



ICAO

International Civil Aviation Organization

INFORMATION PAPER

Twenty-fourth Meeting of the Meteorology Sub-group (MET SG/24) of the Asia and Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG)

Web-conference, 16 – 20 November 2020

Agenda Item 5: Research, development and other initiatives

IMPROVEMENTS IN MDRS METEOROLOGICAL INFORMATION

(Presented by China)

SUMMARY

This paper presents the development of Massive Delay Response System (MDRS) application and MET-ATM cooperation during strategic decision making and tactical operational period. MET forecasters endeavour to provide tailored information to support ATM operation. MET and ATM departments collaborate closely to reach consensus about the operational situation. Developments in MDRS application include providing information of convective area coverage ratio and increasing the forecast lead time in aerodrome warnings.

1. INTRODUCTION

1.1 The number of flights keeps increasing in the developed cities in China. In order to reduce flights delay and avoid stranding passengers at airports, Civil Aviation Administration of China (CAAC) has developed a Massive Delay Response System (MDRS) since 2014. After six years of MDRS application, different kinds of weather forecast products are provided in order to support Air Traffic Flow Management (ATFM) and Air Traffic Management (ATM) operation.

1.2 To support strategic decision making of ATFM, weather forecasters develop and issue tailored MDRS meteorological information. As one of the MDRS meteorological products, the significant weather occurrence possibility prediction plays an important role in the launching of MDRS. The occurrence possibility product forecasts the severe weather in the airports, terminal areas and routes for the next 30 hours. Both the precipitation intensity and the convective area coverage ratio are highlighted in this product (Table 1).

Table 1 An example of the MDRS significant weather occurrence possibility product

Occurrence Possibility Prediction of Significant Weather causing MDRS					
Area: Central and southern China			Time of issuance: 07Z 11/05/2020		
Airports	Significant weather and intensity description	Affecting Period	Affecting areas and directions	Significant weather occurrence possibility	Remarks
Guangzhou (ZGGG)	Heavy rain with thunderstorms	10-13Z 11/05/2020	Terminal area and around the airport	≥70%	1) There will be wide range convections with frequent CB in the area. The convective area coverage ratio is 30%~40%. 2) Heavy rain with thunderstorms will occur during 10-11Z at the airport with visibility of 700-1000m and gust of 16-18m/s.

1.3 ATM controllers and MET forecasters cooperate and make great efforts to conclude a consistent understanding of terminal convective area coverage. As thunderstorms affect airports and routes frequently in the rainy season, an estimate of the Terminal Control Area (TMA) convection coverage ratio, which is a proportion of convective area in the terminal area, becomes an essential part of the significant weather occurrence possibility prediction. Specifically, ATM experts record the subjective evaluation of convection coverage ratios in different cases. Meanwhile, MET forecasters calculate various objective convection coverage ratios depending on different radar reflectivity factors (Figure 1). Then a comparison between subjective and objective records is carried out to generate a threshold of radar reflectivity factor that can indicate the convection coverage. Through statistical analysis, the threshold is modified from 35dBZ to 25dBZ in 2020. Thus the convection coverage in Guangzhou (a megacity of South China) is defined as the ratio of convection over 25dBZ in the terminal area. When the terminal convective area coverage ratio is over 20%, it means extensive thunderstorms arise and could lead to air traffic capacity decrease by 25% or more in TMA. After the criteria threshold is determined, the convective area coverage ratio prediction becomes a key point to assess the airspace availability and the capacity loss.

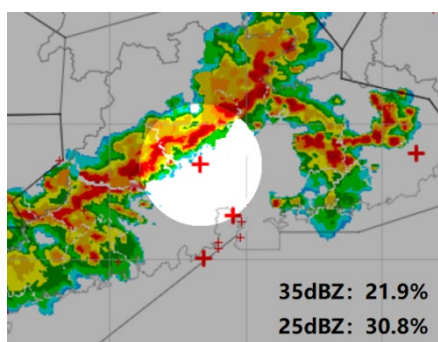


Figure 1 The convective area coverage ratio in the Guangzhou Terminal Control Area on May 11th, 2020

1.4 During the tactical operation period, aerodrome warnings and TMA weather warnings are disseminated for ATM, Airport Operation Centre (AOC) and airlines. Significant weather described in the warnings includes thunderstorms, heavy rain, strong surface wind and wind shear etc. Forecasters keep monitoring the development of weather and issue the aerodrome warnings in advance as possible. According to reviews and summaries of severe weather, the average forecast lead time of thunderstorm aerodrome warnings in Guangzhou (from February to September) increases to 65 minutes this year.

2. DISCUSSION

- 2.1 Better MET-ATM integration supports ATM and ATFM strategic decision making.
- 2.2 High quality meteorological service aims to meet the needs of aviation weather users.

3. ACTION BY THE MEETING

- 3.1 Note the information contained in this paper.