EXPERIENCES FROM OPERATIONAL MEDIUM-RANGE FORECASTING
IN THE DEUTSCHER WETTERDIENST

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1.   MEDIUM- RANGE FORECAST IN THE DEUTSCHER WETTERDIENST

Medium- range weather forecast is made in the Deutscher Wetterdienst since 1979 based on the BKF- model, having been applied at this time. We prefered the more complex ECMWF- model concerning to medium- range forecast, since it was launched at the beginning of the 80's. The BKF- model then took over a role as a back-up-version.

On the 15th of January 1991 the third model generation in the Deutscher Wetterdienst became operational. It works as a model chain consisting at the moment of the Global Model GM for the large scale forecast and the Europe Model EM for the synoptic- and meso-α-scale weather forecast. The Global Model is more or less the T-106 spectral model, which was operational at the European Center until September 1991. Changes have been made in the radiation scheme.

2.   PRACTICE OF MEDIUM- RANGE FORECAST

Our operational medium- range weather forecast is based on the Global Model GM of 00 UTC and on the ECMWF- model of 12 UTC the day before, which are available in the morning.

There is no doubt that basic forecast parameters provided by the model should be treated differently in the short- and in the medium- range. This is because of the increase of the phase speed error of the short waves, while forecasts of the movements of the long waves are fairly reliable. Text formulations with high resolution as appropriate in the short- range forecasting are no more reasonable in the medium- range. Instead of this one should forecast the character of weather belonging to a certain type of circulation.

The daily estimation of how the skill of the latest forecast may be is done subjectively by the experts. In general we use both the ECMWF and the own Global Model output for our daily forecast. Considering the large day by day variation of the skill of medium- range forecast the time lag of 12 hours between the two models should be in general without any importance.

In practice we think that consistency or coincidence with the model run of the day before is an important measure for estmating the predictive skill due to the lack of other or better information. Especially in the beginning of the medium-

range it is temporarily possible to estimate the predictive skill by means of consistency check and to choose the better model.

3.   INTERPRETATION AND VERIFICATION

A statistical interpretation scheme for both the ECMWF- model and the Global Model is available for the area of eastern Germany since half a year. This scheme has been developed in the meteorolgical service of the former GDR and it will be made available also for the western part of Germany.

The basic statistic idea for this interpretation scheme was classification, that means real-time searching of the n most analogous cases in a historical data archive.

The following weather parameter are available
 - minimum and maximum temperature
 - precipitation amount
 - relative duration of sunshine
 - surface winddirection and -speed
 - probability of thunderstorm and fog.

Verifying statistics in our departement is still based on a subjectiv method. There is a decision made afterwards, whether the numerical forecast is 'useful' or 'not useful'. 'Useful' means a satisfying coincidence of the forecast with the varifying analysis concerning Central Europe. The only objective aspect is, that we demand the error of the temperature forecast in 850 hpa for the point 50n/ 10e shall not be more than 5K.
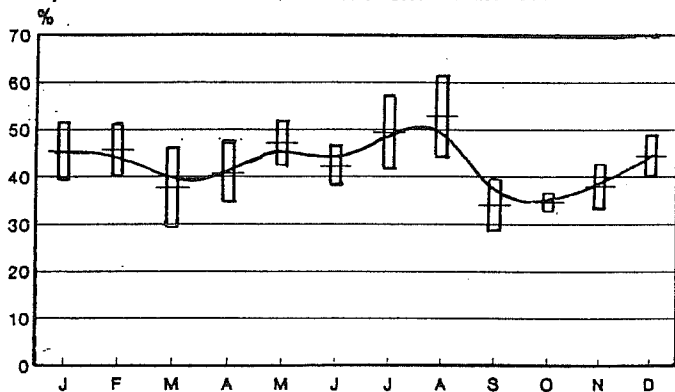

Fig.1 Monthly mean usefulness with 95% interval of confidence
      ECMWF- model: averaged D4,D5,D6 forecasts January1987- September 1991

Fig.1 shows the monthly mean usefulness of the ECMWF model for the period 1987 until 1991. You see a seasonal dependance of the mean usefulness with high values in winter and summer and low values in spring and autumn. Statistically best prooved is the decrease of usefulness in autumn because of the small 95% interval of confidence.

A systematic verification of medium-range weather forecast is projected in the beginning of 1992. The forecast parameters which will be varyfied then are the standard parameters the user normally wants to know: temperature,winddirection and -speed, relative duration of sunshine and probability of precipitation.