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1. INTRODUCTION

In a near future, with new satellite-based measurements, next generation radars, remote sensing instruments, regional and fine scale numerical models, numerical model prediction ensembles for a multi-approach model, the meteorological data flux will continue to considerably increase on the forecaster's workstation. So the role and the tools of the forecasters have to be redefined.

In this paper we will first present tools used nowadays in Météo-France forecasting centers. Then we will enhance how forecasters will need to rely on more sophisticated automation/decision system to deal with all the available data.

2. DESCRIPTION OF METEO-FRANCE TOOLS

In this part we will present tools used in Météo-France from the more sophisticated to the less.

2.1 SYNERGIE

SYNERGIE has been under development since 1989, and is now used in more than 50 locations. A major purpose of this tool is to integrate all the data into the same system in order to fasten the extraction of information and allow the forecaster to use and/or combine data at any step of his work : understanding, analysis, forecasting, as well as production. SYNERGIE provides the forecaster with an integrated, friendly, multi-window and evolutive environment, which allows him to handle and interact with any kind of data (satellite and radar images, conventional observations, numerical weather prediction models, object -BUFR from WAFS, …-). Its high level of tailorability enables any functional configuration.

SYNERGIE has been running on Linux PC operationally in all Météo-France centers since 1 October 2005.

It has been developed as a toolbox tailored and designed for forecasters. It aims a perennial development and implementation of integrated tool for decision-helping and interactive production in the Météo-France national and regional centers. Production tools have been developed to produce surface analysis, SIGWX charts for aviation, Tropical cyclone track forecast. This last module is used in Météo-France oversea territories. Figure 1 shows the main menu for forecasters.

One of the most used module is the alarm display that can be adapted for a specific forecaster. This tool is very useful to help forecaster to detect and monitor high-impact events.

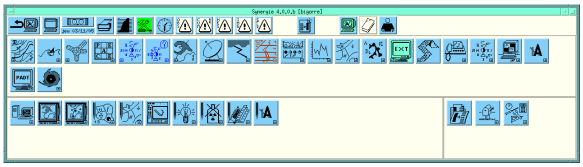

Figure 1: Synergie access

2.2 PREVI-SURVEILLANCE

For local area forecasters, Météo-France has developed a specific tool on Windows PC, with a classic windows operating system. It has been developed to transfer expertise from central forecast office and regional centers to local forecasters and to supply local forecasters with the minimum data set allowing to follow up the meteorological situation.

Data and products are preprocessed with specific superimpositions (for example composite charts of fields from NWP models).

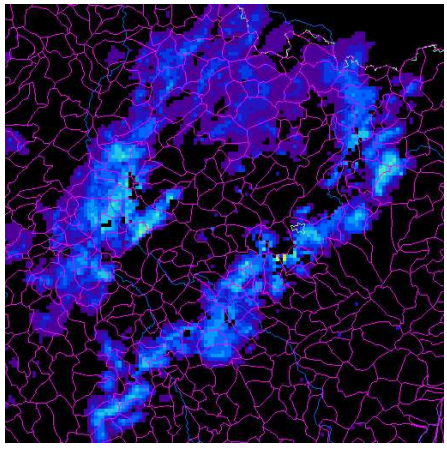

Image from a local radar with rain area
Figure 2

This tool is fitted for local area forecast with specific geographic information. Figure 2.

2.3 Web access

Specific products have been developed for forecasters and are made available through Internet access. We have several examples of web service made available from regional centers to local one, to transfer their expertise. In case of international cooperation specific web service are also developed for other Met services.

3. Future approach

The implementation of a new generation tool in the Météo-France services must be understood as a will of homogenization, optimization and modernization of the operational forecasting offices, in a particular political context : *Météo-France trust in the human expertise and on the added value that it can bring to the final product*. In these conditions, the development and maintenance of a powerful and integrated tool for operational forecasting is critical for helping the forecasters facing the ever-growing amount of raw data to process and synthesize every day.

However, the role of the forecasters will have to be redefined. Probably, the most important tasks of the forecasters will be to monitor and validate numerical model, and to expertise all relevant available data to detect high-impact events for very short range forecast. It is extremely difficult to take into consideration all evidence from the model output along with observational and satellite data and to assess correctly the development of a severe weather system. So, forecasters will need to rely on more sophisticated automation/decision system to deal with all the data available.

The new systems will have to aim both decision helping and interactive production. Therefore the main features can be divided into three categories :

- Standard visualizations and manipulations (zoom, superimposition, animation…): this involves all the features that are available in SYNERGIE.
- Interactive automation/decision tools: diagnostics for the choice of the good NWP scenario to optimize a multi-model approach ; diagnostics to assess the mesoscale models behavior…)
- Interactive Production features They must correspond to specific sub-applications. And enable the forecaster to work in an interactive, (geo)graphical and meteorological environment and fill meteorological databases containing the Météo-France expertise, from which tailored products may be derived for any kind of customers.

The new system will have to address the needs of very various kinds of forecasters (national, regional, local, marine, aviation,...) with specific and adequate sub-application. The whole system has to be built according to a strong constraint of homogeneity and consistency in the developments as well as in the meteorological data generated by the forecasting community on the workstations. We need also systems that can be updated as quick as new products or tools for forecasters are available. This tool must also be able to include geographical information as precise as one found on GIS.

In Météo-France we have started a process, as it has been conducted in Canada in 2004 to define future role of forecaster and its tools for the next 10 years.

4. REFERENCES

Daabeck J., 2005: Overview of meteorological workstation development in Europe, 21st IIPS 85th AMS Annual Meeting, January 14 - 17, 2005 San Diego