

COMPUTER ASSISTED FORECASTING IN THE ALPINE REGION  
INCLUDING ECMWF GUIDANCE

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Extended Abstract

The complex orography of the alpine region represents a great challenge to the forecasting task: in a small area we can find several different climatic response to a specific synoptic condition. With our rather dense network of automatic weather stations we can follow the weather evolution and relate it to the patterns of the general circulation, assisted by the numerical models like the one of ECMWF. To improve our forecast and give better information to our customers we are starting a new project named CAF.

We can summarize some of the actual trends in the operational forecasting meteorology as follows:

- Increasing forecast capability, i.e. longer range, higher resolution in time and space;
- Increasing demand of forecasts by professionals, media and general public, leading to the repetitive work of writing several similar messages;
- Increase of data (surface and upper air observations, satellite and radar images) and products from numerical models;
- Necessity for a tighter and faster forecast control;
- Reduction or limitation of the operational staff, higher stress;
- High risk of know-how and experience loss in operational forecast skill, due to faster turnover of the meteorologists;
- Availability of powerful workstations with high graphical capabilities.

To cope with such negative trends we plan to introduce in our future operational workstations a piece of software named Computer Assisted Forecasting (CAF). Targets of such a system should be:

- Integration of all information sources on a unique computer platform;
- Forecast should be produced with graphical objects, i.e. closer to our meteorological thinking. The computer shall translate it in codes, numbers or texts

- Reduction of the repetitive work like writing several similar forecast for different customers;
- Conservation and transmission of the knowledge of experienced meteorologists introducing expert systems written with their support;
- Fast development of expert systems with integration of the newest data and numerical products;
- Objective real-time control of the forecast for a "perfect nowcasting";
- Allowing more time to study the real new informations for a better understanding of the situation; automatic saving and recalling of the special and unusual conditions, which can lead to severe weather;
- Better working environment;
- We should achieve better forecast with higher time and space resolution, allowing a better and wider marketing of our products.

In the normal way of producing a forecast the meteorologist sits in the centre receiving all kind of informations, data, images, numerical products, and producing all bulletins, warnings, answering all questions, etc. Our proposed scheme introduces the computer as a diligent and careful assistant, which remembers everything, takes over all repetitive work like writing and disseminating bulletins and warnings, executes all checks and empirical methods, controls the forecast in real time, etc.

One of the very first steps is to translate all the possible knowledge in expert systems: data from different sources will combine with pattern analysis of fields, images (first human made, in the future by machine through neural network). The forecaster will have the opportunity to interact with the system to test different combinations, i.e. a kind of parameters sensitivity analysis. Such a system will allow us to "remember" the unusual and sometime even severe weather conditions, reducing therefore the working stress.

In reality the forecaster's job is to correct the previous forecast and daily add a day more in the medium range. Thus we can take the former forecast as a "first guess" producing a "default" forecast, correcting and adjusting it with the newest informations. This will be done better by handling graphical objects than text or numbers, i.e. closer to our way of imagining the evolution of the atmosphere. The main product will be a N-dimensional forecast matrix containing all our forecast parameters in coded form. A customer tailored interface will automatically translate the forecast in the required form, providing only the requested data.

# Computer Assisted Forecasting

