

Technology Transfer to Forecasters: The SNOW-V10 Experience

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Winter, complex terrain nowcasting was a key part of the Winter Olympic Games in Vancouver 2010. Environment Canada provided services related to their mandate of providing a safe and secure environment for Canadians and their guests. Environment Canada was also the weather services provider to the Vancouver Olympic Organizing Committee (VANOC). As part of the latter role, forecasters were deployed at various venues to support the weather aspects of the specific sports.

During the preparation and the Games, it was evident that the venue forecasters were providing nowcasts at an unprecedented depth and level than normal. For example, ski jump venue forecasters were asked to provide nowcasts of wind speed variation of less than 1 m/s for a 90 minute duration. This is very specific to the sport event and quite different from a gusty wind nowcast. The sport officials were also only interested in a 100m part of the domain. A colloquial phrase was the nowcasts were a “centimeter wide but a kilometer deep” which is directly opposite of their normal forecasts.

The venue forecasters were selected from across the country through a competitive process. Complex terrain nowcasting in winter has never been done before in Canada for the venue sites, so all forecasters started at the same spot. Local forecasters had some advantage as they live and play in the area and have a sense of weather challenges. However, the sport criteria were novel. Through the selection process, the venue forecasters could be considered to be “experts”. However, given the situation, they were initially reduced to “novices”. Through anecdotal evidence, it was clear that some of them evolved to be “experts” in their specific nowcast domain.

It was evident that the venue forecasters developed new and novel nowcast techniques and conceptual models. Exit interviews were conducted in order to elicit and document the conceptual models and the contributing factors as a legacy of the Games.

The exit interviews used a technique called the Critical Decision Method. In this method, a memorable event in which the forecaster played a decisive role was selected based on a brief chat about various potential cases. Key words were identified and led to the selection of the case. A coarse time line was created and key decision points were identified to segment the event. Each segment of the time line was first factually elucidated and then probed with questions

designed to elicit and explore the salient point. In this case, the probing questions were to elicit, the role of training, experience, relationships, observations, models and nowcast systems. So the methodology deviated from the standard procedure since specific lines of investigation were explicitly explored. About ten nowcasters were interviewed right after their shift at the end of either the Olympic or Paralympic Games. There were two interviewers and the interviews were intense and took 3-4 hours to conduct.

Conclusions reached from a broad view of the all the interviews were:

- Some but not all of the forecasters showed signs of being “experts”
- The early adopter model of technology transfer was supported
- Training (lecture, simulation) was an important contributor but “on the job”, team case studies were perhaps more important to learning
- In-situ venue forecasters interacting with the sport/venue manager was critical for mutual understanding of requirements and capabilities
- The development of trust was critical to understanding the requirements and was derived through interaction and demonstration
- The Pre-Olympic year trials did not cover all the conditions of the Olympic year conditions (e.g., evening and diurnal effects were not captured)
- The SNOW-V10 data and products were extensively used
- Meteogram and vertical products were easily accepted as they matched or supported the forecast products and conceptual models use
- However, black box systems (nowcast products, NWP output) without diagnostic capability were less used. Some of the cases selected were when the NWP was correct in a coarse sense but they lacked sufficient detail for nowcasting
- Generally, the forecasters abandoned the model guidance about 6 hours in advance for the nowcast and observation systems
- Expert forecasters are never over-loaded, they are able to focus and filter (or ignore) products that were not useful
- The SNOW-V10 observations provided “sampled measurements” and human presence and web cams provided the connections
- Fear of failure, instant feedback drove excellence in nowcasting
- Technology transfer is a highly social process