

International Civil Aviation Organization



ICAO

WORKING PAPER

ICAO Asia and Pacific (APAC)
Twenty-Sixth Meeting of the Meteorology Sub-Group
(MET SG/26)

Online, 1 to 5 August 2022

Agenda Item 6: Research, development and other initiatives

**ENCOURAGING INFORMATION PROVISION TO THE DOCUMENTS OF SIGMET
COORDINATION ACTIVITIES AND THEIR PRACTICES IN THE APAC REGION**

(Presented by MET/S WG ad hoc group on SIGMET Coordination)

SUMMARY

This paper outlines the updates on the online repository of the SIGMET Coordination activities and the consolidation document of SIGMET Coordination practices in the APAC Region developed by the ad hoc group on SIGMET Coordination under MET/S WG. Encouraging States' information provision for the consolidation document is proposed to contribute to facilitating more efficient and better coordinated SIGMET services.

1. INTRODUCTION

1.1 Under Amendment 79 to Annex 3, SIGMET Coordination has become a recommended practice on 5 November 2020.

3.4.4 *Recommendation --- An MWO should coordinate SIGMET with neighbouring MWO(s), especially when the en-route weather phenomenon extends or is expected to extend beyond the MWO's specified area of responsibility, in order to ensure harmonized SIGMET provision.*

1.2 In the APAC Region, there are various SIGMET Coordination initiatives and projects dated back since 2016. In 2020, an ad hoc group on SIGMET Coordination was formed in MET/S WG/10. The group members include China, Fiji, India, Indonesia, Malaysia, Thailand, Vietnam and IFALPA with Hong Kong China, Japan and Singapore as the joint rapporteurs. During MET SG/25 in 2021, the meeting adopted Decision MET SG/25-06 on further update of the SIGMET coordination guidance for enhancement of SIGMET coordination activities in the APAC Region.

1.3 During MET/S WG/12, the ad hoc group on SIGMET Coordination presented the development of an online repository of SIGMET coordination activities and a consolidation document of SIGMET coordination practices in the APAC Region ([MET/S WG/12 WP/08](#)) to facilitate information sharing among the States. The ad hoc group invited the States to provide updates to the online repository and the consolidation document and a Draft Conclusion MET/S WG/12/01 was formulated.

Draft Conclusion MET/S WG/12/01: *Updating the online repository on SIGMET Coordination and the consolidation document on SIGMET Coordination Practices in the APAC region*

That, States be invited to provide regular updates to the online repository on SIGMET Coordination and the consolidation document on SIGMET Coordination practices in the APAC region (using the contact details provided in the documents) to contribute to the ad-hoc group on SIGMET coordination in developing further guidance for enhancement of SIGMET coordination in the Region by gathering lessons learnt from existing SIGMET coordination activities to facilitate more efficient and better coordinated SIGMET service to meet aviation users' expectations and operational requirements in the Region.

1.4 This paper outlines the updates since then on the online repository and consolidation document on SIGMET Coordination practices and made further suggestions to facilitate more efficient and better coordinated SIGMET service.

2. DISCUSSION

Recent updates on the online repository and consolidation document

2.1 An online repository of the SIGMET Coordination activities was developed to let MWOs in the Region to keep track of the various SIGMET Coordination projects being undertaken in the Region. The repository has been updated with the recent SIGMET Coordination activities presented in MET/S WG/12 and other updates from the States. The updated online repository was attached in Appendix A and made available online for access by States/Administrations via the following link: [Link to online repository of SIGMET Coordination activities.](#)

2.2 Gathering key lessons learnt from various SIGMET Coordination initiatives in the Region and relevant workshops on such projects, the ad hoc group developed a consolidation document of SIGMET Coordination practices in the APAC Region. The consolidation document discusses and summarizes the local practices on SIGMET issuance and the meaning of “consensus” when performing SIGMET Coordination. Since MET/S WG/12, the SIGMET issuance practices by Vietnam (Hanoi and Ho Chi Minh FIR) and India (Chennai FIR) were incorporated. Besides, minor editorials and alignment of the table for local practices were made. The updated consolidation document was attached in Appendix B and made available online for access by States/Administrations via the following link: [Link to consolidation document of SIGMET Coordination practices in the APAC Region.](#)

2.3 Noting that currently there includes local practices from only 8 States in section 2.2 of the consolidation document, the ad hoc group is of the view that more inputs from States should be required to further enrich the consolidation document. In this connection, the ad hoc group discussed the plausible ways to publicize the document and invite States' inputs, and concluded that one effective way is for ICAO Asia/Pacific Regional office to issue a State Letter. Thus, the ad hoc group suggests the following Decision for consideration by MET SG/26:

Decision MET SG/26/xx: Encourage States to provide input on local SIGMET issuance practices for the consolidation document on SIGMET Coordination Practices in the APAC region

That, MET SG a) supports the conclusion MET/S WG/12/01 on inviting States to provide updates on the online repository and the consolidation document on SIGMET Coordination practices

in the APAC region and b) invites the ICAO Asia/Pacific Regional Office to notify the States/Administrations of a) of this Decision and the link to the consolidation document by issuing a State Letter.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the updates on the online repository and the consolidation document;
- b) consider the Decision proposed in paragraph 2.3.

Appendix A

Online repository for APAC SIGMET Coordination activities				
SIGMET Coordination group	State/Administrations involved	FIRs involved	Status	Relevant ICAO paper
Collaborative SIGMET Issuance (CSI)	Japan	Fukuoka	Operational	MET/S WG/12 WP/05
	Lao PDR	Vientiane		
	Myanmar	Yangon		
	Philippines	Manila		
	Thailand	Bangkok		
	Vietnam	Hanoi Ho Chi Minh		
GHKPSV SIGMET Coordination	Cambodia	Phnom Penh	Operational	MET/S WG/11 IP/03
	China	Guangzhou		
		Kunming		
		Sanya		
	Hong Kong, China	Hong Kong		
	Vietnam	Hanoi		
Ho Chi Minh				
SSEA SIGMET Coordination	India	Chennai	Operational trial	MET/S WG/12 IP/02
		Mumbai		
		Delhi	Trial	
		Kolkata		
	Indonesia	Jakarta	Operational	
	Sri Lanka	Colombo		
	Hong Kong, China			
Regional Collaboration	Philippines	Manila	Operational	MET SG/25 WP/14
	United States	Oakland Oceanic		

Regional Collaboration	Fiji	Nadi	Trial	MET SG/25 IP/03
	Hong Kong, China			
	Solomon Islands	Honiara		
Regional Collaboration	Hong Kong, China	Hong Kong	Operational	MET SG/25 IP/04
	Philippines	Manila		
Regional Collaboration	Malaysia	Kota Kinabalu	Operational	MET/S WG/12 WP/05
	Philippines	Manila		
	Singapore	Singapore		
Regional Collaboration	Australia	Brisbane	Trial	MET SG/25 IP/06
	New Zealand	Auckland Oceanic East		
		New Zealand		
Regional Collaboration	Australia	Brisbane	Trial	MET SG/25 IP/20
		Melbourne		
	Indonesia	Jakarta		
		Ujung Pandang		
Regional Collaboration	China	Shenyang	Operational	DGCA 56/IP/4/16
		Urumqi		
	Russia	Khabarovsk		
		Irkutsk		
		Novosibursk		
	Operational SIGMET Coordination (OSC)	Indonesia		
Ujung Pandang				
Malaysia		Kota Kinabalu		
		Kuala Lumpur		
Singapore	Singapore			
Regional Collaboration	Japan	Fukuoka	Trial	MET/S WG/8 IP/6

	United States	Oakland Oceanic		
		Anchorage Oceanic		
Regional Collaboration	Malaysia	Kuala Lumpur	Operational	MET/S WG/12 WP/05
	Myanmar	Yangon		
Mekong SIGMET Coordination	Cambodia	Phnom Penh	Operational	MET/S WG/12 IP/03
	Thailand	Bangkok		
	Vietnam	Ho Chi Minh		
	Hong Kong, China			
Regional Collaboration	Indonesia	Ujung Pandang	Trial	MET/S WG/12 IP/04
	United States	Oakland Oceanic		
Regional Collaboration	Indonesia	Ujung Pandang	Trial	MET/S WG/12 IP/04
	Philippines	Manila		
For updates on the online repository, please contact Ms Christy Leung (yyleung@hko.gov.hk), Ms Michiko Ikeda (michi-ikeda@met.kishou.go.jp) or Mr Goh Wee Poh (GOH_Wee_Poh@nea.gov.sg).				

Appendix B

Consolidation of SIGMET Coordination Practices in the APAC Region

1. Introduction

1.1 Inconsistencies in SIGMET information across Flight Information Regions (FIRs) issued by different Meteorological Watch Offices (MWOs) will pose safety concerns and confusion to airspace users. Section 16 of Appendix L, Asia/Pacific Regional SIGMET Guide mentions that the subjectivity inherent in weather forecasting would affect harmonization of SIGMET information. One way to address this problem is by setting objective criteria for SIGMET coordination that ensures better consistency in SIGMET information.

1.2 In this document, a consolidation of the various practices developed from different SIGMET Coordination groups, results of user surveys and local practices of various MWOs in the APAC Region are provided as the current status. Please note that the SIGMET coordination procedures described in this document include some contents that have not yet been agreed within the whole Region.

2. SIGMET issuance practice

2.1 SIGMET coordination could be facilitated through better alignment in SIGMET issuance practices among the MWOs. However, issuance criteria generally vary from region to region given that each region has its own unique weather, climate characteristics and challenges. Apart from subjectivity in the assessment of the weather situation, other local considerations such as number of aircraft movements, size of the FIR, user requirements, etc. would also affect the SIGMET issuance practices.

2.2 Below is a consolidation of the various local practices for SIGMET issuance in the APAC Region. These local practices are consolidated from the Issuance criteria for thunderstorms in Appendix J, Asia/Pacific Regional SIGMET Guide, and/or supplemented by States via various SIGMET Coordination activities and workshops in the region.

Phenomenon	Issuance criteria	MWOs practice
Bangkok FIR		
Thunderstorms	Minimum dimension for SIGMET issuance	55 NM x 55 NM
Brisbane & Melbourne FIR		
Thunderstorms	Minimum dimension for areas of high-level air traffic movements and low-level flights	3000 NM ²
	Minimum dimension for areas with lower air traffic movements and generally high-level flights with airborne radar	7200 NM ²
	Distance between adjacent thunderstorm cells to be applied for frequent and squall line SIGMETs	40 NM
	Length of thunderstorms requiring the issuance of squall line SIGMET	≥ 100 NM

Chennai FIR		
Thunderstorms	Minimum dimension for land areas	≥ 30 NM x 30 NM
	Minimum dimension for ocean areas	≥ 50 NM x 50 NM
Colombo FIR		
Thunderstorms	Minimum dimension for land areas	≤ 30 NM x 30 NM
	Minimum dimension for ocean areas	30 NM x 30 NM
Fukuoka FIR*		
Thunderstorms	Minimum dimension for the approach control areas around congested airports	100 km x 100 km [54 NM x 54 NM]
	Minimum dimension for areas around main air routes in Japan	150 km x 150 km [81 NM x 81 NM]
	Minimum dimension for other oceanic areas	200 km x 200 km [108 NM x 108 NM]
	Length of thunderstorms requiring the issuance of squall line SIGMET	500 km (Length) x 100 km (Width) [270 NM x 54 NM]
Hanoi & Ho Chi Minh FIR*		
Thunderstorms	Minimum dimension for areas within TMA of international airports or over air routes with dense flight operations	100 km x 100 km [54 NM x 54 NM]
	Minimum dimension for other areas	200 km x 200 km [108 NM x 108 NM]
	Length of thunderstorms requiring the issuance of squall line SIGMET	500 km (Length) x 100 km (Width) [270 NM x 54 NM]
Jakarta FIR		
Thunderstorms	Minimum dimension for SIGMET issuance	60 NM x 60 NM
	Minimum separation between two identifiable SIGMET areas	45 NM
	Length of thunderstorms requiring the issuance of squall line SIGMET	270 NM (Length) x 55 NM (Width)
Manila FIR		
Thunderstorms	Minimum dimension for land areas	60 NM x 60 NM
	Minimum dimension for ocean areas	120 NM x 120 NM
Ujung Pandang FIR		
Thunderstorms	Minimum dimension for SIGMET issuance	60 NM x 60 NM
	Minimum separation between two identifiable SIGMET areas	45 NM
	Length of thunderstorms requiring the issuance of squall line SIGMET	270 NM (Length) x 55 NM (Width)

* Original sizes provided in km. Square brackets are used to provide their corresponding sizes in NM.

2.3 In the consolidation process, it is noted that user surveys were conducted to understand the user preferences on SIGMET issuance. Below is a consolidation of the user preferences on SIGMET issuance in the APAC Region:

2.3.1 Based on the user survey collected during the Hong Kong Observatory (HKO) SIGMET Coordination Workshop ([ICAO MET SG/25 – WP/15](#)) with targeted participants from pilots, air traffic controllers, operational centre personnel, the user preferences on SIGMET issuance were summarized below:

Phenomenon	Issuance criteria	User preference
Thunderstorms	Minimum dimension in Terminal area	30 NM x 30 NM
	Minimum dimension En-route	30 NM x 30 NM
	Minimum gap between two SIGMET areas	60 NM
Turbulence	Horizontal extent based on report	30 NM
	Vertical extent based on report	2000 FT
Icing	Horizontal extent based on report	60 NM
	Vertical extent based on report	4000 FT
	Minimum dimension of an icing area	60 NM x 60 NM

2.4 As a synoptic scale weather system, tropical cyclone (TC) could affect multiple FIRs in its lifespan and would warrant close coordination across multiple MWOs in the issuance of WC SIGMET. Gathering lessons learnt from SIGMET Coordination activities in the APAC Region, a consolidation on the issuance of WC SIGMET across FIR boundaries was summarized below:

- MWO responsibility for WC SIGMET issuance depends on which FIR the TC center is observed in.
 - When handling a TC leaving one’s FIR, the MWO concerned is advised to seek confirmation with the neighbouring MWO that they have issued a related observed/forecast WC SIGMET before the lapse of or cancelling the original WC SIGMET. This is to avoid a null period of WC SIGMET for the TC.
 - *ICAO Annex 3 7.1.6 stipulates that a WC SIGMET shall be issued as soon as possible but not more than 12 hours before the commencement of the period of validity.* For early alerting of the threat of TC approach and to facilitate coordination in advance, it is suggested that a forecast WC SIGMET be issued at least 6 hours but no more than 12 hours before a TC of tropical storm or above intensity is expected to enter ones’ FIR. Similarly, it is suggested that a forecast WC SIGMET be issued for the expected intensification of the TC inside one’s FIR at least 6 hours but no more than 12 hours before the TC is expected to intensify into a tropical storm.
- MWOs with local issuance practice for WC SIGMET across FIR boundaries are welcome to supplement inputs on the above.

3. Meaning of “Consensus”

3.1 A common understanding of what constitutes consensus can help focus consultation efforts to ensure consensus can be arrived. In this regard, Section 13 of Appendix L, Asia/Pacific Regional SIGMET Guide indicates that it may be necessary to identify indicators of consensus, which should form part of the preliminary requirements as agreed by the participating MWOs. A consolidation of the maximum acceptable difference between WS

SIGMETs across FIRs from various SIGMET Coordination activities and workshops were given below:

3.1.1 JMA as a CSI member State conducted a survey for airlines about the acceptable difference of SIGMETs issued by neighbouring MWOs ([MET SG/24 WP/14](#)) and proposed a draft guideline of acceptable difference as follows:

WS SIGMET – Thunderstorms	Maximum acceptable difference across FIRs
Cloud top height	≤ 5000 FT (≤ 2000 FT at cruising altitude, viz. FL300 – FL400 desirable)
Movement direction	≤ 90 degree (≤ 45 degree desirable)

3.1.2 HKO conducted a survey during the HKO SIGMET Coordination Workshop ([ICAO MET SG/25 – WP/15](#)) with targeted participants from pilots, air traffic controllers, operational centre personnel, the maximum acceptable difference between SIGMETs across FIRs were as follows:

	User preference	MWO practice
WS SIGMET – thunderstorms		
• Cloud top height	≤4000 FT	≤4000 FT
• Movement speed	≤10 KT	≤5 KT
• Movement direction	≤45 degree	≤45 degree
WS SIGMET – turbulence		
• Height level	≤2000 FT	Spread between 1000 – 5000 FT
WS SIGMET – icing		
• Height level	≤2000 FT	≤4000 FT

Note: There is greater difficulty in arriving a consensus view of the height of turbulence and icing with a more stringent criterion from user’s expectation.

3.1.3 Noting the outcome from 3.1.2, the GHKPSV SIGMET Coordination group ([MET/S WG/11 IP/03](#)) and SSEA SIGMET Coordination ([MET/S WG/11 IP/04](#)) have adopted the following objective criteria as reference when conducting SIGMET Coordination:

WS SIGMET – Thunderstorms	Acceptable difference across FIRs
Cloud top height	≤4000 FT
Movement speed	≤10 KT
Movement direction	≤45 degree
WS SIGMET – Turbulence	
Height level	≤2000 FT
WS SIGMET – Icing	
Height level	≤2000 FT

4. Conclusion

4.1 SIGMET Coordination projects and initiatives have enhanced technical discussions among MWOs. Related workshops and user surveys conducted have further allowed the consolidation of practices across the APAC Region. This document serves as a reference for all MWOs participating in SIGMET Coordination activities in the Region. Inputs and updates from MWOs are welcome for a more comprehensive summary of the current practices adopted by various FIRs and development of an updated guidance for enhancement of SIGMET Coordination activities in the Region.

For updates on the consolidation document, please contact Ms Christy Leung (vyleung@hko.gov.hk), Ms Michiko Ikeda (michi-ikeda@met.kishou.go.jp) or Mr Goh Wee Poh (GOH Wee Poh@nea.gov.sg).