International Civil Aviation Organization

WORKING PAPER

ASIA AND PACIFIC (APAC)
Twenty-Seventh Meeting of the Meteorology Sub-Group (MET SG/27)

Bangkok, Thailand, 04 to 08 September 2023

Agenda Item 3: Air navigation deficiencies

REVIEW OF AIR NAVIGATION DEFICIENCIES

(Presented by the Secretariat)

SUMMARY

This paper presents the List of (open) APANPIRG air navigation deficiencies in the field of meteorology (MET) and invites the meeting to review and update, as necessary, the associated corrective action plans (CAPs) for the resolution of deficiencies.

1. INTRODUCTION

1.1 An APANPIRG air navigation deficiency is a situation where a facility, service or procedure does not comply with a regional air navigation plan approved by the Council or with related ICAO Standards and Recommended Practices (SARPs), and which situation has a negative impact on the safety, regularity or efficiency of international civil aviation[1].

1.2 This paper invites the meeting to review the List of air navigation deficiencies in the field of MET, as recorded by the APAC Air Navigation Planning and Implementation Regional Group (APANPIRG), and provide updates, as necessary, concerning the associated corrective action plans (CAPs) for the resolution of deficiencies.

2. DISCUSSION

2.1 As endorsed by the Thirty-third Meeting of APANPIRG (APANPIRG/33, 22 – 24 November 2022, Conclusion APANPIRG/33/14 – Update of Information in APANPIRG Air Navigation Deficiencies Reporting Form), the current List of air navigation deficiencies contains twelve (12) (open) deficiencies in the MET field.

2.2 APANPIRG/33 noted that the Solomon Islands had reported significant progress at MET SG/26 towards rectifying the deficiency AP-MET-23 (concerning the lack of SIGMET issued for the Honiara FIR). In addition, APANPIRG/33 acknowledged further information submitted by the Solomon Islands (in APANPIRG/33, IP/08 – Rectification of APANPIRG AN Deficiency AP-MET-23) to validate the rectification of the deficiency. Therefore, based on the recommendation of MET

[1] APANPIRG Procedural Handbook, 6th Ed., 1 June 2020, Part V, section 2, paragraph 1.3

SG/26, APANPIRG/33 endorsed the removal of deficiency AP-MET-23 from the Open List.

2.3 APANPIRG/33 also noted that Papua New Guinea (PNG) and Tonga had reported significant progress at MET SG/26 towards rectifying the deficiencies AP-MET-04 and AP-MET-17 (concerning information on volcanic activity not provided regularly to ATS units, MWOs and VAACs). Furthermore, subject to additional corrective actions, confirmation from the recipient operational units, and evidence of relevant, established procedures, APANPIRG/33 noted that PNG and Tonga could report the rectification of the deficiencies to ICAO.

2.4 A copy of the APANPIRG Reporting Form on Air Navigation Deficiencies in the MET field, including detailed notes, is provided in **Appendix A**. The (open) deficiencies concern MET facilities and services provided in seven (7) APAC States, as summarised in **Table 1** below:

Table 1: Summary of APANPIRG air navigation deficiencies in the MET field

MET facilities and services	**Asia/Pacific States**	**Def. ID**	**Status**
Aerodrome meteorological observations or reports	Kiribati Nauru	AP-MET-02 AP-MET-21	open open
Meteorological watch office (MWO) or SIGMET information	Democratic Peoples' Republic of Korea Nauru Nepal Papua New Guinea Papua New Guinea	AP-MET-16 AP-MET-24 AP-MET-14 AP-MET-08 AP-MET-22	open open open open open
Volcanic ash/activity information	Papua New Guinea Tonga	AP-MET-04 AP-MET-17	open open
WAFS forecasts or flight briefings	Kiribati Nauru Solomon Islands	AP-MET-18 AP-MET-19 AP-MET-20	open open open

2.5 Concerning the deficiencies (AP-MET-18, AP-MET-19 and AP-MET-20) related to the availability of WAFS forecasts for inclusion in flight briefings and documentation, a selection relevant ICAO Annex 3 provisions are reproduced in **Appendix B** to help the States concerned determine the requirements for WAFS forecasts (MET SG/26, Action No. 26/04 refers).

2.6 Noting that the overall rate of progress on the resolution of air navigation deficiencies remains limited, and the absence of target dates in the CAPs remains a significant obstacle, the Secretariat is liaising directly with those States concerned to facilitate the establishment, reporting and progress of CAPs to expedite the rectification of the air navigation deficiencies.

3. ACTION BY THE MEETING

3.1 This paper invites the meeting to:

a) Note the information in this paper;

b) Review the List of (open) APANPIRG air navigation deficiencies in the MET field in **Appendix A** and provide updates, as necessary, especially for the CAPs to rectify the deficiencies; and

c) Discuss any relevant matters as appropriate.

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APPENDIX A

Adapted from APANPIRG/33, Appendix D to the Report on Agenda Item 4.
Updates endorsed by APANPIRG/33 show deleted text using strikeout (~~text to be deleted~~) and added text with grey shading (text to be inserted).

REPORTING FORM ON (OPEN) AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ Facilities** (Index No.)	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
MWO and SIGMET service (Annex 3: Chapter 3, 3.4 and Chapter 7)	**Democratic Peoples' Republic of Korea** (DPRK) (AP-MET-16)	Requirements for MWO and SIGMET service not established for Pyongyang FIR	2008	Reported by ICAO Regional Office mission	Establish MWO to provide required service, including SIGMET information for Phnom Penh FIR. **See notes below for more information.**	GACA, Democratic Peoples' Republic of Korea	TBC	A
Meteorological observations and reports. (Annex 3: Chapter 4)	**Kiribati** (AP-MET-02)	METAR from Kiribati not available on regular basis.	1998	Reported by airlines	Equipment to be installed and arrangements to be made for regular observations and reports, including: training of personnel; maintenance of equipment; calibration and verification of meteorological observations; and proper/secure transmission of data. **See notes below for more information.**	State designated MET authority	TBC	A
Meteorological information for operators and flight crew members, including forecasts provided by the WAFCs (Annex 3: Chapter 9)	**Kiribati** (AP-MET-18)	WAFC forecasts not available for inclusion in flight briefings and documentation	2008	Reported by TCB CAEMSA-SP Technical Expert	Implement procedures and systems for the required meteorological information to be supplied to operators and flight crew members, including forecasts generated from the digital forecasts provided by the WAFCs. **See notes below for more information.**	State designated MET authority	TBC	U
Meteorological information for operators and flight crew members, including forecasts provided by the WAFCs (Annex 3: Chapter 9)	**Nauru** (AP-MET-19)	WAFC forecasts not available for inclusion in flight briefings and documentation	2008	Reported by TCB CAEMSA-SP Technical Expert	Implement procedures and systems for the required meteorological information to be supplied to operators and flight crew members, including forecasts generated from the digital forecasts provided by the WAFCs. **See notes below for more information.**	State designated MET authority	TBC	U
Meteorological observations and reports. (Annex 3: Chapter 4)	**Nauru** (AP-MET-21)	METAR/SPECI service not provided	2008	Reported by TCB CAEMSA-SP Technical Expert	Equipment to be installed and arrangements to be made for regular observations and reports, including: training of personnel; maintenance of equipment; calibration and verification of meteorological observations; and proper/secure transmission of data. **See notes below for more information.**	State designated MET authority	TBC	U

REPORTING FORM ON (OPEN) AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ Facilities** (Index No.)	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Provision of SIGMET information (Annex 3, Chapter 7)	**Nauru** (AP-MET-24)	Lack of SIGMET issued for the Nauru FIR.	Sep 2011	IATA deemed this situation unsafe and unacceptable to airline operations.	Implement procedures for SIGMET information to be issued by the designated meteorological watch office/s concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations. **See notes below for more information.**	State designated MET authority	TBC	U
Provision of SIGMET information (Annex 3: Chapter 7)	**Nepal** (AP-MET-14)	Requirements for issuance and dissemination of SIGMET information for Kathmandu FIR have not been fully implemented	2000		Implement procedures for SIGMET information to be issued by the designated meteorological watch office/s concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations. **See notes below for more information.**	State designated MET authority	TBC	A
Reporting of information on volcanic eruptions to civil aviation units. (Annex 3, 3.6, 4.8)	**Papua New Guinea** (AP-MET-04)	Information on volcanic activity not provided regularly to ATS units, MWOs and VAACs.	1995	Observed by States concerned. Reported at the WMO/ICAO Workshop on Volcanic Ash Hazards (Darwin, 1995)	Establish arrangements for State volcano observatories to send the required volcano observation information as quickly as practicable to the associated ACC/FIC, MWO and VAAC. **See notes below for more information.**	Rabaul Volcano Observatory, NWS and ASL of Papua New Guinea	TBC	A
Provision of SIGMET for volcanic ash (Annex 3: Chapter 7)	**Papua New Guinea** (AP-MET-08)	Requirements for issuance and proper dissemination of SIGMET for volcanic ash have not been fully implemented	Dec 2003	Reported by airlines, noted by Volcanic Ash Advisory Centres and confirmed by ICAO mission	Implement procedures for SIGMET information to be issued by the designated meteorological watch office/s concerning the occurrence or expected occurrence of volcanic ash. **See notes below for more information.**	NWS of Papua New Guinea	TBC	U

REPORTING FORM ON (OPEN) AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION								
Identification		**Deficiencies**			**Corrective action**			
Requirements	**States/ Facilities** (Index No.)	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action ***
Provision of SIGMET information (Annex 3, Chapter 7)	**Papua New Guinea** (AP-MET-22)	Lack of SIGMET issued for the Port Moresby FIR.	Sep 2011	IATA deemed this situation unsafe and unacceptable to airline operations.	Implement procedures for SIGMET information to be issued by the designated meteorological watch office/s concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations. **See notes below for more information.**	State designated MET authority	TBC	U
Meteorological information for operators and flight crew members, including forecasts provided by the WAFCs (Annex 3: Chapter 9)	**Solomon Islands** (AP-MET-20)	WAFC forecasts not available for inclusion in flight briefings and documentation	2008	Reported by TCB CAEMSA-SP Technical Expert	Implement procedures and systems for the required meteorological information to be supplied to operators and flight crew members, including forecasts generated from the digital forecasts provided by the WAFCs. **See notes below for more information.**	State designated MET authority	TBC	U
~~Provision of SIGMET information (Annex 3, Chapter 7)~~	~~**Solomon Islands** (AP-MET-23)~~	~~Lack of SIGMET issued for the Honiara FIRs.~~	~~Sep 2011~~	~~IATA deemed this situation unsafe and unacceptable to airline operations.~~	~~Implement procedures for SIGMET information to be issued by the designated meteorological watch office/s concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations.~~ ~~**See notes below for more information.**~~	~~State designated MET authority~~	~~TBC~~	~~U~~
Reporting of information on volcanic eruptions to civil aviation units. (Annex 3: 3.6, 4.8)	**Tonga** (AP-MET-17)	Information on volcanic activity not provided regularly to ATS units, MWOs and VAACs	2008	Reported by TCB CAEMSA-SP technical expert	Establish arrangements for State volcano observatories to send the required volcano observation information as quickly as practicable to the associated ACC/FIC, MWO and VAAC. **See notes below for more information.**	MOI and MEIDECC	TBC	U

NOTES ON THE (<u>OPEN</u> AND <u>CLOSED</u>) AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION				
Index No.	**State**	**Update Date**	**NOTES ON <u>OPEN</u> AND <u>CLOSED</u> DEFICIENCIES**	**Status**
AP-MET-01	Solomon Islands	December 2020	Removed from the open List; APANPIRG/31 Conclusion 31/19, refers.	Closed

NOTES ON THE (OPEN AND CLOSED) AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION				
Index No.	**State**	**Update Date**	**NOTES ON OPEN AND CLOSED DEFICIENCIES**	**Status**
AP-MET-02	Kiribati	September 2017	APANPIRG/28 noted that Kiribati should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-03	Indonesia	September 2017	Removed from the open List, APANPIRG/28 Conclusion 28/29 refers.	Closed
AP-MET-04	Papua New Guinea	November 2022 September 2017	APANPIRG/33 noted MET SG/26 recommended that Papua New Guinea: • Conduct additional corrective actions, including seeking confirmation from the recipient operational units and providing evidence of the relevant established procedures; and • Submit an official report to ICAO providing complete details of the action taken. APANPIRG/28 noted that Papua New Guinea should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-05	–	–	This Index No. is not used.	Closed
AP-MET-06	Indonesia	September 2017	Removed from the open List, APANPIRG/28 Conclusion 28/29 refers.	Closed
AP-MET-07	Philippines	November 2019	Removed from the open List, Conclusion APANPIRG/30/19, refers.	Closed
AP-MET-08	Papua New Guinea	September 2017	APANPIRG/28 noted that Papua New Guinea should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-09	Cambodia	September 2018	Removed from the open List, APANPIRG/29 Decision 29/23 refers	Closed
AP-MET-10	–	–	This Index No. is not used.	Closed
AP-MET-11	Cambodia	September 2018	Removed from the open List, APANPIRG/29 Decision 29/24 refers	Closed
AP-MET-12	Lao PDR	September 2018	Removed from the open List, APANPIRG/29 Decision 29/24 refers	Closed
AP-MET-13	–	–	This Index No. is not used.	Closed
AP-MET-14	Nepal	September 2017	APANPIRG/28 noted that Nepal should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-15	–	–	This Index No. is not used.	Closed

NOTES ON THE (OPEN AND CLOSED) AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION				
Index No.	**State**	**Update Date**	**NOTES ON OPEN AND CLOSED DEFICIENCIES**	**Status**
AP-MET-16	Democratic People's Republic of Korea	September 2017	APANPIRG/28 noted that DPRK should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-17	Tonga	November 2022	APANPIRG/33 noted MET SG/26 recommended that Tonga: • Conduct additional corrective actions, including seeking confirmation from the recipient operational units and providing evidence of the relevant established procedures; and • Submit an official report to ICAO providing complete details of the action taken.	**Open**
		September 2017	APANPIRG/28 noted that: • Removal of the Deficiency from the open List is subject to the concurrence of the ATS units, MWOs and VAACs concerned that the Deficiency is resolved.	
		June 2018	MET SG/22 noted that: • VAAC Wellington was coordinating with Tonga on the validation of corrective action taken to resolve the Deficiency.	
		29 May 2017	MOI, Civil Aviation Division, advised that: • Relevant operating procedures implemented in the units concerned and case studies of real volcanic events presented as evidence of the State volcano observatory's issuance of the required volcano observation information.	
		10 May 2013	Ministry of Infrastructure (MOI), Civil Aviation Division, advised that: • MOU established between the national authority providing volcano monitoring (Ministry of Lands, Environment, Climate Change and Natural Resources – MLECCNR) and the national authority providing meteorological service for international air navigation (MOl) for the reporting of volcanic activity to the associated ACCs, MWOs and VAACs in accordance with the relevant ICAO SARPs.	
AP-MET-18	Kiribati	September 2017	APANPIRG/28 noted that Kiribati should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-19	Nauru	September 2017	APANPIRG/28 noted that Nauru should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-20	Solomon Islands	September 2017	APANPIRG/28 noted that Solomon Islands should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
		June 2019	MET SG/23 requested the Secretary in conjunction with support from other States to provide Solomon Islands with assistance in preparing the full report on rectification of the Deficiency.	

NOTES ON THE (OPEN AND CLOSED) AIR NAVIGATION DEFICIENCIES IN THE MET FIELD IN THE ASIA/PAC REGION				
Index No.	**State**	**Update Date**	**NOTES ON OPEN AND CLOSED DEFICIENCIES**	**Status**
AP-MET-21	Nauru	September 2017	APANPIRG/28 noted that Nauru should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-22	Papua New Guinea	September 2017	APANPIRG/28 noted that Papua New Guinea should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**
AP-MET-23	Solomon Islands	November 2022	Removed from the open List; refer to: • Conclusion APANPIRG/33/14 – *Update of information in APANPIRG Air Navigation Deficiencies Reporting Form*; • APANPIRG/33 WP/14 – *STATUS OF AIR NAVIGATION DEFICIENCIES IN THE ASIA/PAC REGION*; • APANPIRG/33 WP/13 – *METEOROLOGY SUB-GROUP (MET SG/26) REPORT*; and • APANPIRG/33 IP/08 – *RECTIFICATION OF APANPIRG AN DEFICIENCY AP-MET-23*	Closed
		October 2021	MET SG/25 requested the Solomon Islands, with assistance from its partner States, to conduct additional corrective action to enable the MET SG to confirm that Solomon Islands had fully resolved the Deficiency; maintain a log of all SIGMETs issued over at least one month to capture the operational WC-, WS- and WV-SIGMETs, plus any test WV-SIGMETs; pass the details [of the log] to the ad hoc group [on AN Deficiencies] to compare against SIGMETs received by RODB Brisbane [MET SG/25, Action No. 25/10]. Subject to Solomon Islands demonstrating resolution of the issues concerning content, format and timeliness of SIGMET information (as discussed in MET SG/25, WP/12) and sustainable provision of ICAO-compliant SIGMET service, MET SG would support the removal of Deficiency AP-MET-23 from the APANPIRG open list. Therefore, to facilitate the removal of the Deficiency from the open List, MET SG/25 requested the Secretariat coordinate with the Solomon Islands to report the resolution of the Deficiency to APANPIRG [MET SG/25, Action No. 25/11].	
		June 2019	MET SG/23 requested the Secretary in conjunction with support from other States to provide Solomon Islands with assistance in preparing the full report on rectification of the Deficiency.	
		September 2017	APANPIRG/28 noted that Solomon Islands should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	
AP-MET-24	Nauru	September 2017	APANPIRG/28 noted that Nauru should: • Verify the status of implementation of CAP; and • Work together with ICAO to develop and properly record the remaining steps of the CAP to resolve the Deficiency.	**Open**

Acronyms/Abbreviations/Definitions (used in this document)

ACC — Area control centre
ASL — Air Services Ltd.
ATS — Air traffic services

Acronyms/Abbreviations/Definitions (used in this document)

CAEMSA-SP	— Cooperative Agreement for the Enhancement of Meteorological Services to Aviation - South Pacific
CAP	— Corrective action plan
FIC	— Flight information centre
FIR	— Flight information region
GACA	— General Administration of Civil Aviation
IATA	— International Air Transport Association
MEIDECC	— Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communication
MET	— Meteorological
METAR	— Aerodrome routine meteorological report *(in meteorological code)*
MWO	— Meteorological watch office
NWS	— National Weather Service
SIGMET	— Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations
SPECI	— Aerodrome special meteorological report *(in meteorological code)*
TBC	— To be confirmed
TCB	— Technical Cooperation Bureau (of ICAO)
VAAC	— Volcanic ash advisory centre
WAFC	— World area forecast centre
WMO	— World Meteorological Organization

APPENDIX B

Selected ICAO Annex 3 provisions related to the availability of WAFS forecasts for inclusion in flight briefings and documentation:

1.1 Definitions	*World area forecast system (WAFS).* A worldwide system by which world area forecast centres provide aeronautical meteorological en-route forecasts in uniform standardized formats.
2.1 Objective, determination and provision of meteorological service	2.1.1 The objective of meteorological service for international air navigation shall be to contribute towards the safety, regularity and efficiency of international air navigation. 2.1.2 This objective shall be achieved by supplying the following users: operators, flight crew members, air traffic services units, search and rescue services units, airport managements and others concerned with the conduct or development of international air navigation, with the meteorological information necessary for the performance of their respective functions. 2.1.3 Each Contracting State shall determine the meteorological service which it will provide to meet the needs of international air navigation. This determination shall be made in accordance with the provisions of this Annex and in accordance with regional air navigation agreement; it shall include the determination of the meteorological service to be provided for international air navigation over international waters and other areas which lie outside the territory of the State concerned.
2.2 Supply, use, quality management and interpretation of meteorological information	2.2.1 Close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological service for international air navigation.
3.1 World area forecast system	The objective of the world area forecast system (WAFS) shall be to supply meteorological authorities and other users with global aeronautical meteorological en-route forecasts in digital form. This objective shall be achieved through a comprehensive, integrated, worldwide and, as far as practicable, uniform system, and in a cost-effective manner, taking full advantage of evolving technologies.
3.2 World area forecast centres	3.2.1 A Contracting State, having accepted the responsibility for providing a world area forecast centre (WAFC) within the framework of the WAFS, shall arrange for that centre: a) to prepare gridded global forecasts of: 1) upper wind; 2) upper-air temperature and humidity; 3) geopotential altitude of flight levels; 4) flight level and temperature of tropopause; 5) direction, speed and flight level of maximum wind; 6) cumulonimbus clouds; 7) icing; and

	8) turbulence; b) to prepare global forecasts of significant weather (SIGWX) phenomena; c) to issue the forecasts referred to in a) and b) in digital form to meteorological authorities and other users, as approved by the Contracting State on advice from the meteorological authority; d) to receive information concerning the release of radioactive materials into the atmosphere from its associated World Meteorological Organization (WMO) regional specialized meteorological centre (RSMC) for the provision of transport model products for radiological environmental emergency response, in order to include the information in SIGWX forecasts; and e) to establish and maintain contact with volcanic ash advisory centres (VAACs) for the exchange of information on volcanic activity in order to coordinate the inclusion of information on volcanic eruptions in SIGWX forecasts.
3.3 Aerodrome meteorological offices	3.3.1 Each Contracting State shall establish one or more aerodrome and/or other meteorological offices which shall be adequate for the provision of the meteorological service required to satisfy the needs of international air navigation. 3.3.2 An aerodrome meteorological office shall carry out all or some of the following functions as necessary to meet the needs of flight operations at the aerodrome: a) prepare and/or obtain forecasts and other relevant information for flights with which it is concerned; the extent of its responsibilities to prepare forecasts shall be related to the local availability and use of en-route and aerodrome forecast material received from other offices; … d) provide briefing, consultation and flight documentation to flight crew members and/or other flight operations personnel; e) supply other meteorological information to aeronautical users; f) display the available meteorological information; … 3.3.4 For an aerodrome without an aerodrome meteorological office located at the aerodrome: a) the meteorological authority concerned shall designate one or more aerodrome meteorological office(s) to supply meteorological information as required; and b) the competent authorities shall establish means by which such information can be supplied to the aerodromes concerned.
Appendix 2 2.1 Use of world area forecast system (WAFS) products	2.1.1 Aerodrome meteorological offices shall use WAFS forecasts issued by the WAFCs in the preparation of flight documentation, whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the meteorological authority and the operator concerned. 2.1.2 In order to ensure uniformity and standardization of flight documentation, the WAFS GRIB and BUFR data received and, as of 4 November 2021, IWXXM data received, shall be decoded into standard WAFS charts in accordance with relevant provisions in this Annex, and the meteorological content and identification of the originator of the WAFS forecasts shall not be amended.

Appendix 8 4. Specifications related to flight documentation	4.2.2.2 Charts to be provided shall be generated from the digital forecasts provided by the WAFCs whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the meteorological authority and the operator concerned.