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# ***Beijing 2008 Olympics WWRP Forecast Demonstration Project:***

## ***A Brief Introduction***

*By Wang yubin<sup>(1)</sup>, Wang jianjie<sup>(1)</sup>, Xie Pu<sup>(1)</sup>, Tom Keenan<sup>(2)</sup>*

*(1) Beijing Meteorological Bureau ,CMA,China*

*(2) Bureau of Meteorology Research Centre, BOM,Australia*

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### ***1. Background***

The Beijing 2008 (B08) Olympics will be conducted from 8 to 24 August 2008. It is a major international event in which weather can have a significant impact. Weather services are required to support planning and coordination of the B08 activities.

A WWRP endorsed and coordinated international Forecast Demonstration Project (FDP) undertaken concurrently with a Research and Development Project (RDP) are being organised by the China Meteorological Administration. The FDP, with participants from Australia, Canada, China, Hong Kong, China and United States of America (USA), will employ state-of-the-art nowcasting systems using observation techniques, numerical weather prediction and a combination of both. FDP systems are now successfully installed in the Beijing Meteorological Bureau, CMA.

The overall mission of the B08FDP is to: “through international collaboration build, demonstrate and quantify the benefits during the B08 Olympic period of an end-to-end nowcasting weather service focused on high impact weather and based on latest science and technology”.

The focus of B08FDP is 0 to 6 hour thunderstorms forecasts. B08FDP nowcasts will be generated automatically and made available in a timely manner to BMB/CMA forecasters. Forecast products generated by participating nowcasting systems will be inter-compared, benchmarked for skill, and assessed relative to official BMB/CMA products for added value and impact. Pre-determined nowcasting products will be made available to end users for evaluation, including an assessment of their impact upon the decision-making processes as well as the associated social and societal benefits.

The duration of the B08FDP is four years. A trial demonstration phase was conducted first during July to August 2006. Another trail run will take place during July to August 2007. The formal FDP will be conducted in the B08 Olympics and the Paralympics period.

### ***2. Goals and Emphasis of B08FDP***

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The primary goals of B08 FDP are as follows:

- (a) Implement an *advanced* nowcasting system for high-impact weather and precipitation, thereby providing an enhanced weather service for B08. Accounting for the influence of topography on thunderstorms and precipitation is a big challenge;
- (b) Demonstrate the correct implementation, introduction, training and use (technology transfer) of advanced nowcasting system into forecast operations;
- (c) Demonstrate the utility and feasibility of advanced data assimilation techniques and high resolution NWP for operational nowcasting.
- (d) Quantify the impact of the implementation of operationally focused nowcasting systems on the quality of high impact weather and precipitation forecasts for end-users.
- (e) Develop and implement new validation techniques for assessing the effectiveness of high impact nowcasts and quantitative precipitation nowcasts.
- (f) Promote the implementation of nowcasting techniques in China and for the benefit of WMO NMHSs.

Emphasis of the B08FDP will be placed on 0-6 hour nowcasts with a particular forecast challenges associated with thunderstorm phenomena such as wind gust, precipitation, hail, etc.. Observation-based radar techniques will provide the primary focus for thunderstorm nowcasting. High-resolution NWP techniques that make use of mesoscale data sources and state-of-the-art assimilation procedures will be blended with observational techniques for the 1-6 hour nowcasts. Probabilistic and deterministic approaches will be demonstrated. Advanced forecast generation and production systems will be employed to optimise decision making. Verification will be included in the forecast system and the role of human interaction will also be studied .

### ***3. New Nowcasting FDP Innovations since S2KFDP***

There are several important new improvements and innovations planned for the B08FDP that were not available during the FDP in the 2000 Sydney Olympics (S2KFDP). These are :

- a) high resolution NWP from several systems,
- b) considerable emphasis on combining NWP and extrapolation methods,
- c) more attention on the 1-6 hr nowcasting,
- d) use of probabilistic forecast concept in the nowcast,
- e) focus on real-time verification, and
- f) more emphasis on the assessment of the social and economic impact resulting

All significant new advances will be implemented for the B08FDP .

Furthermore, CMA/BMB is implementing an extensive network of Doppler radars and surface observation stations for the B08FDP. This will provide an enhanced observational base for nowcasting techniques.

The role of the forecaster in the nowcasting process is a key issue for many weather services. A cognitive analysis of the forecaster's interaction with the data and the state-of-the-art nowcasting

systems will better define the role of the forecaster. Besides, identifying the value of human interaction in the production of nowcasts, this process will also identify implementation gaps.

#### 4. Progress in 2006

Significant progress in the implementation of the B08FDP has been made in 2006. The first trial run has achieved its goals successfully.

Before the first trial, BMB/CMA set up the enhanced B08FDP network (Fig. 1) with shareable databases. A remote working environment was created. Real-time, high temporal- and spatial-resolution data were provided (Table 1). The 《B08FDP local data manual》was completed and provided to participants. WWRP FDP systems successfully installed in BMB included: The Canadian Radar Processing and Decision System (CARDS) multi radar and enhanced nowcasting guidance information; The Short-range Warnings of Intense Rainstorms in Localized Systems (SWIRLS) providing extensive nowcasting guidance capability; The very short range NWP Short Term Ensemble Prediction System (STEPS) employing probabilistic nowcasting techniques; The NCAR NIWOT system blending observational and extrapolation techniques; The BMRC Real time verification of nowcasting systems (RTFV); The CMA high resolution deterministic rapid update analyses and NWP system for longer periods (4 hours +) i.e. the Next Generation NWP System (GRAPES); and also from BMRC the Thunderstorm Interactive Forecast System (TIFS) and nowcast server that provides a range of severe weather, rainfall estimation and visualisation applications. All the system were able to successfully ingest real-time local data.

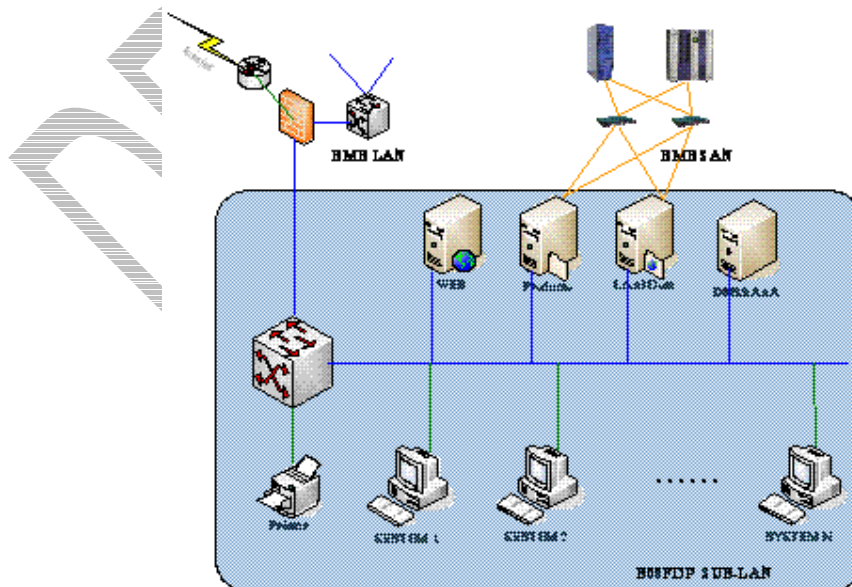


Fig. 1 B08FDP Network

Table 1 Real-time observation for the first trial of B08FDP

DATA	INTERVAL	SIZE	TRANSFER INTERVAL
AWS (NetCDF format)	5 minutes	10K	5 minutes
Radar (NexRAD Level II format)	6minutes	14 M/1M	6minutes
Satellite(FY2C)	30 minutes	135 M	30 minutes
Lighting(Text format)	0.1 $\mu$ s	--	real time
Intense Radiosonde	6h	(On GTS)	--

The basic version of RTFV (using IDL) was installed and localized in BMB successfully in trial period. SEIA project made good progress. Two street survey and two workshops were held to broadly identify end users. Enhanced Training for BMB Champions will also be done. A Training Working Group was established to develop training plan and coordinate training activities.

## 5. Summary

BMB/CMA in collaboration with WWRP is conducting a FDP in relation to the B08 Olympics/Paralympics. State-of-the-art nowcasting systems from participants have been successfully installed in BMB in August 2006. The first trial run in 2006 was successfully completed. The second trial run will be carried out in August 2007. The FDP will be conducted during the B08 Olympics and Paralympics. The nowcasting products and services from the FDP is expected to improve the weather forecasts for the B08 Games and contribute to an enhanced public weather service in Beijing, China.

## References

- [1] *Report of the 2<sup>nd</sup> Workshop of WWRP B08FDP, August 30 - September 1, 2006, Beijing, China*
- [2] *Beijing 2008 Olympics WWRP Forecast Demonstration Project & Research and Development Project, A Proposal Submitted to WWRP/WMO*

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