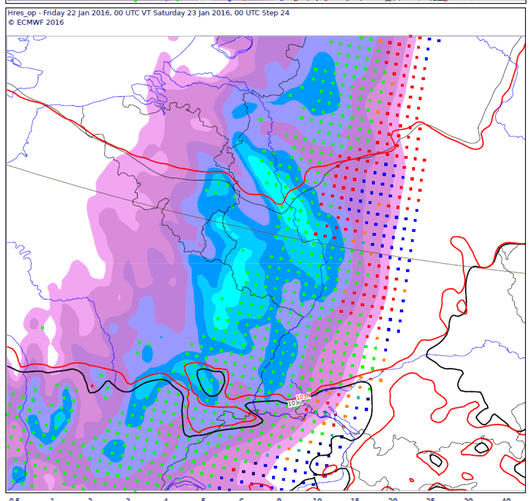


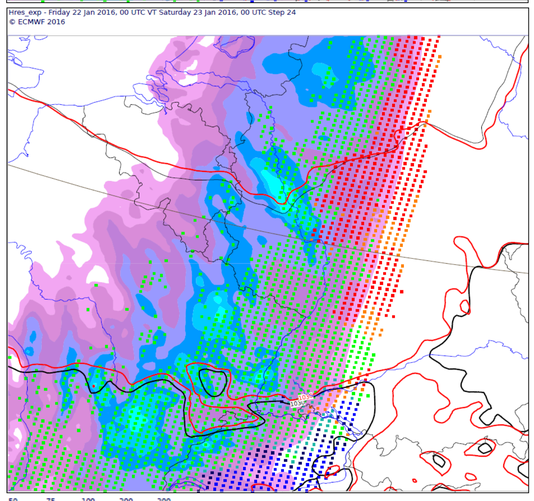
The transition of thy synoptic pattern to a zonal and slightly anticyclonal regime has been well predicted already in the medium range. The intensity of appraching fronts as well as the precip amount and type was quite difficult to estimate well in advance. EFI/SOT and other probabilistic tools were not suitable to catch this event because freezing rain is a mostly combination of some non-severe parameters.
Therefore the provision of the precipitation type as a weather parameter is hightly appreciated and a step forward improving forecasts of surface weather parameters and thus of severe weather. In this case the onset of the event was better caught by the operationel model, but for sea level pressure 41r2 perfomed better; deviations are rather small.
Both versions predicted the transition from freezing rain to rain without icing too fast. MOS as a statistical method of the downscaling of the model output has been given a clear indication that icing conditions will last longer than initially expected. Because of the weak sea level pressure gradient cold and frosty air in valleys and bassins has been kept into the early morning of the 23 January.

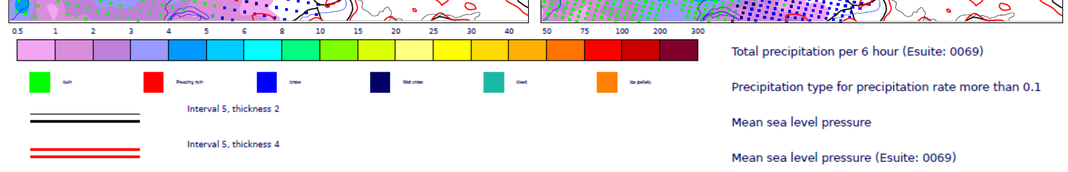
Even the 41r2 HRES is not able to dissolve complex orographic features close to reality. In this context MOS is a way to improve the final forecast by a calibration based on long-time statistics.



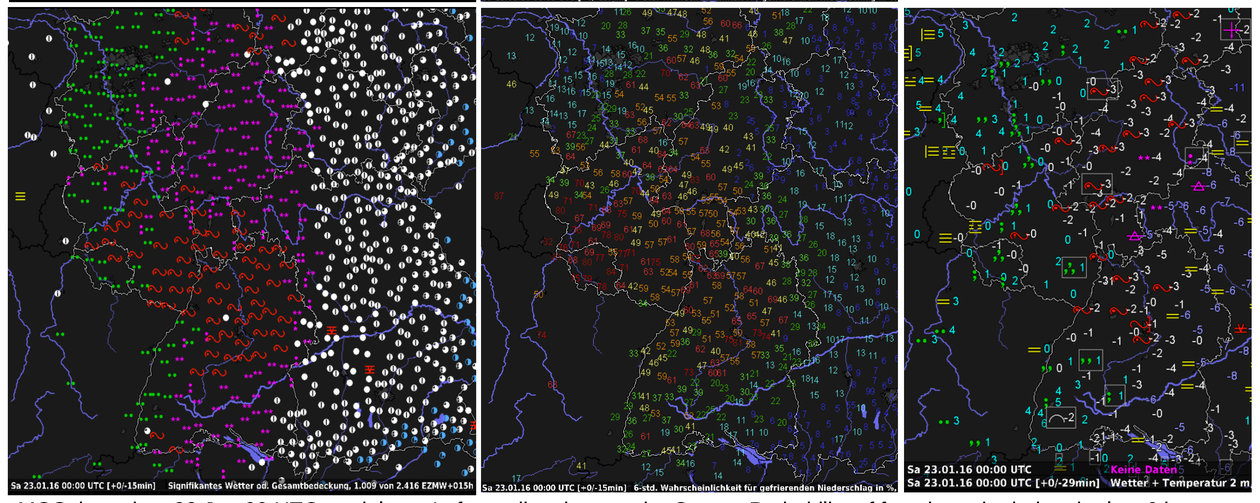
MOS, based on 21 Jan 00 UTC
Left: predicted ww-code
Right: Probability of freezing rain during the last 6 hours







Sea level pressure, 6-hr total precip and type, 19 Jan, 00+96 H (top), 21 Jan, 00+48 H (middle), 22 Jan, 00+24 H (bottom). Left part: Operational model, right part: 41 r2



MOS, based on 22 Jan 00 UTC model run. Left: predicted ww-code. Center: Probability of freezing rain during the last 6 hours. Right part: Observed weather and 2m-temperature at 23 Jan, 00 UTC

Finally, the quality of the model reached a level that it became difficult for a newer model cycle to get a real gain of forecast accuracy for complex surface weather parameter.

Thanks to R. Hess and S. Trepte (DWD) for providing the MOS data.

National Forecast and Advisory Centre of DWD
Frankfurter Straße 135, D – 63067 Offenbach