



TWELFTH AIR NAVIGATION CONFERENCE

Montréal, 19 to 30 November 2012

Agenda Item 4: Optimum capacity and efficiency – through global collaborative ATM

4.3: Enhanced operational decision-making through integrated meteorological information

METEOROLOGICAL INFORMATION TO SUPPORT AIR TRAFFIC MANAGEMENT

(Presented by Japan)

SUMMARY

This paper introduces the “Air Traffic Meteorological category forecast (ATMet category forecast)” and “SIGWX briefing sheet” issued by Air Traffic Meteorology Center (ATMetC) of Japan Meteorological Agency (JMA) in supporting the Air Traffic Management Center (ATMC) of the Japan Civil Aviation Bureau (JCAB).

1. INTRODUCTION

1.1 Since 2005, the Air Traffic Meteorology Center (ATMetC) have closely supported air traffic management by the Air Traffic Management Center (ATMC) of the JCAB, with providing dedicated meteorological information for ATM support which indicates future possible weather-related impact on air traffic flow, such as “Air Traffic Meteorological category forecast (ATMet category forecast)” and “SIGWX briefing sheet”. These two ATM-tailored MET products are both developed through close coordination with the ATMC, aiming at fulfilling their operational requirements.

2. ATMET CATEGORY FORECAST

2.1 The ATMet category forecast shows estimated current and future level of impacts on air traffic flow which are caused by significant weather in each ATC sector and at major airports. By using this ATMet category forecast, ATM officers in the ATMC can judge whether there are any possibilities to modify air traffic capacity in each ATC Sector or at aerodromes in a proactive manner, which can lead to effective and efficient air traffic flow management.

2.2 The ATMet category forecast is valid until 6 hours later and updated by 15 minutes every hour except since 14 to 16 UTC when usually amount of air traffic is less. Level of weather-related impacts on air traffic flow are estimated for each ATC sector in the domestic airspace and 7 major airports in four ranks with colour code (in ascending order, white, blue, yellow and red), and attached with the abbreviation of main-cause weather phenomena. This estimated level of impact is defined by various criteria of weather conditions. For example, in ATC sector, horizontal extent, location, and intensity of CB are used as major criteria, and at aerodrome, wind, visibility, and snow fall rate are considered.

2.3 In addition to the ATMC, the ATMet forecast is used by area control centres, air traffic controllers, some major airliners, and also, meteorological watch offices. In order to suit their each operational requirement, the forecast has three different types of format that can be easily understood by such many kinds of users (see Figure 1).

2.4 The criteria of each four categories in the forecast are decided by investigations on the past significant delay cases which may be affected by weather conditions (see Table1), considering aircrafts operating limitations, flight operations manuals of airliners, and suggestions from ATM officers. The investigations on past delay cases are done by collating weather conditions with actual results of air traffic flow control. In case major airways or airport operation minima are changed, before the AIP amendment is issued, ATMetC consult with ATMC to discuss modification of the criteria.

3. SIGWX BRIEFING SHEET

3.1 When an significant weather phenomenon affected major aerodrome, it may cause large impacts not only on the aerodrome operation but also on whole domestic air traffic flow. To mitigate such impact, ATMetC has conducted detail research on weather-related impact at such airports. From their experience, it has been revealed that there are some characteristic impact scenarios which are specific to the aerodrome. ATMetC has recently started to issue the SIGWX Briefing Sheet for Tokyo and New-Chitose Airport which depicts detail specific weather-related impact expected to occur at the airport (see Figure 2). ATMetC issues this Briefing Sheet when they forecast some significant weather which can cause such characteristic influences to the airport, and encourages ATM Officers quick response to such impact. Currently, target weather phenomena are strong wind at Tokyo International Airport (RJTT) and heavy snow at New-Chitose Airport (RJCC). Other weather-related impact scenarios can be identified by further research.

3.2 According to the discussion with ATMC and studies on past air traffic delay cases by ATMetC, each characteristic weather impact are shown in colour code (Red, Yellow and Gray).(See Figure 2). Colours are identified depending on severity and type of the impact, such as “Ground stop or divert”-Red, “holding, go-around or lowering of capacity” – Yellow and “holding or go-around” – Gray. As an example, the scenario and criteria at Tokyo International Airport are shown in Table 2.

3.3 From 12 to 15 hours before the significant weather is expected to reach at the airport, ATMetC considers making the Briefing Sheet. from 6 to 12 hours before, ATMetC provides the provisional sheet to ATMC and makes a briefing with it. And finally, from 0 to 6 hours before, ATMetC issues final version of the sheet with referring to real weather condition and makes extra-briefing, as necessary.

4. SUMMARY AND CONCLUSIONS

4.1 Since 2005, ATMetC have been developed and provided its ATM-tailored products with which they can directly support ATM operations in the ATMC. While such “Scenario-based” approach should be verified further, it is obviously effective to enhance smooth, better, efficient air traffic management at and around major congestive airports, like Tokyo International Airport. And needless to say, it is also essential to maintain close collaboration with ATMC and the other stakeholders to accomplish mature understanding what impacts the weather can cause.

4.2 The Conference is invited to note the information in this paper.

航空交通気象時系列予想 (表形式) 2012年06月19日09UTC発表

(UTC)	09	10	11	12	13	14	15
RJCC							
RJAA		SECT-OB	WIND SECT-OB	WIND	WIND CROSS		
RJTT	SECT-OB	SECT-OB	BD CROSS	WIND	BD CROSS	WIND AC-CROSS	
RJGG		CROSS WIND					
RJBB	CROSS			WIND			
RJFF							
ROAH	TS	TS					
S01							
S02							
S03							
S04							
S31							
S34							
T01							
T02							
T03				CB			
T04							
T06				CB			
T10				CB			
T11							
T12				CB			
T17				CB			
T21							
T22				CB			
T23				CB			
T24				CB			
T26				CB			
T27							
T28							
F01							
F02							
F03							
F05							
F06							
F07							
F08							
F11							
F15				CB	CB		
F16		CB					
F17							
N01							
N02							
N06							

気象庁
航空交通気象センター

気象による航空交通への影響が発生する可能性

- 非常に高い
- 高い
- やや高い
- 低い

※赤着色の気象要因
 RJAA: 上空3000ft以下で60kt以上の強風を伴う
 RJAA: CROSS25kt以上かつまたは種の降水現象を伴う
 RJTT: 地上平均風速30kt以上かつ上空5000ft以下で60kt以上の強風を伴う
 RJTT: A/C-BWY CROSS25kt以上かつまたは種の降水現象を伴う
 RJTT: A/C-BWY CROSS30kt以上
 RJTT: 地上平均風速40kt以上
 RJGG: CROSS25kt以上かつまたは種の降水現象を伴う
 RJGG: CROSS30kt以上
 RJBB: 地上平均風速40kt以上
 ROAH: TS OH

Colour code

Major Airport and Sector

航空交通気象時系列予想 (地図形式) 2012年06月19日09UTC発表

気象庁航空交通気象センター

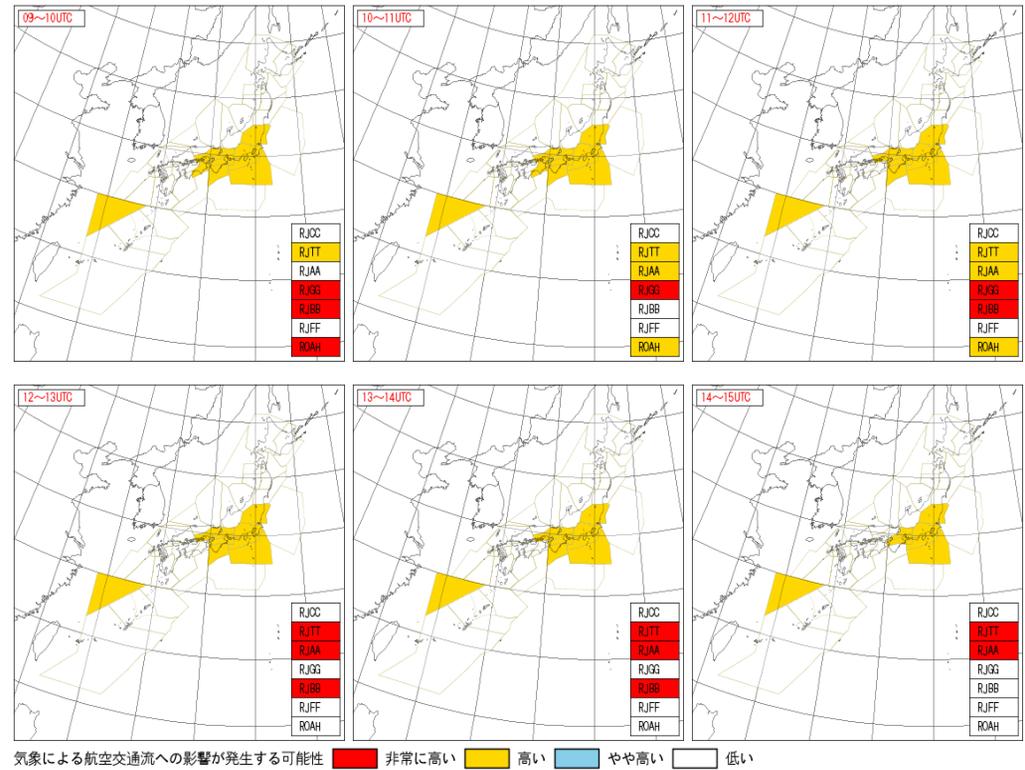


Figure 1. Air Traffic Meteorological Forecast (09UTC on 19th June 2012)
Tabular format (left) and Map-type format (right)

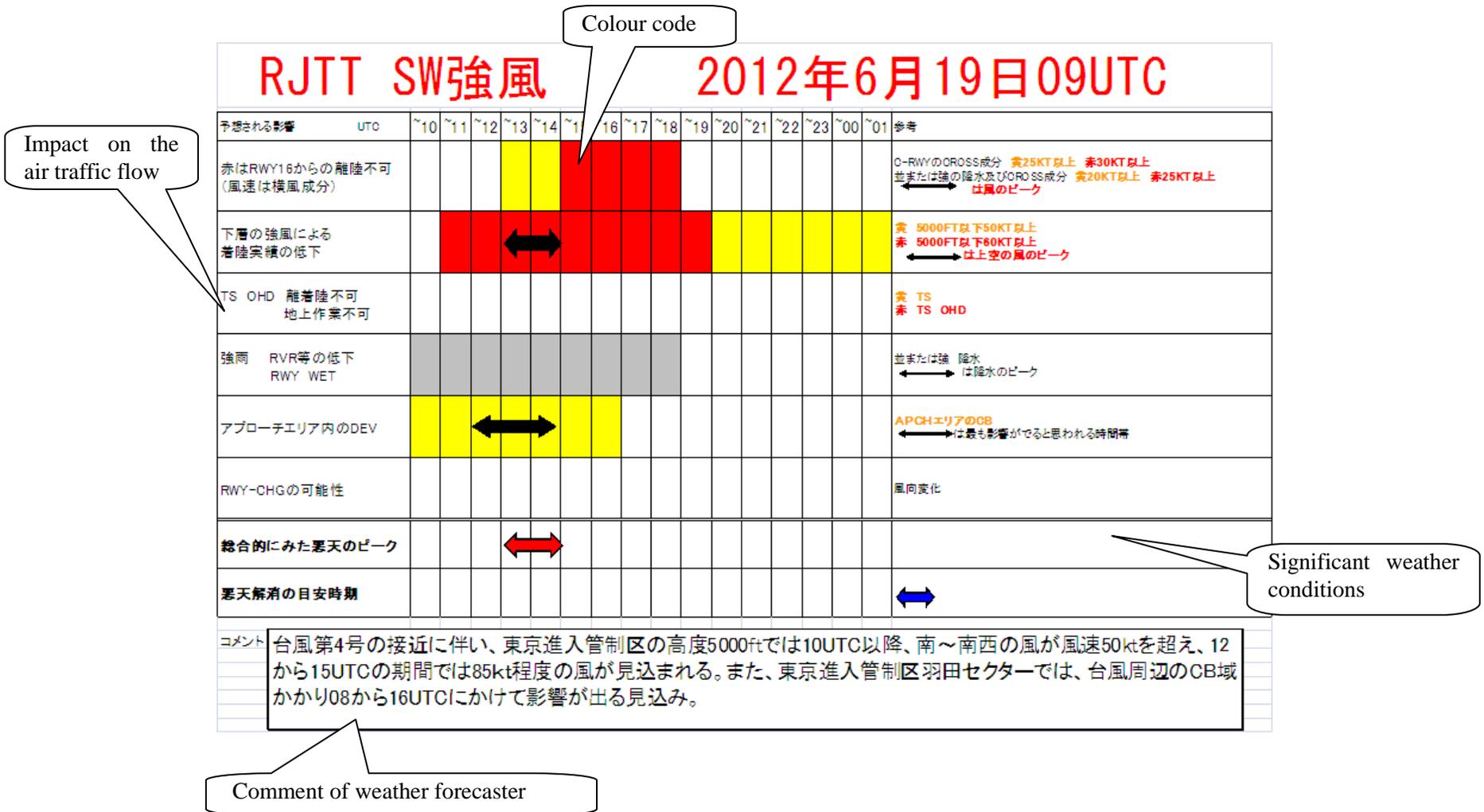


Figure 2. SIGWX briefing sheet (case of strong wind at RJTT)

Table 1 The criteria for ATMet Category Forecast. The weather conditions are converted into color code

target area color	RJTT RWY34-16 & RWY22-04-23-05	RJAA RWY34-16	RJGG RWY36-18	RJBB RWY06-24	RJFF RWY34-16	ROAH RWY36-18	RJCC RWY01-19	sector
RED	wind speed is over 40kt							the proportion occupied with CB whose top of over FL300 in the sector is over 50% (in the sector T27 and T28, CB top of over FL240, southern sector from Y14)
	cross wind component to runway is over 30kt							
	cross wind component to runway is over 25kt with moderate or heavy precipitation							
	visibility is less than 600m	visibility is less than 400m					visibility is less than 800m with snow	
	ceiling is less than 200ft						ceiling is less than 400ft with snow blowing snow	
	TS OHD							
YELLOW	snow fall rate is over 1cm/1h							CB exists on selected airway or on selected area the proportion occupied with CB whose top of over FL300 in the sector is over 20% (in the sector T27 and T28, CB top of over FL240, southern sector from Y14)
	wind speed at surface is over 30kt and wind speed below 5000ft is over 60kt		wind speed below 3000ft is over 60kt			snow fall rate is over 5cm/3h		
	snow fall rate is over 2cm/3h when wind direction is within 120 - 240 degree							
	over 34kt with gust is over 50kt							
	cross wind component to runway is over 25kt							
	cross wind component to runway is over 20kt with moderate or heavy precipitation							
BLUE	TS							the proportion occupied with CB whose top of over FL300 in the sector is over 10% (in the sector T27 and T28, CB top of over FL240, southern sector from Y14)
	ceiling is less than 200ft							
	moderate or heavy snow			visibility is less than 400m				
	CB in HANEDA sector		CB in NARITA sector			visibility is less than 1600m with snow		
	ceiling is less than 600ft with snow							
	snow fall rate is over 3cm/3h when wind direction is within 250-110 degree							
BLUE	wind speed at surface is over 30kt and wind speed below 5000ft is over 50kt [WIND]					wind speed below 3000ft is over 50kt		the proportion occupied with CB whose top of over FL300 in the sector is over 10% (in the sector T27 and T28, CB top of over FL240, southern sector from Y14)
	TS in TAF but CB doesn't exist in the aerodrome							
						wind speed is over 20kt with snow		
ceiling is less than 200ft								

Table 2 The criteria for SIGWX briefing sheet (excerpts)

RED	Wind speed below 5000ft is over 60kt
	Cross wind component to runway is over 30kt (dry condition) or 25kt (wet condition)
	TS OHD
YELLOW	Wind speed below 5000ft is over 50kt
	Cross wind component to runway is over 25kt (dry condition) or 20kt (wet condition)
	CB in approach area
GRAY	TS
	Lowering of visibility or ceiling
	Change of wind direction
	Wet runway condition