

The PROFF project at Norwegian Meteorological institute

new tools, new methods

Introduction

The idea behind Proff is to establish a new forecasting system, changing from manual production to products monitored by the forecaster and generated automatically on-demand by the user. This is a challenging task, involving development along unknown paths. But eventually it will change the meteorological service and bring it up to date.

History

Plans for the system emerged in 2004, resulting in many different projects dealing with different aspects of the new production line from development of new tools to management of all the data and the forecaster's new role in the system.

In 2007, when the project was still under development, www.yr.no was launched. During 2008 we still were in the process of preparation for implementation of Proff-tools. In 2009 Proff gradually entered full use in the three operational offices of met.no.

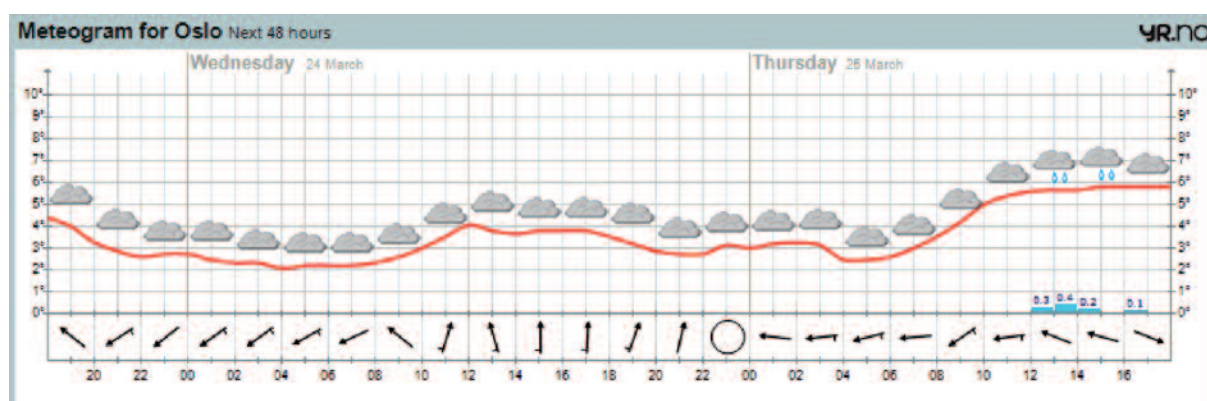


Figure 1/ Product example from www.yr.no

Why changes in forecasting were needed?

We realised that the users had access to very little information from the available data present in the forecasting process. Text forecasts were resource demanding; more than 70 000 pages of text were produced per year! The forecaster was left with little time to monitor weather and evaluate all available information. There was a “distance” between the weather forecaster and researchers with a potential to improve cooperation and understanding. And very importantly, there was a need for a flexible and automated verification system.

Proff - a new forecasting system

The basics of Proff are 1) The Human forecaster, 2) High resolution models, 3) Ensemble prediction systems, 4) Statistical corrections. The system generates products automatically from a gridded database, accessed through our web portal yr.no. In the future most likely all products will link to the Proff production line. We need to develop dialogue with user-groups to meet the users' needs. We foresee development of new products arising from this dialogue. We also expect the need to continuously adapt to new technology.

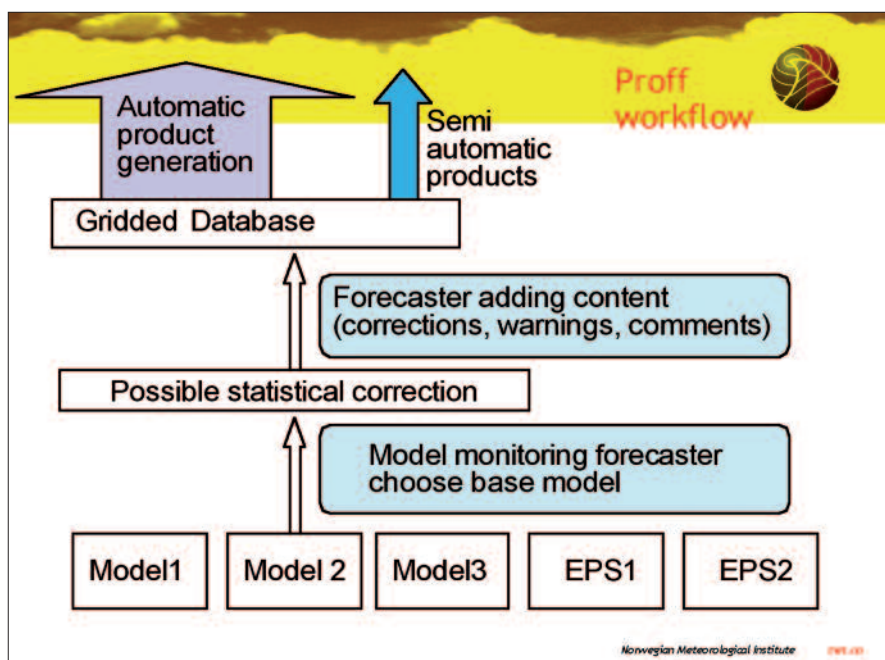


Figure 2:
Shows the work flow in Proff. The forecaster choose one model, adds corrections to that model, later managing all data in the database. Finally there is automatic generation of products.

Do we need to correct the models?

Models have improved a lot over the last 10 years, but there are still difficulties in significant areas such as underestimated wind speed in coastal areas, fjords and mountain areas. Other examples can be polar lows that often need adjustments; peak values in extreme events sometimes are underestimated; and deterministic precipitation forecasts are difficult.

The largest benefits from editing the fields are in the nowcasting range 0-12h, but further correction up to 36h is valuable.

To correct the model we use the Proff field editor, capable of interpolation in time and space, visualising it in Diana. Operating the Proff field editor, a forecaster will add field corrections on the chosen model field by defining objects that capture topography or threshold values.

The work flow (session)

In an editing session the forecaster chooses the “best” model among four different models. The forecasters cooperate within our three regional offices as a team, with one leader. Then the forecasters correct some key parameters (such as wind, precipitation and cloud cover), using the Proff field editor, when needed. Only significant model errors are corrected. Forecasters in all three operational offices take part in the correction. The team leader approves the session when ready. The corrections are saved in a database, which in the next step automatically generates the products for yr.no.

PROFF - current state, 2009

During 2009 Proff was gradually implemented into operational service. Preliminary results from a manual verification show that the forecasters seem to be good at selection of “today’s model”. The success rate of editing varies more. High resolution editing of temperature is very difficult. Direct verification and feedback to the forecaster is needed, and through Proff we have experienced increased cooperation between forecasters and researchers on verification.

Coming up

It is a goal to automatically correct systematic errors in the models, reducing the need for manual corrections. Automatic text generation for sea forecasts is under development. Some old production will be phased out. Additional automatic verification with feedback is also under development. And from December 2009 Proff-data was used in yr-products! This year the Proff2 project started, with focus on monitoring tools and verification, probability forecasts, nowcasting, interaction with user groups and further development and utilisation of the forecasters skills.

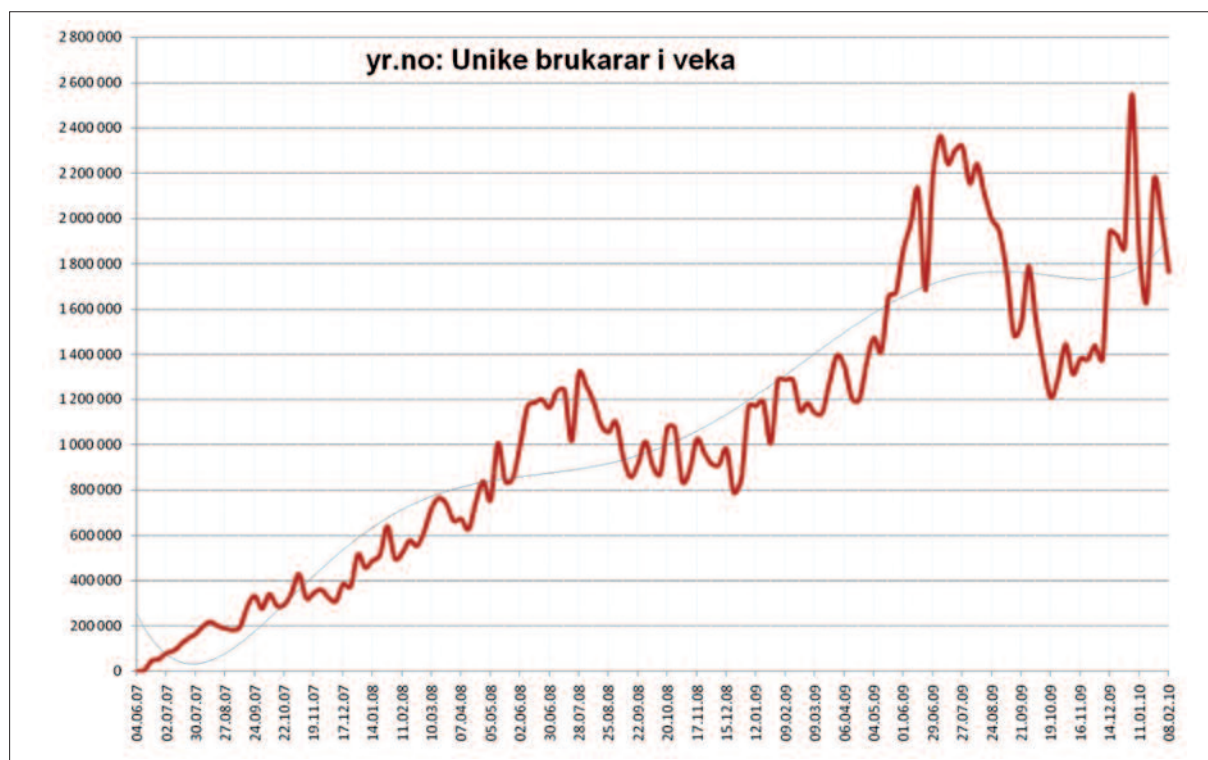


Figure 3: Shows weekly users of www.yr.no

Conclusions

The public is very content with yr.no, having access to detailed weather information at any time they need it, with significant corrections made by the forecaster. The number of weekly users is around 2.2 million in a country with less than 5 million people. Development of the Proff system will continue, and the forecaster will have to prove that he/she can add something to the model through verification. In the near future it is likely that the models will show improved skill in “normal” weather without manual corrections. The forecaster skills will most likely still be important in dangerous weather events, being responsible for corrections and for selecting the severity level of the gale warnings and other products in the nowcasting range.

References: <http://diana.met.no>
www.yr.no