"The future role of the human forecaster – a change in the philosophy?"

In 2003, the Meteorological Service of Canada (MSC) began a significant restructuring of its forecasting operations in response to financial pressures.

Senior management proposed that MSC could be more cost effective
• continuing to provide quality services by pursuing a more centralized forecasting approach
• and increasing the automation of forecasts via numerical weather prediction (NWP).

As a result regional public forecasting centres were reduced in number from 14 to 5 and renamed in Storm Prediction Centres (SPC).
Aviation forecasts were centralized to two Canadian Aviation Centres in Edmonton and Montreal.

To reach the goal a new methodology for operational forecasting was introduced
• Specifically, automation of "routine weather" forecasts would be increased to allow the forecaster to concentrate their efforts on "high-impact weather" (HIW).
• There would also be greater emphasis on science in operations, including improved forecaster knowledge, and tools incorporating the latest research.
• National laboratories were to be established at each Storm Prediction Centre (SPC), focusing the flow of knowledge and technology between operations and research, and developing new approaches to meteorological problems with national applications.

Three forecaster forums took place in 2003, 2004 and 2005 and were attended by more than 450 participants.

The presentations on these forums included
• the new Meteorological Service of Canada (MSC) structure and forecasting methodology,
• defining "high-impact weather" (HIW),
• the future role of the human forecaster at MSC,
• forecast tools of the future,
• forecaster training and development,
• links between operational meteorology and research,
• the future of NWP
• the communication of uncertainty via probabilistic approaches.

The new MSC forecast methodology – that routine weather forecasts would be automated and forecasters would focus on "high-impact weather" (HIW) – was well understood and was accepted by most participants.
There was an agreement on definition of "high-impact weather" (HIW) in order to provide a basis for determining local and regional variations and to imply differences between single and cumulative events which can have significant impacts on safety, health, environment and economy.

Most participants thought that
• the human forecaster should be the heart of weather prediction, meaning the forecast process would be driven by the forecaster rather than automated NWP systems.
• Furthermore it was expressed that to do an adequate job of predicting "high-impact weather" (HIW) the forecaster must go through the analysis, diagnosis and prognosis process to have an opportunity to recognize potential "high-impact weather" (HIW) events and maintain skills.

• NWP was considered to be a good tool offering important guidance, and there will be increasingly sophisticated methods of viewing NWP by comparing it with observational data.

• Ensemble forecast systems should be used by the forecaster to improve on deterministic products.

• Additional forecaster training was needed to reach a better level of familiarity with ensemble concepts.

• More probability information should be included in public forecasts.

• Free-form text was identified as the best way for forecasters to express uncertainty to the public.

The Meteorological Service of Canada (MSC) has completed the implementation of its restructuring strategy and has worked towards addressing many of the Forecasters Forum recommendations and concerns:

• The forecaster of the future would not be able to maintain the analysis, diagnosis and prognosis skills

• His/her only role is occasional intervention when automated forecast processes go awry.

• It is recognized that there will be skill in knowing when to intervene.

• It is stated that it is becoming increasingly difficult for human forecasters to add value to NWP forecasts.

However to add value to NWP is at those times when NWP does poorly and the weather is typically of critical importance to the public. Under these circumstances expert forecasters can increase forecast skill considerably. The human forecaster will have a crucial role in producing the best possible forecast for "high-impact weather" (HIW). This role should be recognized and resources devoted to better facilitating it. Taking all the above into account, it is suggested that the primary role of the human forecaster should be to develop and maintain a shared weather-object database that uses a sequence of composite depictions that evolve through time the current and future states of the atmosphere. The emphasis would be on the sensible weather near the surface, since that region of the atmosphere has the greatest influence on the activities of the public. Basic activities are based in nowcasting and warnings for the public.

The main idea is that the daily activity of the forecaster would be focused on meteorology, not on details in generating products. That means maintaining shared situational awareness at all times. This would likely require a forecaster with specific task of maintaining the "big picture" of the atmosphere and coordinating the more detailed activities of the mesoscale weather activities.

The question now is how the to optimise the human-machine mix

• The human forecaster currently plays a vital role at MSC weather offices and could continue to contribute towards significant improvements in "high-impact weather" (HIW) forecasting if supported by tools that are designed to achieve an optimal human-machine mix.

• This would be accomplished using an area-based, object-oriented analysis / forecast system with a toolbox of NWP guidance.

• The forecaster's work would be focused on "high-impact weather" (HIW) events, mainly in the short term but also in the longer term if necessary.

• Products would be automatically generated from the weather object database, allowing the forecaster to focus on "hands-on" analysis, diagnosis and prognosis, and to maintain shared situational awareness at all times.

See also the feedback in the general discussion
of the WGCEF meeting in Toulouse 2009

There will be a new approach in doing weather forecasting in the future; the weather forecasting work will change in NMSs.

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