International Civil Aviation Organization

WORKING PAPER

A38-WP/210[1]
TE/82
3/9/13
(Information paper)

ASSEMBLY — 38TH SESSION

TECHNICAL COMMISSION

Agenda Item 35: Air Navigation — Implementation Support

DEVELOPMENT OF METEOROLOGICAL SERVICES FOR THE TERMINAL AREA IN CHINA

(Presented by China)

EXECUTIVE SUMMARY	
This paper presents the development of meteorological services for the terminal area (MSTA) in China, including the content, format and demonstration products of MSTA. MSTA will serve to fill the gap between aerodrome forecast (TAF) and en-route forecast, and provide better MET services for air navigation. It is recommended to include MSTA into the MET part in Module B1-105 in the Aviation System Block Upgrade (ASBU).	
Strategic Objectives:	This paper is related to safety, regularity and efficiency of air navigation.

1. INTRODUCTION

1.1 With the increasing air traffic density, adverse weather has seriously affected the operation in the terminal area, while the current aerodrome forecast (in meteorological code form) (TAF) products are unable to fully meet the operational requirements in the terminal area. In order to satisfy the demand of users for providing adequate meteorological services to support the operation in terminal area, and to fill the gap between TAF and en route forecast, the Air Traffic Management (ATM) Bureau of CAAC (hereafter as ATMB of CAAC), which is the aeronautical meteorological service provider in China, in cooperation with Hong Kong Observatory, launched a research of meteorological services for the terminal area (MSTA) in 2010.

1.2 A working group on MSTA has been set up, its membership including forecasters from the regional aviation meteorological centres providing weather services to the three busiest airports in China: Beijing, Shanghai and Guangzhou.

[1] Chinese version provided by the People's Republic of China.

2. DISCUSSION

2.1 **The provider of MSTA -** The working group is of the view that each terminal area has its own characteristics, and MSTA is primarily based on the data from local Doppler weather radar and outputs of mesoscale numerical prediction models. MSTA should be provided by the meteorological office designated by the State Meteorological Authority.

2.2 **Contents of MSTA**

2.2.1 **Geographic area of MSTA -** Since the coverage of terminal area varies from aerodrome to aerodrome, the geographic area of MSTA should be the actual coverage of the terminal area.

2.2.2 **Weather elements to be included in MSTA -** It is desirable to include in MSTA all the adverse weather elements that seriously affect safety and efficiency of the operation in terminal area, such as convection (thunderstorm), cross wind, low ceiling and visibility, snow and icing. However, considering the different extent of the effect on the operation in terminal area the significant weather conditions exert, the working group agrees to take a phase in approach, and the first priority is given to forecasts of convection, wind and icing.

2.2.3 **The format of MSTA -** MSTA is mainly used for Air Traffic Flow Management, separation control, flight in terminal area and thus should be tailored for air traffic controllers, pilots and airline dispatchers for easy use and transmission. The group therefore considers that the format of the MSTA should be in graphical, tabular, text or coded format depending on the needs of users.

2.2.4 **The valid time -** Based on current and foreseeable future technological capabilities, the group believes that the focus of the research should be on the nowcast (within 6 hours) of convection, and short term forecast (within 24 hours) of other elements.

2.2.5 **Accuracy requirement -** The accuracy level of MSTA should be determined by Meteorological Authority and the user community through consultation based on the ability of the provider and the demand of users.

2.2.6 **Verification -** The verification of MSTA is crucial while very challenging due to the limitation of the means for weather observation. In order to build up customer confidence in MSTA products, a study of a verification scheme must be carried out in parallel with the development process. Moreover, the group suggests that the World Meteorological Organization (WMO) provide guidance materials to States on the verification of MSTA.

2.2.7 **Cooperation between ATMB of CAAC and Hong Kong Observatory on MSTA -** Focal points have been designated to update each other of the work regularly, and to share resources and technology. A joint working group meeting is held annually for both sides to discuss issues encountered in the research.

2.2.8 **Demonstration MSTA products -** After years of research, several demonstration MSTA products have been developed by the working group (Fig. 1-6). Among these products, convection forecast has been provided to users on a trial basis. The feedback from the users has shown that these products are very useful, especially at busy airports with complicated weather conditions.

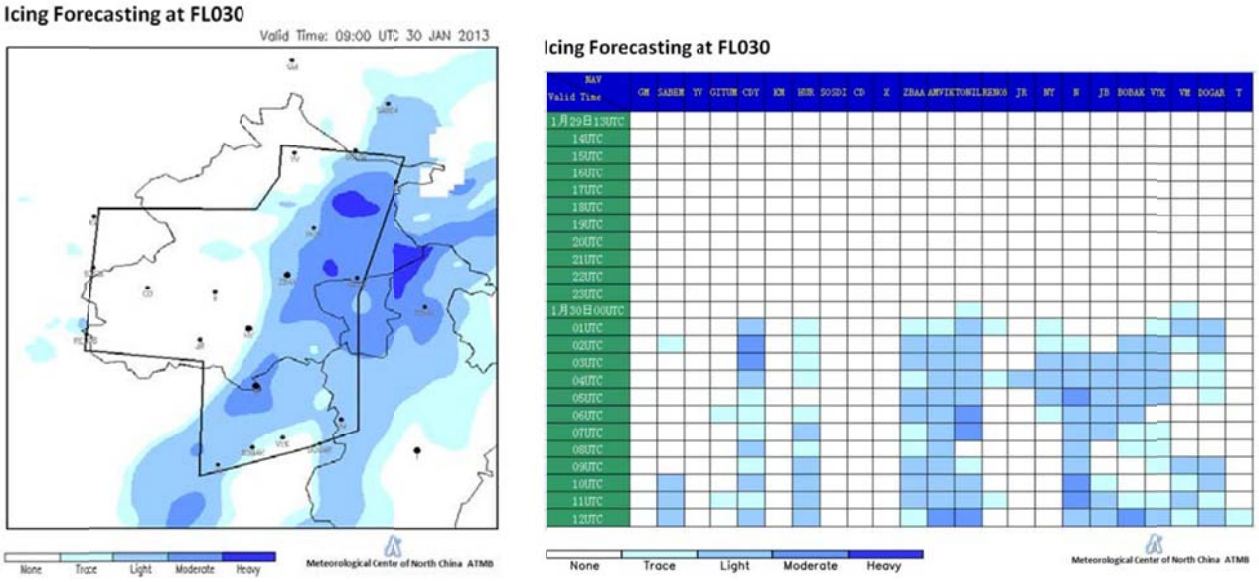


Fig. 1-2 Icing forecast

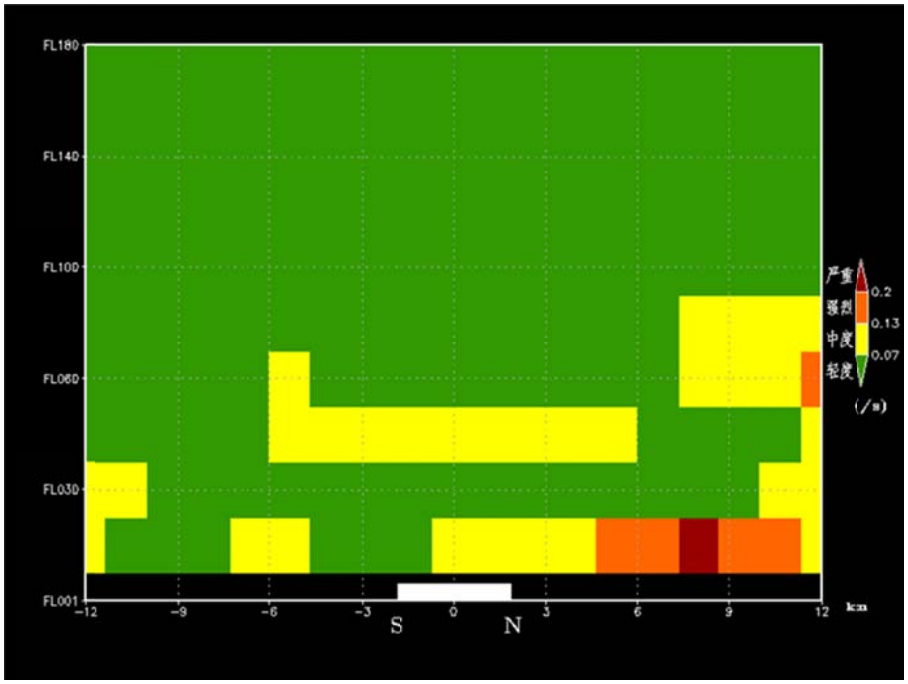


Fig. 3 Wind shear along the runway

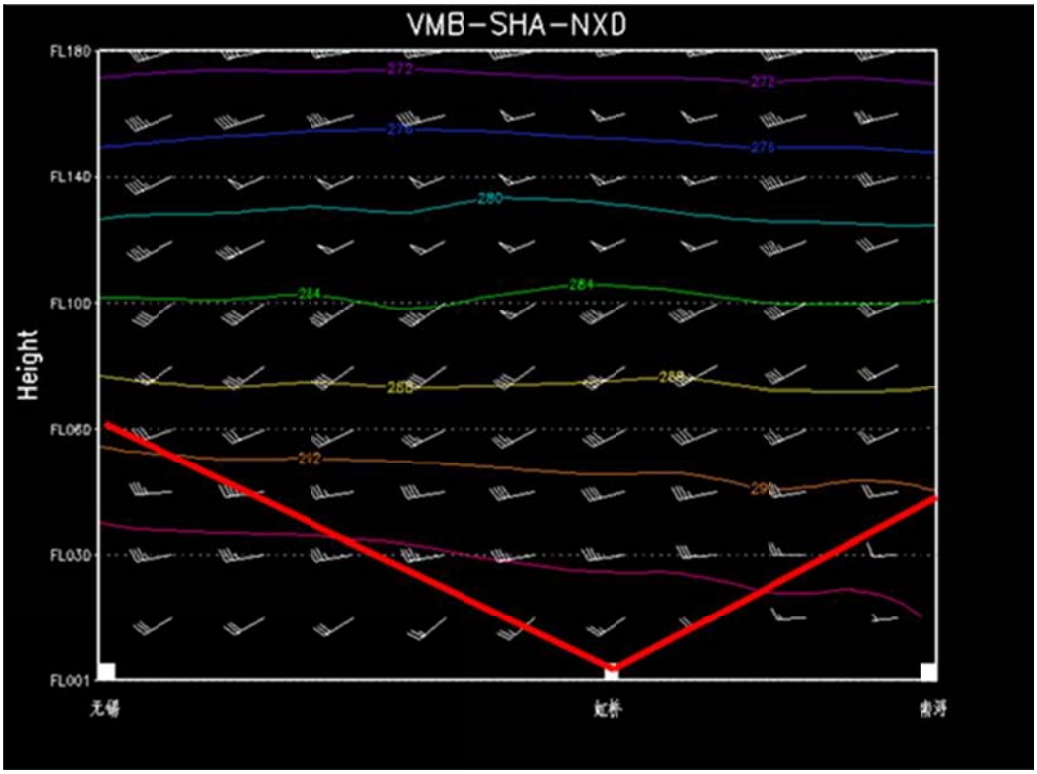
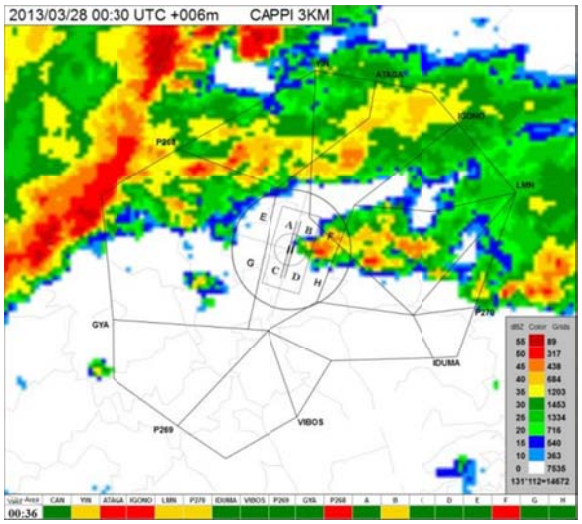


Fig. 4 En-route wind and temperature



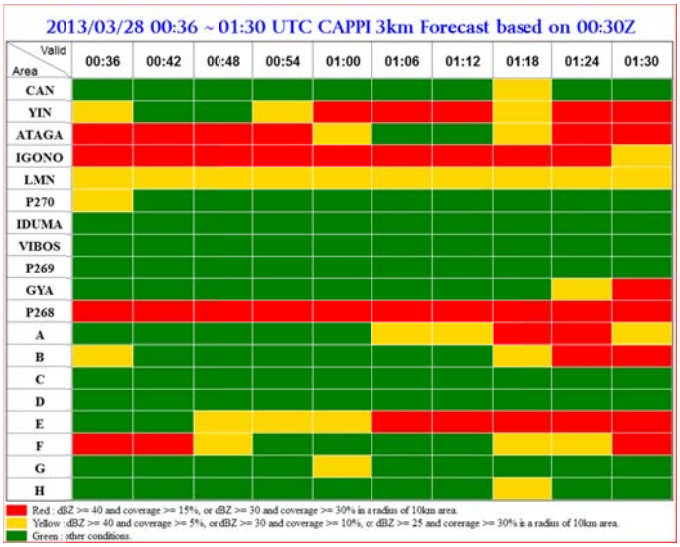


Fig. 5-6 Time series forecasts of thunderstorm intensity at key ATC points

3. FUTURE WORK

3.1 The future work of the group will be to:

a) introduce the demonstration products to users, seek opinions and suggestions from them, and to improve the products accordingly;

b) provide business MSTA products to users; and

c) proceed with the research of other weather elements for MSTA.

4. CONCLUSION

4.1 MSTA will serve to fill the gap between TAF and en-route forecast, and provide better MET services for air navigation. It is recommended to include MSTA into the meteorological (MET) part in Module B1-105 in ASBU.

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