



International Civil Aviation Organization

**THIRD MEETING OF THE METEOROLOGICAL
REQUIREMENTS TASK FORCE (MET/R TF/3)**

28 – 29 November 2013, Bangkok, Thailand

Agenda Item 3: MET and ATM Requirements and Information Exchange

**DEVELOPMENT OF METEOROLOGICAL SERVICES FOR
THE TERMINAL AREA IN CHINA**

(Presented by China)

SUMMARY

This paper presents the development the meteorological services for the terminal area in China.

1. Introduction

1.1 With the increasing air traffic density, the operation in terminal area is impacted tremendously by adverse weather. The current TAF products are unable to meet the operational requirement in terminal area. In response to users' requirement on the new weather capability support for the operation in terminal area and to bridge the gap between the TAF and en route forecast, Air Traffic Management Bureau of CAAC (hereafter as ATMB of CAAC), which provides aeronautical meteorological service in China, cooperating with Hong Kong Observatory, launched its meteorological services for the terminal area (MSTA) program in 2010.

1.2 A workgroup on MSTA has been set up including forecasters from 3 regional aviation meteorological centers, which provide weather service for 3 busiest airports in China: Beijing, Shanghai and Guangzhou airports. Experts from Hong Kong Observatory were also invited to the workgroup.

2. Discussion

2.1 The provider of the MSTA

The workgroup agreed that MSTA is terminal-area-specific, which is primarily based on the data from local Doppler weather radar and outputs of mesoscale numerical prediction models. The MSTA should be provided by the meteorological office designated by the State Meteorological Authority.

2.2 Contents of the MSTA

2.2.1 Geographic area covered by the MSTA

Since the coverage of terminal area varies from aerodrome to aerodrome, the geographic area covered by the MSTA should be the actual coverage of local terminal area.

2.2.2 Inclusion of meteorological elements in the MSTA

Ideally, weather phenomena such as thunderstorm, cross wind, low ceiling and visibility, snow and icing, which greatly impact the safety and efficiency of the flight operation in the terminal area, should be included in the MSTA. However, considering the different impact of different weather phenomena on the flights in the terminal area, the workgroup agreed that MSTA be developed by stages in China, and the first priority be given to convection, wind and icing.

2.2.3 The format of the MSTA

The MSTA is mainly used for Air Traffic Flow Management, separation control, flight in terminal area and thus should be tailored for ATC, pilots and dispatchers for easy use and transmission. The group therefore considered that the format of the MSTA will be in graphical, tabular, text or coded format in the light of users' requirement.

2.2.4 The valid time

Based on current and foreseeable future technological capability, the group agreed that it be focused on the nowcast (within 6 hours) of convection, and short term forecast (within 24 hours) of other elements.

2.2.5 Accuracy requirement

The group considered that the accuracy level of the MSTA should be determined by the agreement between Meteorological Authority and the users community based on the attainable accuracy of the provider and the acceptable accuracy of the users.

2.2.6 Verification

The group noted that the verification of the MSTA is crucial and challenging due to the limitation of weather observation. To build customer confidence before the MSTA products are operational, study of the verification scheme should be carried out in parallel with the development of the MSTA. Moreover, the group suggested that WMO provide guidance materials to States on the verification of the MSTA.

2.3 Cooperation between ATMB of CAAC and Hong Kong Observatory on the MSTA

2.3.1 Focal points were designated to provide each other updates of the work, and to share the resources like data and technology;

2.3.2 A joint workgroup meeting is held annually to provide an opportunity for both sides to discuss challenging issues.

2.4 Arrangement of the research on the MSTA

The workgroup is divided into 3 sub-groups, and each sub-group focuses on one particular weather element: Beijing Regional Aviation Meteorological Center works toward developing icing forecast, convection and wind are the responsibility of Guangzhou and Shanghai Regional Aviation Meteorological Centers respectively.

2.5 MSTA products

2.5.1 Convection forecasts on trial use in Guangzhou Airport

From July 2013, as the meteorological support for ATM decision making, the convection nowcast products have been provided for Guangzhou terminal area as trial products. Observations and forecasts of the convection in the terminal area are disseminated to Area Control Center, Terminal Control Center, Flight Service Center and Operations Control Center in Guangzhou via intranet. The forecast of the convection is valid for 1 hour and gets updated every 6 minutes.

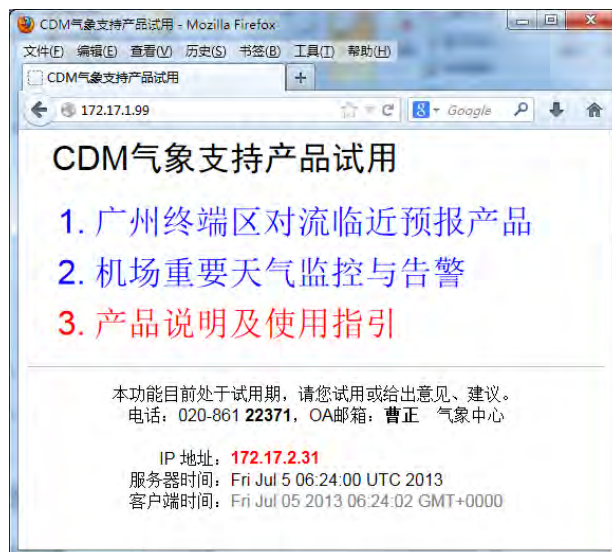


Fig 1. Forecast of convection as trial products to support for ATM decision making

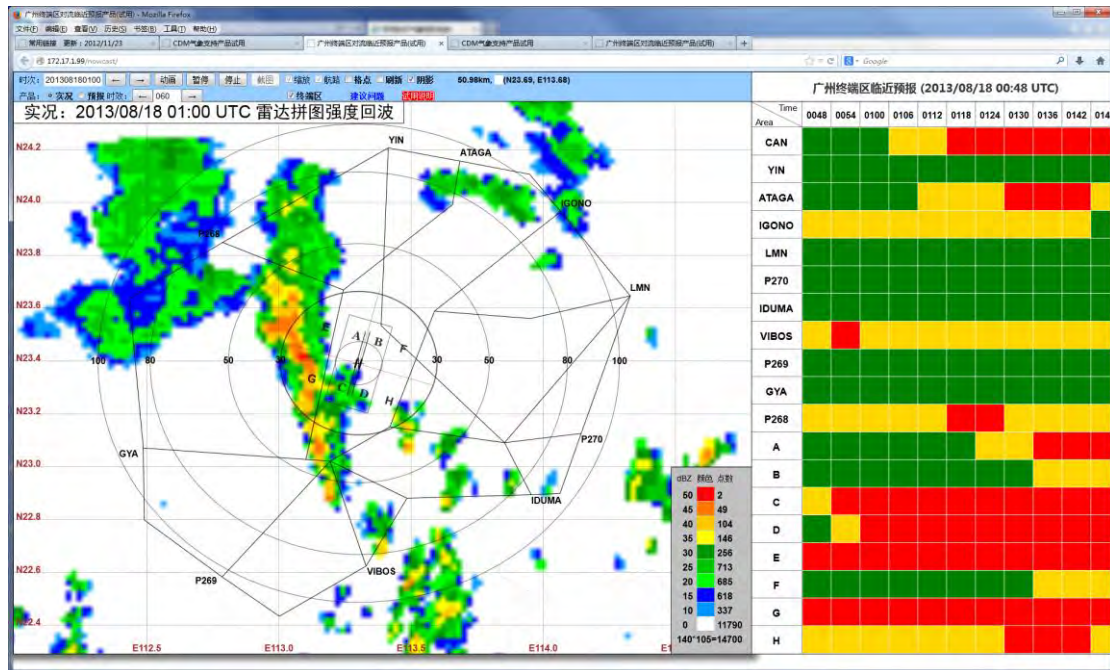


Fig. 2 Observation of convection and its impact at Key ATC points

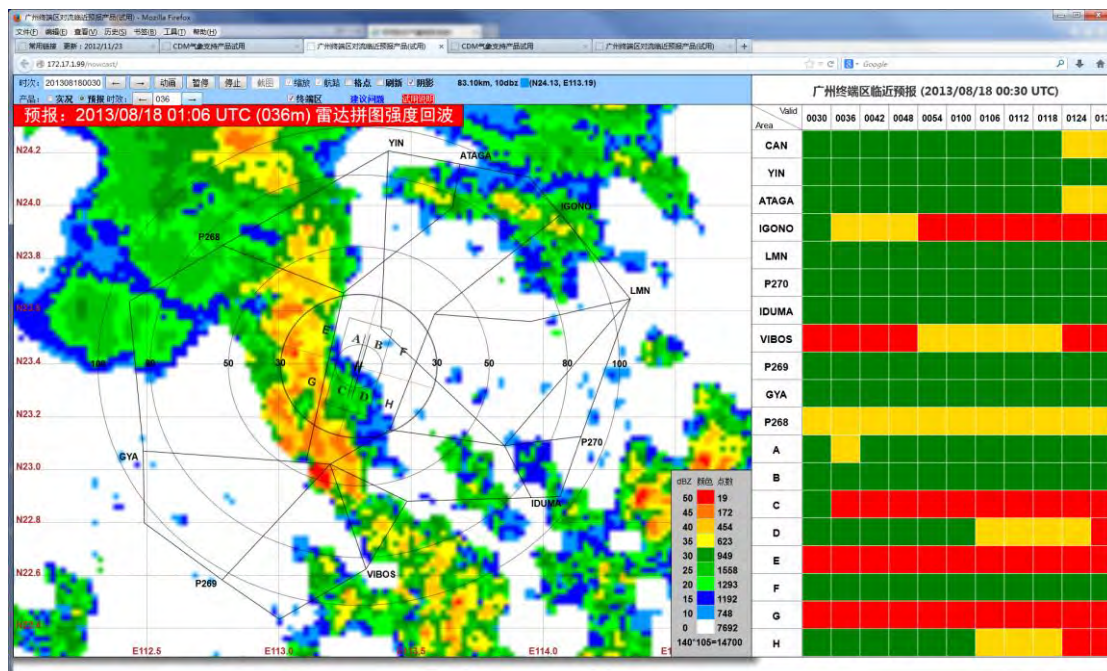


Fig. 3 Forecast of convection and its impact at Key ATC points

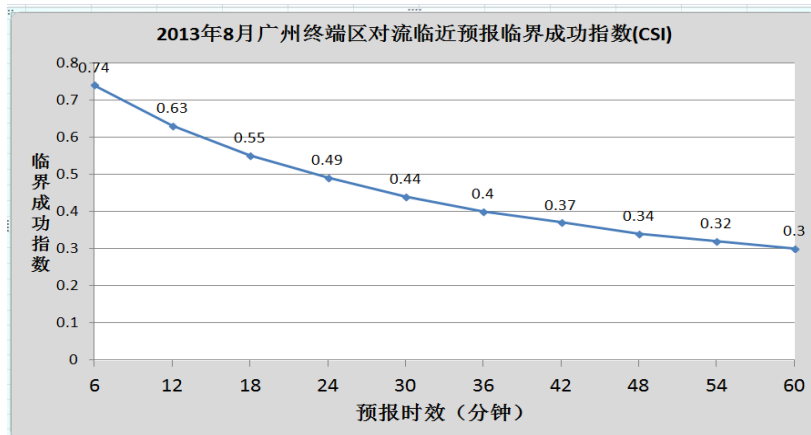
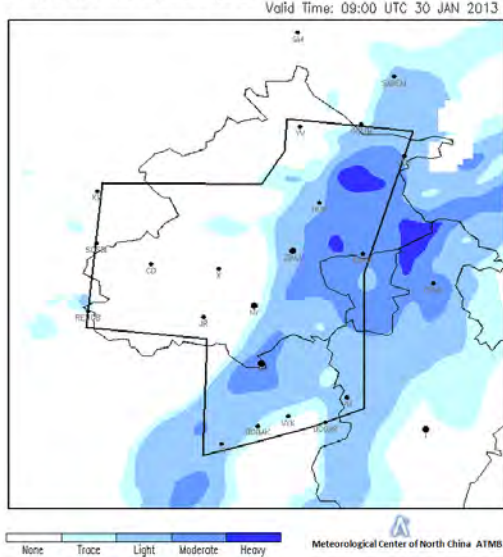


Fig. 4 Accuracy of forecast of convection in August 2013

Users' feedback: After several months' trial use, ATC users think that the total performance of the forecast of convection is good, especially the forecast of the movement direction of the weather system. On the other hand, the movement speed of the weather system can be improved further and more work should be done to optimize the algorithm of the impact of convection on ATM.

2.5.2 Demonstration of the icing and wind forecasts

Icing Forecasting at FL030



Icing Forecasting at FL030

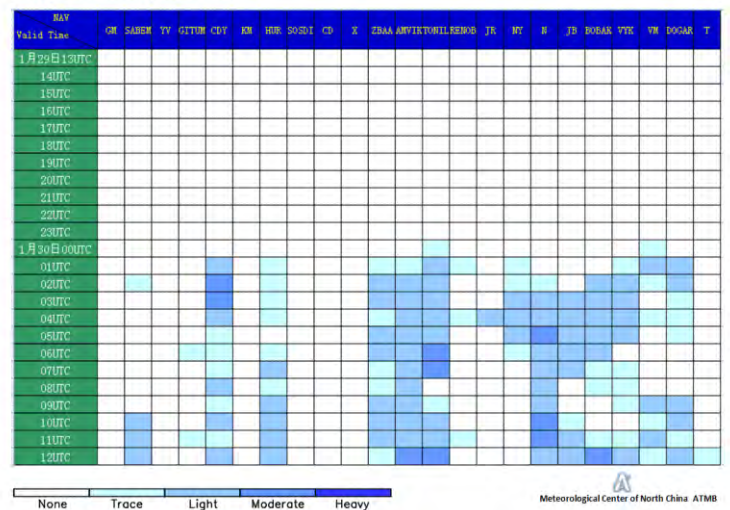
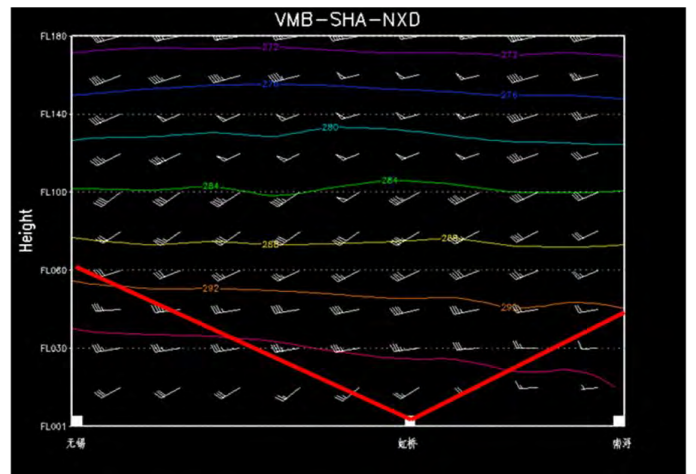


Fig. 5 Icing forecast



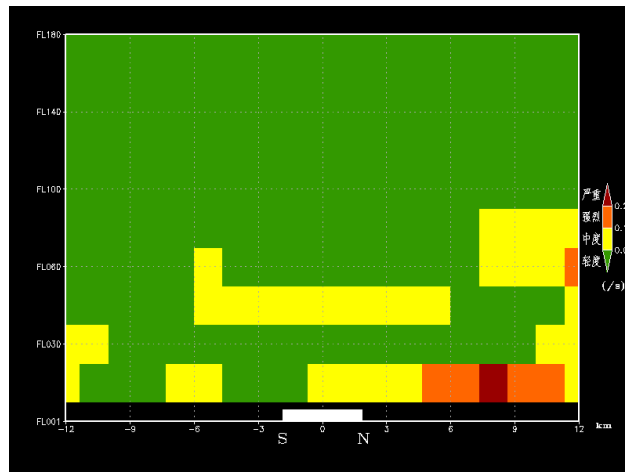


Fig. 6 Wind shear along the runway

Fig. 7 en-route wind and temperature

2.6 Future work

- a) to introduce the demonstration products to users, solicit users for input, and to improve the MSTA according to user responses;
- b) to provide MSTA products to users; and
- c) to proceed with the research of other weather elements of the MSTA.

3. Action by the Meeting

3.1 The meeting is invited to note the information contained in this paper.
