



ICAO

*International Civil Aviation Organization***WORKING 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 3: Planning and monitoring**AMENDMENT 79 TO ANNEX 3**

(Presented by the Secretariat)

SUMMARY

This paper presents Amendment 79 to ICAO Annex 3, which became applicable on 5 November 2020, and invites the meeting to consider further actions, as necessary, to support States with compliance with the provisions of Amendment 79.

1. INTRODUCTION

1.1 The Council of ICAO, at the fourth meeting of its 219th Session on 9 March 2020, adopted Amendment 79 to the International Standards and Recommended Practices, Meteorological Service for International Air Navigation (Annex 3 to the Convention on International Civil Aviation).

1.2 This paper reminds the meeting that, unless otherwise indicated, Amendment 79 became applicable on 5 November 2020 and invites the meeting to consider further actions, as necessary, to support States with compliance with the provisions of Amendment 79.

2. DISCUSSION

2.1 The Council of ICAO adopted the first edition of Annex 3 in 1948, with the principle intent of defining the meteorological codes used by States for the transmission of meteorological information for aeronautical purposes to users.

2.2 Since its first edition, Annex 3 has undergone iterative improvement when necessary to ensure that aeronautical meteorological services continue to fulfil the evolving operational requirements as expressed by States and users, with due regard to evolving scientific capabilities and technological advances

2.3 Amendment 79 arises from recommendations developed by the fourth meeting of the Meteorology Panel (METP/4) concerning SIGMET information on the release of radioactive material in the atmosphere, improved harmonization of SIGMET information, space weather advisory information, routine observations at aerodromes (METAR) information, tropical cyclone advisory and related SIGMET information, the ICAO Meteorological Information Exchange Model (IWXXM), the

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international airways volcano watch (IAVW), the world area forecast system (WAFS), special air-reports on turbulence, quality management system, dissemination of AIRMET and GAMET and the inclusion of heavy dust storms (HVY DS) in special air-reports.

2.4 The text of the Amendment 79, arranged to show deleted text with a line through it and new text highlighted with grey shading, as presented in ICAO State letter, Ref.: AN 10/1.1-20/16 2 April 2020, Subject: *Adoption of Amendment 79 to Annex 3*, is reproduced in the **Attachment** to this paper.

3. ACTION BY THE MEETING

3.1 This paper invites the meeting to review the information in the **Attachment** to this paper and consider further actions, as necessary, to support States with compliance with the provisions of Amendment 79.

TEXT OF AMENDMENT 79

TO THE

**INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

**METEOROLOGICAL SERVICE
FOR INTERNATIONAL AIR NAVIGATION**

ANNEX 3

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

Editorial Note.— Amend, throughout Annex 3, the title of Doc 10003 to read: Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003)

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PART I

CORE SARPs

CHAPTER 1. DEFINITIONS

1.1 Definitions

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Volcanic ash advisory centre (VAAC). A meteorological centre designated by regional air navigation agreement to provide advisory information to meteorological watch offices, area control centres, flight information centres, world area forecast centres and international OPMET databanks regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere following volcanic eruptions.

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CHAPTER 2. GENERAL PROVISIONS

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**2.2 Supply, use, quality management and interpretation
of meteorological information**

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2.2.3 Recommendation.— *The quality system established in accordance with 2.2.2 should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and should be certified by an approved organization.*

Note.— The ISO 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be

formulated by each State and in most cases are unique to the State organization. Guidance on the establishment and implementation of a quality management systems is given in the ~~Manual on the Quality Management System for the Provision of Meteorological Service for International Air Navigation (Doc 9873)~~ Guide to the Implementation of Quality Management Systems for National Meteorological and Hydrological Services and Other Relevant Service Providers (WMO-No. 1100).

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CHAPTER 3. GLOBAL SYSTEMS, SUPPORTING CENTRES AND METEOROLOGICAL OFFICES

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Insert new text as follows:

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.*

Note.— *Guidance on the bilateral or multilateral coordination between MWOs of Contracting States for the provision of SIGMET can be found in the Manual of Aeronautical Meteorological Practice (Doc 8896).*

End of new text.

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3.7 Tropical cyclone advisory centres

A Contracting State having accepted the responsibility for providing a tropical cyclone advisory centre (TCAC) shall arrange for that centre to:

- a) monitor the development of tropical cyclones in its area of responsibility, using geostationary and polar-orbiting satellite data, radar data and other meteorological information;
- b) issue advisory information concerning the position of the cyclone centre, changes in intensity at time of observation, its direction and speed of movement, central pressure and maximum surface wind near the centre, in abbreviated plain language to:

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PART II

APPENDICES AND ATTACHMENTS

APPENDIX 1. FLIGHT DOCUMENTATION — MODEL CHARTS AND FORMS

(See Chapter 9 of this Annex.)

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MODEL TCG Tropical cyclone advisory information in graphical format

MODEL VAG Volcanic ash advisory information in graphical format

Example 1. Mercator projection

Example 2. Polar stereographic projection

MODEL STC SIGMET for tropical cyclone in graphical format

MODEL SVA SIGMET for volcanic ash in graphical format

Example 1. Mercator projection

Example 2. Polar stereographic projection

MODEL SGE SIGMET for phenomena other than tropical cyclone and volcanic ash in graphical format

MODEL SN Sheet of notations used in flight documentation

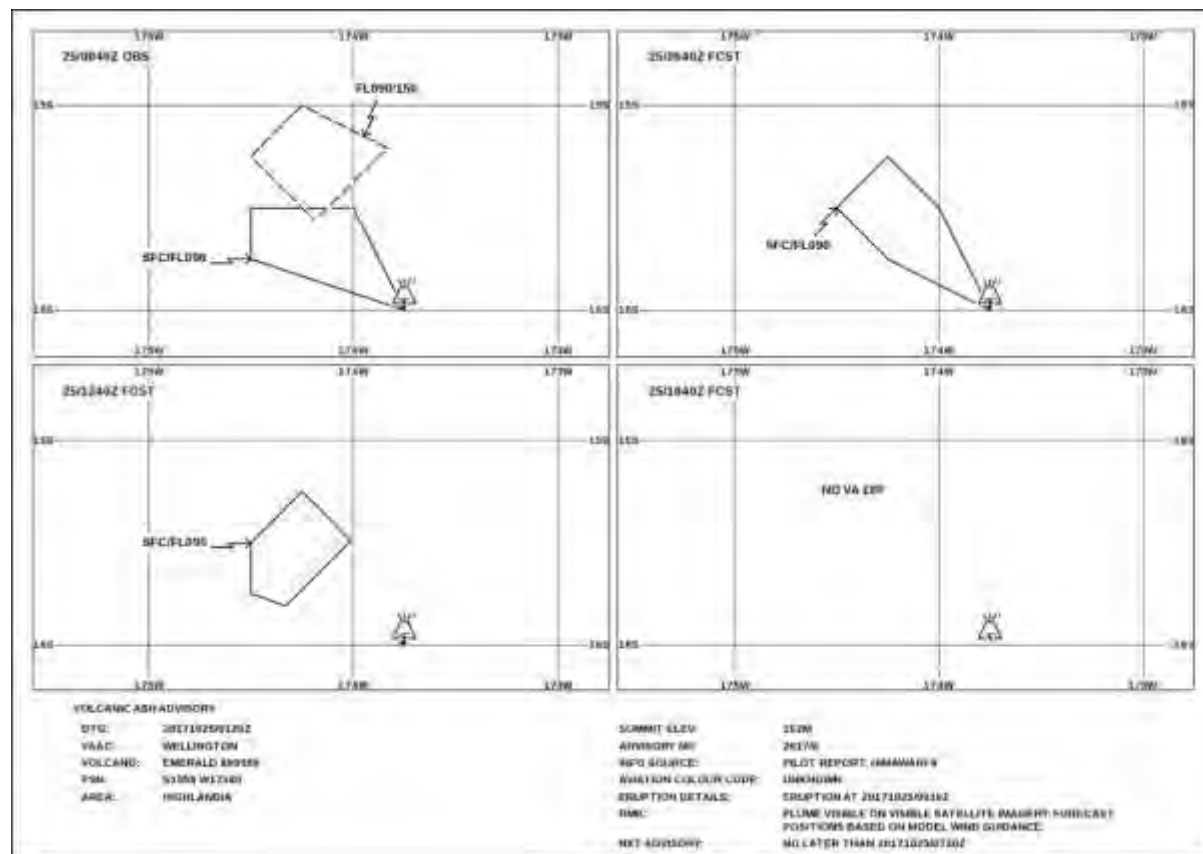
...

Editorial Note.— Replace the existing MODEL VAG example in toto by the following two new examples.

VOLCANIC ASH ADVISORY INFORMATION IN GRAPHICAL FORMAT

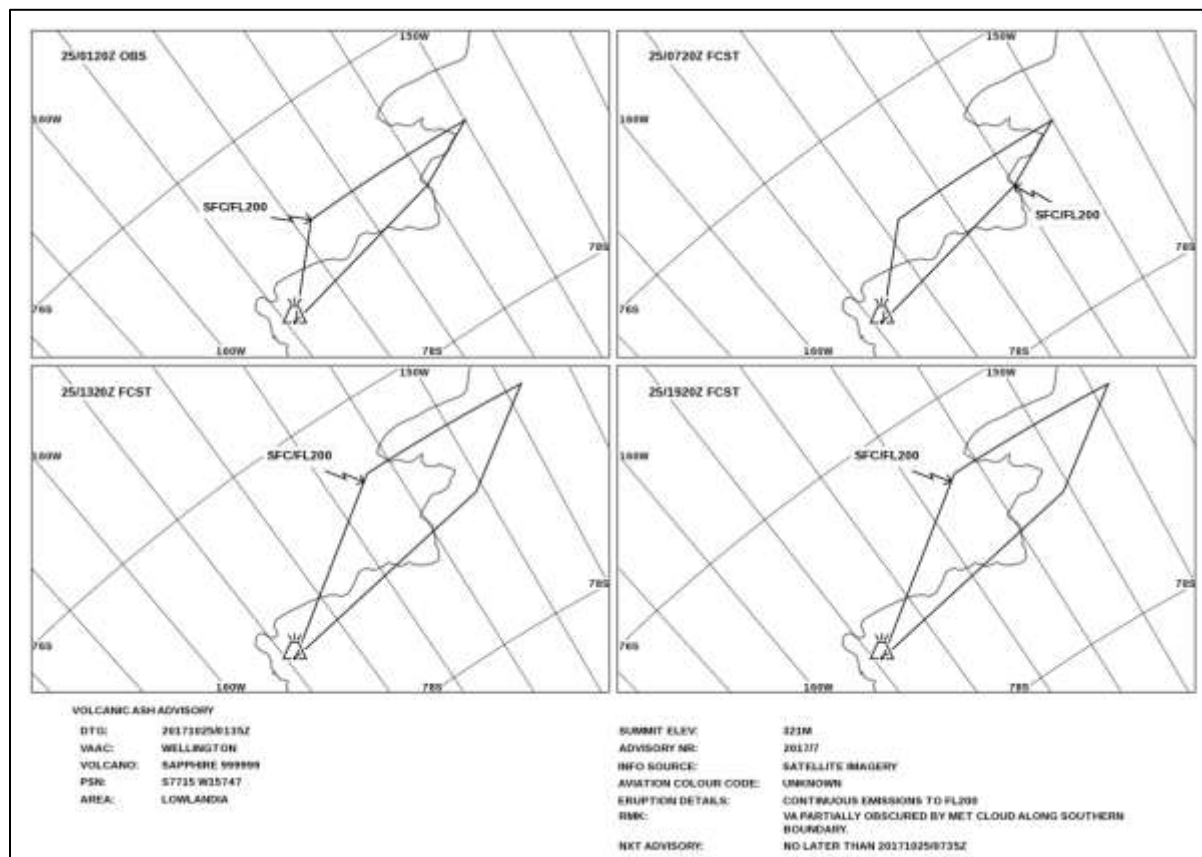
MODEL VAG

Example 1. Mercator projection

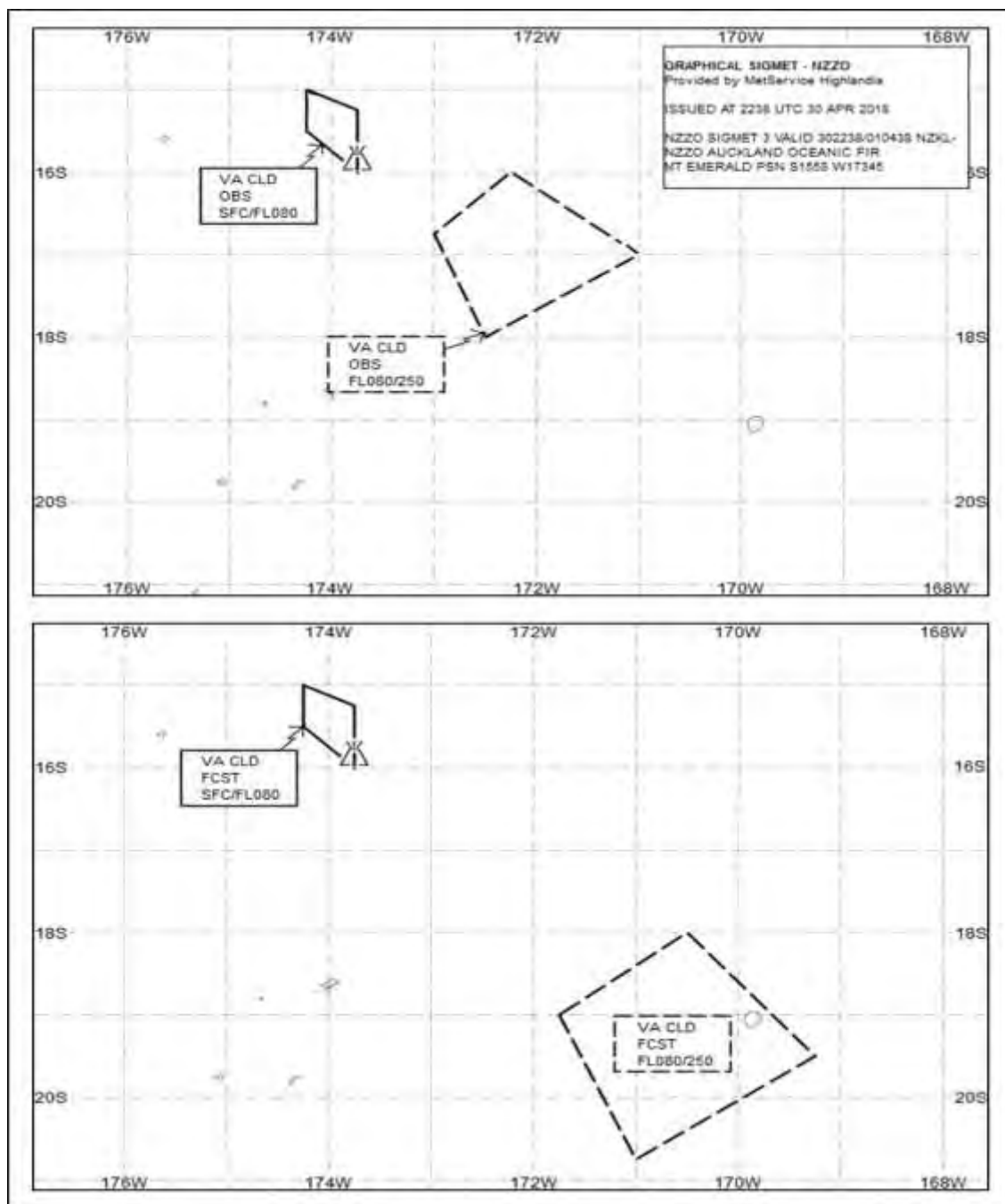


VOLCANIC ASH ADVISORY INFORMATION IN GRAPHICAL FORMAT
Example 2. Polar stereographic projection

MODEL VAG

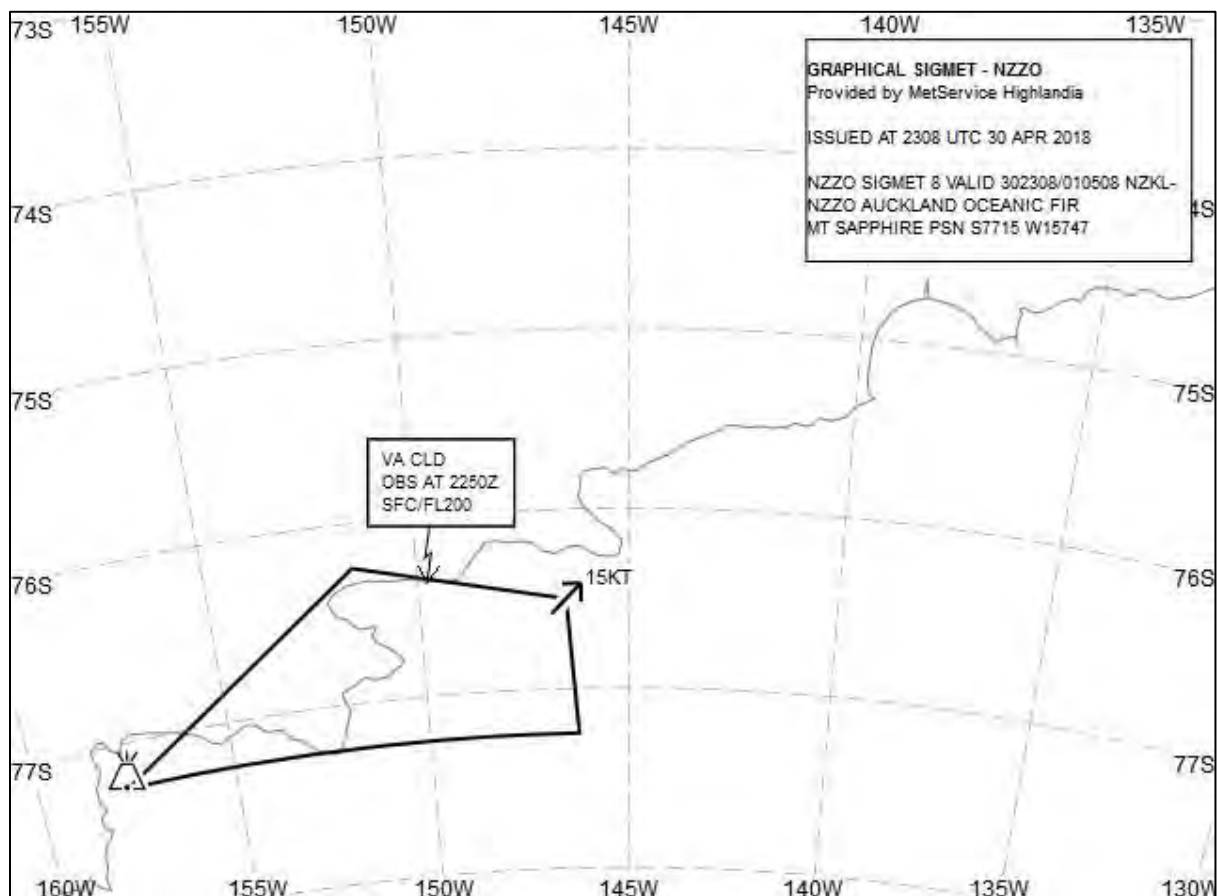


Editorial Note.— Replace the existing MODEL SVA example in toto by the following two new examples.

SIGMET FOR VOLCANIC ASH IN GRAPHICAL FORMAT**MODEL SVA****Example 1. Mercator projection**

SIGMET FOR VOLCANIC ASH IN GRAPHICAL FORMAT
Example2. Polar stereographic projection

MODEL SVA



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**APPENDIX 2. TECHNICAL SPECIFICATIONS RELATED TO
 GLOBAL SYSTEMS, SUPPORTING CENTRES AND
 METEOROLOGICAL OFFICES**

(See Chapter 3 of this Annex.)

1. WORLD AREA FORECAST SYSTEM

1.1 Formats and codes

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1.2 Upper-air gridded forecasts

1.2.1 The forecasts of upper winds; upper-air temperature; and humidity; direction, speed and flight level of maximum wind; flight level and temperature of tropopause, areas of cumulonimbus clouds, icing, clear air and in-cloud turbulence, and geopotential altitude of flight levels shall be prepared four times a

day by a WAFC and shall be valid for fixed valid times at 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 and 36 hours after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based. ~~The dissemination of each forecast shall be in the above order and shall be completed~~ disseminated as soon as technically feasible but not later than ~~6~~ 5 hours after standard time of observation.

1.2.2 The grid point forecasts prepared by a WAFC shall comprise:

- a) wind and temperature data for flight levels 50 (850 hPa), 80 (750 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 210 (450 hPa), 240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 320 (275 hPa), 340 (250 hPa), 360 (225 hPa), 390 (200 hPa), 410 (175 hPa), 450 (150 hPa), 480 (125 hPa) and 530 (100 hPa);
- b) flight level and temperature of tropopause;
- c) direction, speed and flight level of maximum wind;
- d) humidity data for flight levels 50 (850 hPa), 80 (750 hPa), 100 (700 hPa), 140 (600 hPa) and 180 (500 hPa);
- e) horizontal extent and flight levels of base and top of cumulonimbus clouds;
- f) icing for layers centred at flight levels 60 (800 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa) and 300 (300 hPa);

Note. — *Layers centred at a flight level referred to in f) have a depth of 100 hPa.*

- g) ~~clear air~~ turbulence for layers centred at flight levels 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 340 (250 hPa), 390 (200 hPa) and 450 (150 hPa); and
- ~~h) in cloud turbulence for layers centred at flight levels 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa) and 300 (300 hPa); and~~

Note 1. — *Layers centred at a flight level referred to in f) and h) have a depth of 100 hPa.*

Note 2¹. — *Layers centred at a flight level referred to in g) have a depth of 100 hPa for flight levels below 240, then 50 hPa for flight levels 240 and above.*

Note 2. — *Turbulence referred to in g) above encompasses all types of turbulence, including clear-air and in-cloud turbulence.*

- h) geopotential altitude data for flight levels 50 (850 hPa), 80 (750 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 210 (450 hPa), 240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 320 (275 hPa), 340 (250 hPa), 360 (225 hPa), 390 (200 hPa), 410 (175 hPa), 450 (150 hPa), 480 (125 hPa) and 530 (100 hPa).

Note. — *The exact pressure levels (hPa) for a), d), f), g), and h) are provided in the Manual of Aeronautical Meteorological Practice (Doc 8896).*

1.2.3 The foregoing grid point forecasts shall be issued by a WAFC in binary code form using the GRIB code form prescribed by the World Meteorological Organization (WMO).

Note.— The GRIB code form is contained in the Manual on Codes (WMO-No. 306), Volume I.2, Part B — Binary Codes.

1.2.4 The foregoing grid point forecasts a), b), c), d) and h) shall be prepared by a WAFC in a regular grid with a horizontal resolution of 1.25° of latitude and longitude.

1.2.5 The foregoing grid point forecasts e), f) and g) shall be prepared by a WAFC in a regular grid with a horizontal resolution of 0.25° of latitude and longitude.

1.3 Significant weather (SIGWX) forecasts

1.3.1 General provisions

1.3.1.1 Forecasts of significant en-route weather phenomena shall be prepared as SIGWX forecasts four times a day by a WAFC and shall be valid for fixed valid times at 24 hours after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based. ~~The dissemination of~~ Each forecast shall be ~~completed~~ disseminated as soon as technically feasible but not later than 9-7 hours after standard time of observation under normal operations and not later than 9 hours after standard time of observation during backup operations.

1.3.1.2 SIGWX forecasts shall be issued in binary code form using the BUFR code form prescribed by WMO.

Note.— The BUFR code form is contained in the Manual on Codes (WMO-No. 306), Volume I.2, Part B — Binary Codes.

1.3.1.3 **Recommendation.**— *As of 4 November 2021, in addition to 1.3.1.2, SIGWX forecasts should be disseminated in IWXXM GML form.*

Note 1.— *Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).*

Note 2. — *Geography markup language (GML) is an encoding standard of the Open Geospatial Consortium (OGC).*

Editorial Note.— A similar Note concerning GML will be inserted after Notes following: Appendix 2, 3.1.2, 5.1.3, and 6.1.2; Appendix 3, 2.1.3; Appendix 5, 1.1.2; Appendix 6, 1.1.6 and 2.1.6; and Appendix 8, 2.2.2.

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2. AERODROME METEOROLOGICAL OFFICES

2.1 Use of world area forecast system (WAFS) products

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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

2.2 Notification of WAFS concerning significant discrepancies

Aerodrome meteorological offices using WAFS BUFR or, as of 4 November 2021, IWXXM data shall notify the WAFS concerned immediately if significant discrepancies are detected or reported in respect of WAFS SIGWX forecasts concerning:

...

Table A2-1. Template for advisory message for volcanic ash

Key: M = inclusion mandatory, part of every message;
 O = inclusion optional;
 C = inclusion conditional, included whenever applicable;
 = = a double line indicates that the text following it should be placed on the subsequent line.

Note 1.— The ranges and resolutions for the numerical elements included in advisory messages for volcanic ash are shown in Appendix 6, Table A6-4.

Note 2.— The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC, Doc 8400).

Note 3.— Inclusion of a colon after each element heading is mandatory.

Note 4.— The numbers 1 to 19 are included only for clarity and are not part of the advisory message, as shown in the example.

Element	Detailed content	Template(s)	Examples	
...	
5	Name of volcano (M)	Name and IAVCEI ² number of volcano	VOLCANO: nnnnnnnnnnnnnnnnnnn [nnnnn] or UNKNOWN or UNNAMED	VOLCANO: KARYMSKY 1000- 43300130 UNNAMED UNKNOWN
6	...	...	...
7	State or region (M)	State, or region if ash is not reported over a State	AREA: nnnnnnnnnnnnnnn or UNKNOWN	AREA: RUSSIA UNKNOWN
8	Summit elevation (M)	Summit elevation in m (or ft)	SUMMIT ELEV: nnnnM (or nnnnnFT) or SFC or UNKNOWN	SUMMIT ELEV: 1536M SFC
9	...	...	...
10	Information source (M)	Information source using free text	INFO SOURCE: Free text up to 32 characters	INFO SOURCE: MTSAT- 4RHIMAWARI-8 KVERT KEMSD
11	...	...	...
12	Eruption details (M)	Eruption details (including date/time of eruption(s))	ERUPTION DETAILS: Free text up to 64 characters or UNKNOWN	ERUPTION AT N 20080923/0000Z DETAILS: FL300 REPORTED

Element	Detailed content	Template(s)	Examples
			NO ERUPTION – RE-SUSPENDED VA ⁶ UNKNOWN
...
18	Remarks (M) Remarks, as necessary	RMK: <i>Free text up to 256 characters or NIL</i>	RMK: LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED. TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY RE-SUSPENDED VA ⁶ 7 NIL
19

Notes.—

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6. To be included (as free text) only for those situations where volcanic ash has been re-suspended.
7. To be included (as free text) where space in the remarks section allows.

Example A2-1. Advisory message for volcanic ash

VA ADVISORY	
DTG:	20080923/0130Z
VAAC:	TOKYO
VOLCANO:	KARYMSKY 4000-13300130
PSN:	N5403 E15927
AREA:	RUSSIA
SUMMIT ELEV:	1536M
ADVISORY NR:	2008/4
INFO SOURCE:	MTSAT-1R HIMAWARI-8 KVERT KEMSD
...	...

Table A2-2. Template for advisory message for tropical cyclones

Key: M = inclusion mandatory, part of every message;
 C = inclusion conditional, included whenever applicable;
 O = inclusion optional;
 = = a double line indicates that the text following it should be placed on the subsequent line.

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Element	Detailed content	Template(s)	Examples
1	Identification of the type of message (M)	TC ADVISORY	TC ADVISORY
...
8	Observed CB cloud ³ (CO)	CB: WI nnnKM (or nnnNM) OF TC CENTRE or WI ⁴ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]) and TOP [ABV or BLW] FLnnn NIL	CB: WI 250NM OF TC CENTRE TOP FL500 NIL
9	...	...	...
10	Changes in intensity (M)	INTST CHANGE: INTSF or WKN or NC	INTST CHANGE: INTSF

Editorial Note — Renumber subsequent Elements

Notes.—

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Example A2-2. Advisory message for tropical cyclones

TC ADVISORY	
DTG:	20040925/1900Z
TCAC:	YUFO*
TC:	GLORIA
ADVISORY NR:	2004/13
OBS PSN:	25/1800Z N2706 W07306
CB:	WI 250NM OF TC CENTRE TOP FL500
MOV:	NW 20KMH
INTST CHANGE:	INTSF
C:	965HPA

MAX WIND:	25MPS
FCST PSN +6 HR:	25/2200Z N2748 W07350
FCST MAX WIND +6 HR:	22MPS
FCST PSN +12 HR:	26/0400Z N2830 W07430
FCST MAX WIND +12 HR:	22MPS
FCST PSN +18 HR:	26/1000Z N2852 W07500
FCST MAX WIND +18 HR:	21MPS
FCST PSN +24 HR:	26/1600Z N2912 W07530
FCST MAX WIND +24 HR:	20MPS
RMK:	NIL
NXT MSG:	20040925/2000Z
*Fictitious location	

Table A2-3. Template for advisory message for space weather information

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Element	Detailed content	Template(s)	Examples	
1	
...	
7	Space weather effect and intensity (M)	Effect and intensity of the space weather phenomena	SWX EFFECT: HF COM MOD <i>or</i> SEV [AND] ³ <i>or</i> SATCOM MOD <i>or</i> SEV [AND] ³ <i>or</i> GNSS MOD <i>or</i> SEV <i>or</i> HF COM MOD <i>or</i> SEV AND GNSS MOD <i>or</i> SEV [AND]³ <i>or</i> RADIATION⁴ MOD <i>or</i> SEV	SWX EFFECT: HF COM MOD SATCOM SEV GNSS SEV HF COM MOD AND SATCOM MOD AND GNSS MOD RADIATION MOD SATCOM SEV
8	Observed <i>or</i> expected space weather phenomena (M)	Day and time (n UTC) of observed phenomena (<i>or</i> forecast if phenomena have yet to occur); Horizontal extent ^{2,4} (latitude bands and longitude in degrees) <i>and/or</i> altitude of space weather phenomena	OBS (or FCST) SWX: nn/nnnnZ DAYLIGHT SIDE <i>or</i> HNH <i>and/or</i> MNH <i>and/or</i> EQN <i>and/or</i> EOS <i>and/or</i> MSH <i>and/or</i> HSH Wnnn(nn) <i>or</i> Ennn(nn) – Wnnn(nn) <i>or</i> Ennn(nn) <i>and/or</i> ABV FLnnn <i>or</i> FLnnn – nnn <i>and/or</i> Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – [Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] <i>or</i> NO SWX EXP	OBS SWX: 08/0100Z DAYLIGHT SIDE 08/0100Z HNH HSH E18000 – W18000 08/0100Z HNH HSH W18000 – W09000 ABV FL350 08/0100Z S2000 W17000 – S2000 W13000 – S1000 W13000 – S1000 W17000 – S2000 W17000 NO SWX EXP
9	Forecast of the phenomena (+6)	Day and time (in UTC) (6 hours from the time	FCST SWX +6 HR: nn/nnnnZ DAYLIGHT SIDE <i>or</i>	FCST SWX +6 HR: 08/0700Z DAYLIGHT SIDE

Element	Detailed content	Template(s)	Examples
HR) (M)	<p>given in Item 8, rounded to the next full hour);</p> <p>Forecast extent <i>and/or</i> altitude of the space weather phenomena for that fixed valid time</p>	<p>HNH <i>and/or</i> MNH <i>and/or</i> EQN <i>and/or</i> EQS <i>and/or</i> MSH <i>and/or</i> HSH Wnnn(nn) or Ennn(nn) – Wnnn(nn) or Ennn(nn) <i>and/or</i> ABV FLnnn or FLnnn – nnn <i>and/or</i> Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] or NO SWX EXP or NOT AVBL</p>	<p>08/0700Z HNH HSH W18000 – W09000 ABV FL350</p> <p>08/0700Z HNH HSH E18000 – W18000</p> <p>NO SWX EXP</p> <p>NOT AVBL</p>
10 Forecast of the phenomena (+12 HR) (M)	<p>Day and time (in UTC) (12 hours from the time given in Item 8, rounded to the next full hour).</p> <p>Forecast extent <i>and/or</i> altitude of the space weather phenomena for that fixed valid time</p>	<p>FCST SWX +12 HR: nn/nnnnZ DAYLIGHT SIDE <i>or</i> HNH <i>and/or</i> MNH <i>and/or</i> EQN <i>and/or</i> EQS <i>and/or</i> MSH <i>and/or</i> HSH Wnnn(nn) or Ennn(nn) – Wnnn(nn) or Ennn(nn) <i>and/or</i> ABV FLnnn or FLnnn – nnn <i>and/or</i> Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] or NO SWX EXP or NOT AVBL</p>	<p>FCST SWX +12 HR: 08/1300Z DAYLIGHT SIDE</p> <p>08/1300Z HNH HSH W18000 – W09000 ABV FL350</p> <p>08/1300Z HNH HSH E18000 – W18000</p> <p>NO SWX EXP</p> <p>NOT AVBL</p>
11 Forecast of the phenomena (+18 HR) (M)	<p>Day and time (in UTC) (18 hours from the time given in Item 8, rounded to the next full hour).</p> <p>Forecast extent <i>and/or</i> altitude of the space weather phenomena for that fixed valid time</p>	<p>FCST SWX +18 HR: nn/nnnnZ DAYLIGHT SIDE <i>or</i> HNH <i>and/or</i> MNH <i>and/or</i> EQN <i>and/or</i> EQS <i>and/or</i> MSH <i>and/or</i> HSH Wnnn(nn) or Ennn(nn) – Wnnn(nn) or Ennn(nn) <i>and/or</i> ABV FLnnn or FLnnn – nnn <i>and/or</i> Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] or NO SWX EXP or NOT AVBL</p>	<p>FCST SWX +18 HR: 08/1900Z DAYLIGHT SIDE</p> <p>08/1900Z HNH HSH W18000 – W09000 ABV FL350</p> <p>08/1900Z HNH HSH E18000 – W18000</p> <p>NO SWX EXP</p> <p>NOT AVBL</p>
12 Forecast of the phenomena (+24 HR) (M)	<p>Day and time (in UTC) (24 hours from the time given in Item 8, rounded to the next full hour).</p> <p>Forecast extent <i>and/or</i> altitude of the space weather phenomena for that fixed valid time</p>	<p>FCST SWX +24 HR: nn/nnnnZ DAYLIGHT SIDE <i>or</i> HNH <i>and/or</i> MNH <i>and/or</i> EQN <i>and/or</i> EQS <i>and/or</i> MSH <i>and/or</i> HSH Wnnn(nn) or Ennn(nn) – Wnnn(nn) or Ennn(nn) <i>and/or</i> ABV FLnnn or FLnnn – nnn <i>and/or</i> Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] or NO SWX EXP or NOT AVBL</p>	<p>FCST SWX +24 HR: 09/0100Z DAYLIGHT SIDE</p> <p>09/0100Z HNH HSH W18000 – W09000 ABV FL350</p> <p>09/0100Z HNH HSH E18000 – W18000</p> <p>NO SWX EXP</p> <p>NOT AVBL</p>
...
14 Next advisory (M)	Year, month, day and time in UTC	<p>NXT ADVISORY: nnnnnnnn/nnnnZ or NO FURTHER ADVISORIES</p>	<p>NXT ADVISORY: 20161108/0700Z</p> <p>NO FURTHER</p>

Element	Detailed content	Template(s)	Examples
		or WILL BE ISSUED BY nnnnnnnn/nnnnZ	WILL BE ISSUED BY ADVISORIES 20210726/1800Z

Notes.—

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1. **Used only when the message issued to indicate that a test or an exercise is taking place. When the word "TEST" or the abbreviation "EXER" is included, the message may contain information that should not be used operationally or will otherwise end immediately after the word "TEST". [Applicable 7 November 2019]**
2. Fictitious location.
3. One or more effects with the same intensity may be combined.
34. One or more latitude ranges ~~should~~ **may** be included in the space weather advisory information ~~for "GNSS" and "RADIATION".~~

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APPENDIX 3. TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL OBSERVATIONS AND REPORTS

(See Chapter 4 of this Annex.)

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**Table A3-2. Template for METAR and SPECI
(Until 4 November 2020)**

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**Table A3-2. Template for METAR and SPECI
(As of 5 November 2020)**

...

<i>Element as specified in Chapter 4</i>	<i>Detailed content</i>	<i>Template(s)</i>			<i>Examples</i>
...
END OF METAR IF THE REPORT IS MISSING.					
Surface wind (M)	Wind direction (M)	nnn <i>or</i> /// ¹²	VRB		24004MPS VRB01MPS ///10MPS
	Wind speed (M)	[P]nn[n] <i>or</i> // ¹²			(24008KT) (VRB02KT) 240//KT 19006MPS ///KT (19012KT) 00000MPS (00000KT) 140P49MPS (140P99KT)
	Significant speed variations (C) ³	G[P]nn[n]			12003G09MPS (12006G18KT)
	Units of measurement (M)	MPS (<i>or</i> KT)			24008G14MPS (24016G28KT)
	Significant directional variations (C) ⁴	nnnVnnn	—		02005MPS 350V070 (02010KT 350V070)
Visibility (M)	Prevailing <i>or</i> minimum visibility (M) ⁵	nnnn <i>or</i> /// ¹²	C A V O K	0350 /// CAVOK	
	Minimum visibility and direction of the minimum visibility (C) ⁶	nnnn[N] <i>or</i> nnnn[NE] <i>or</i> nnnn[E] <i>or</i> nnnn[SE] <i>or</i> nnnn[S] <i>or</i> nnnn[SW] <i>or</i> nnnn[W] <i>or</i> nnnn[NW]		2000 1200NW 6000 2800E 6000 2800	
Runway visual range (C) ⁷	Name of the element (M)	R			R32/0400
	Runway (M)	nn[L]/ <i>or</i> nn[C]/ <i>or</i> nn[R]/			R12R/1700 R10/M0050 R14L/P2000
	Runway visual range (M)	[P <i>or</i> M]nnnn <i>or</i> /// ¹²			R16L/0650 R16C/0500 R16L/// R10/// R16R/0450 R17L/0450
	Runway visual range past tendency (C) ⁸	U, D <i>or</i> N			R12/1100U R26/0550N R20/0800D R12/0700
...
...

Element as specified in Chapter 4	Detailed content	Template(s)			Examples
Cloud (M) ¹⁴	Cloud amount and height of cloud base or vertical visibility (M)	FEWnnn or SCTnnn or BKNnnn or OVCnnn or FEW/// ¹² or SCT/// ¹² or BKN/// ¹² or OVC/// ¹² or ///nnn ¹² or ////// ¹²	VVnnn or VV/// ¹²	NSC or NCD ¹²	FEW015 VV005 OVC030 VV/// NSC SCT010 OVC020 BKN/// ///015
	Cloud type (C) ²	CB or TCU or /// ¹²	—		BKN009TCU NCD SCT008 BKN025CB BKN025/// ///CB //////// BKN///TCU
Air and dew-point temperature (M)	Air and dew-point temperature (M)	[M]nn/[M]nn or ///[M]nn ¹² or [M]nn/// ¹² or //// ¹²			17/10 ///10 17/// 02/M08 M01/M10
Pressure values (M)	Name of the element (M)	Q			Q0995
	QNH (M)	Qnnnn or //// ¹²			Q1009 Q1022 Q/// Q0987
Supplementary information (C)	Recent weather (C) ^{2,9}	RERASN or REFZDZ or REFZRA or REDZ or RE[SH]RA or RE[SH]SN or RESG or RESHGR or RESHGS or REBLN or RESS or REDS or RETSRA or RETSSN or RETSGR or RETSGS or RETS or REFC or REVA or REPL or REUP ¹² or REFZUP ¹² or RETSUP ¹² or RESHUP ¹² or RE// ¹²			REFZRA RETSRA
	Wind shear (C) ²	WS Rnn[L] or WS Rnn[C] or WS Rnn[R] or WS ALL RWY			WS R03 WS ALL RWY WS R18C
	Sea-surface temperature and state of the sea or significant wave height (C) ¹⁵	W[M]nn/Sn or W[M]nn/Hn[n]n W[M]nn/Sn or W///Sn or W[M]nn/S/ or W[M]nn/Hn[n]n or W///Hn[n]n or W[M]nn/H///			W15/S2 W12/H75 W///S3 WM01/S/ W///H104 W17/H/// W///H/// W///S/

APPENDIX 4. TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS

(See Chapter 5 of this Annex.)

...

2.6 Turbulence

The turbulence shall be reported in terms of the cube root of the eddy dissipation rate (EDR).

Note.— The EDR is an aircraft-independent measure of turbulence. However, the relationship between the EDR value and the perception of turbulence is a function of aircraft type, and the mass, altitude, configuration and airspeed of the aircraft. The EDR values given below describe the severity levels for a medium-sized transport aircraft under typical en-route conditions (i.e. altitude, airspeed and weight).

2.6.1 Routine air-reports

The turbulence shall be reported during the en-route phase of the flight and shall refer to the 15-minute period immediately preceding the observation. Both the average and peak value of turbulence, together with the time of occurrence of the peak value to the nearest minute, shall be observed. The average and peak values shall be reported in terms of the cube root of EDR. The time of occurrence of the peak value shall be reported as indicated in Table A4-2. The turbulence shall be reported during the climb-out phase for the first 10 minutes of the flight and shall refer to the 30-second period immediately preceding the observation. The peak value of turbulence shall be observed.

2.6.2 Interpretation of the turbulence report

Turbulence shall be considered:

- a) severe when the peak value of the cube root of EDR equals or exceeds 0.70.45;
- b) moderate when the peak value of the cube root of EDR is equal to or above 0.40.20 and below or equal to 0.70.45;
- c) light when the peak value of the cube root of EDR is above 0.10 and below or equal to 0.40.20; and
- d) nil when the peak value of the cube root of EDR is below or equal to 0.10.

~~— *Note.— The EDR is an aircraft-independent measure of turbulence. However, the relationship between the EDR value and the perception of turbulence is a function of aircraft type, and the mass, altitude, configuration and airspeed of the aircraft. The EDR values given above describe the severity levels for a medium-sized transport aircraft under typical en-route conditions (i.e. altitude, airspeed and weight).*~~

2.6.3 Special air-reports

Special air-reports on turbulence shall be made during any phase of the flight whenever the peak value of the cube root of EDR equals or exceeds 0.40.20. The special air-report on turbulence shall be made with reference to the 1-minute period immediately preceding the observation. Both the average and peak value of turbulence shall be observed. The average and peak values shall be reported in terms of the cube root of EDR. Special air-reports shall be issued every minute until such time as the peak values of the cube root of EDR fall below 0.40.20.

...

Table A4-1. Template for the special air-report (downlink)

Key: M = inclusion mandatory, part of every message;
 C = inclusion conditional; included whenever available.

Note.— Message to be prompted by the pilot-in-command. Currently only the condition “SEV TURB” can be automated (see 2.6.3).

<i>Element as specified in Chapter 5</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
Message type designator (M)	Type of air-report (M)	ARS	ARS
...
DATA BLOCK 1			
Latitude (M)	Latitude in degrees and minutes (M)	Nnnnn or Snnnn	S4506
...
DATA BLOCK 2			
Wind direction (M)	Wind direction in degrees true (M)	nnn/	262/
...
DATA BLOCK 3			
Condition prompting the issuance of a special air-report (M)		SEV TURB [EDRnnn] ² or SEV ICE or SEV MTW or TS GR ³ or TS ³ or HVY DS ⁴ or HVY SS ⁴ or VA CLD [FLnnn/nnn] or VA ⁵ [MT nnnnnnnnnnnnnnnnnnnnnnn] or MOD TURB [EDRnnn] ² or MOD ICE	SEV TURB EDR076 VA CLD FL050/100

...

APPENDIX 5. TECHNICAL SPECIFICATIONS RELATED TO FORECASTS

(See Chapter 6 of this Annex.)

...

4.4 Exchange and dissemination of area forecasts for low-level flights

4.4.1 Area forecasts for low-level flights prepared in support of the issuance of AIRMET information shall be exchanged between aerodrome meteorological offices and/or meteorological watch offices responsible for the issuance of flight documentation for low-level flights in the flight information regions concerned.

4.4.2 **Recommendation.**—*Area forecasts for low-level flights, in support of international air navigation, prepared in accordance with regional air navigation agreement and in support of the issuance of AIRMET information should be disseminated to the aeronautical fixed service Internet-based services.*

...

APPENDIX 6. TECHNICAL SPECIFICATIONS RELATED TO SIGMET AND AIRMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS AND ALERTS

(See Chapter 7 of this Annex.)

...

4.2 Criteria related to phenomena included in SIGMET and AIRMET messages and special air-reports (uplink)

...

4.2.6 Turbulence shall be considered:

- a) severe whenever the peak value of the cube root of EDR equals or exceeds 0.70.45; and
- b) moderate when the peak value of the cube root of EDR is equal to or above 0.40.20 and below or equal to 0.70.45.

...

Table A6-1A. Template for SIGMET and AIRMET messages

Key: M = inclusion mandatory, part of every message;
 C = inclusion conditional, included whenever applicable;
 = = a double line indicates that the text following it should be placed on the subsequent line.

Note 1.— The ranges and resolutions for the numerical elements included in SIGMET/AIRMET messages are shown in Table A6-4 of this appendix.

Note 2.— In accordance with 1.1.5 and 2.1.5, severe or moderate icing and severe or moderate turbulence (SEV ICE, MOD ICE, SEV TURB, MOD TURB) associated with thunderstorms, cumulonimbus clouds or tropical cyclones should not be included.

Element	Detailed content	SIGMET template	AIRMET template	SIGMET message examples	AIRMET message examples
...
IF THE SIGMET OR AIRMET MESSAGE IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.					
Status indicator (C) ⁵	Indicator of test or exercise	TEST or EXER	TEST or EXER	TEST EXER	TEST EXER
...
Observed or forecast phenomenon (M) ^{20,21}	Indication whether the information is observed and expected to continue, or forecast	OBS [AT nnnnZ] or FCST [AT nnnnZ]		OBS OBS AT 1210Z FCST FCST AT 1815Z	

Element	Detailed content	SIGMET template	AIRMET template	SIGMET message examples	AIRMET message examples
Location (C) ^{20, 21, 33}	Location (referring to latitude and longitude (in degrees and minutes))	<p>Nnn[nn] Wnnn[nn] or Nnn[nn] Ennn[nn] or Snn[nn] Wnnn[nn] or Snn[nn] Ennn[nn]</p> <p>or</p> <p>N OF Nnn[nn] or S OF Nnn[nn] or N OF Snn[nn] or S OF Snn[nn] [AND]</p> <p>W OF Wnnn[nn] or E OF Wnnn[nn] or W OF Ennn[nn] or E OF Ennn[nn]</p> <p>or</p> <p>N OF Nnn[nn] or N OF Snn[nn] AND S OF Nnn[nn] or S OF Snn[nn]</p> <p>or</p> <p>W OF Wnnn[nn] or W OF Ennn[nn] AND E OF Wnnn[nn] or E OF Ennn[nn]</p> <p>or</p> <p>N OF LINE²² or NE OF LINE²² or E OF LINE²² or SE OF LINE²² or S OF LINE²² or SW OF LINE²² or W OF LINE²² or NW OF LINE²² Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]</p> <p>[– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]</p> <p>[AND N OF LINE²² or NE OF LINE²² or E OF LINE²² or SE OF LINE²² or S OF LINE²² or SW OF LINE²² or W OF LINE²² or NW OF LINE²² Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]</p> <p>or</p> <p>WI^{22, 23} Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – [Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]</p> <p>or</p> <p>APRX nnKM WID LINE²² BTN (or nnNM WID LINE²² BTN) Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]</p> <p>[– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]</p> <p>or</p> <p>ENTIRE UIR</p> <p>or</p> <p>ENTIRE FIR</p> <p>or</p> <p>ENTIRE FIR/UIR</p> <p>or</p> <p>ENTIRE CTA</p> <p>or²⁴</p> <p>WI nnnKM (or nnNM) OF TC CENTRE</p> <p>or²⁵</p> <p>WI nnKM (or nnNM) OF Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]</p>		<p>N2020 W07005</p> <p>N48 E010</p> <p>S60 W160</p> <p>S0530 E16530</p> <p>N OF N50</p> <p>S OF N5430</p> <p>N OF S10</p> <p>S OF S4530</p> <p>W OF W155</p> <p>E OF W45</p> <p>W OF E15540</p> <p>E OF E09015</p> <p>N OF N1515 AND W OF E13530</p> <p>S OF N45 AND N OF N40</p> <p>N OF LINE S2520 W11510 – S2520 W12010</p> <p>SW OF LINE N50 W005 – N60 W020</p> <p>SW OF LINE N50 W020 – N45 E010 AND NE OF LINE N45 W020 – N40 E010</p> <p>WI N6030 E02550 – N6055 E02500 – N6050 E02630 – N6030 E02550</p> <p>APRX 50KM WID LINE BTN N64 W017 – N60 W010 – N57 E010</p> <p>ENTIRE FIR</p> <p>ENTIRE UIR</p> <p>ENTIRE FIR/UIR</p> <p>ENTIRE CTA</p> <p>WI 400KM OF TC CENTRE</p> <p>WI 250NM OF TC CENTRE</p> <p>WI 30KM OF N6030 E02550[‡]</p>	

[‡] Applicable as of 7 November 2019

Element	Detailed content	SIGMET template	AIRMET template	SIGMET message examples	AIRMET message examples
Level (C) ^{20, 21, 24}	Flight level or altitude	[SFC]/FLnnn or [SFC/]nnnnM (or [SFC/][n]nnnnFT) or FLnnn/nnn or TOP FLnnn or [TOP] ABV FLnnn (or [TOP] ABV [n]nnnnFT) [nnnn]/nnnnM (or [[n]nnnn/][n]nnnnFT) or [nnnnM]/FLnnn (or [[n]nnnnFT]/FLnnn) or ^{22, 24} TOP [ABV or BLW] FLnnn		FL180 SFC/FL070 SFC/3000M SFC/10000FT FL050/080 TOP FL390 ABV FL250 TOP ABV FL100 ABV 7000FT TOP ABV 9000FT TOP ABV 10000FT 3000M 2000/3000M 8000FT 6000/12000FT 2000M/FL150 10000FT/FL250 TOP FL500 TOP ABV FL500 TOP BLW FL450	
Movement or expected movement (C) ^{20, 25, 26, 34}	Movement or expected movement (direction and speed) with reference to one of the sixteen points of compass, or stationary	MOV N [nnKMH] or MOV NNE [nnKMH] or MOV NE [nnKMH] or MOV ENE [nnKMH] or MOV E [nnKMH] or MOV ESE [nnKMH] or MOV SE [nnKMH] or MOV SSE [nnKMH] or MOV S [nnKMH] or MOV SSW [nnKMH] or MOV SW [nnKMH] or MOV WSW [nnKMH] or MOV W [nnKMH] or MOV WNW [nnKMH] or MOV NW [nnKMH] or MOV NNW [nnKMH] (or MOV N [nnKT] or MOV NNE [nnKT] or MOV NE [nnKT] or MOV ENE [nnKT] or MOV E [nnKT] or MOV ESE [nnKT] or MOV SE [nnKT] or MOV SSE [nnKT] or MOV S [nnKT] or MOV SSW [nnKT] or MOV SW [nnKT] or MOV WSW [nnKT] or MOV W [nnKT] or MOV WNW [nnKT] or MOV NW [nnKT] or MOV NNW [nnKT]) or STNR		MOV SE MOV NNW MOV E 40KMH MOV E 20KT MOV WSW 20KT STNR	
Changes in intensity (C) ²⁰	Expected changes in intensity	INTSF or WKN or NC		INTSF WKN NC	
Forecast time (C) ^{20, 21, 25, 26}	Indication of the forecast time of phenomenon	FCST AT nnnnZ	—	FCST AT 2200Z	—
TC forecast position (C) ^{22, 24}	Forecast position of TC centre at the end of the validity period of the SIGMET message	TC CENTRE PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] or ³¹ TC CENTRE PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB	—	TC CENTRE PSN N1030 E16015 TC CENTRE PSN N1015 E15030 600015 CB	—

Element	Detailed content	SIGMET template	AIRMET template	SIGMET message examples	AIRMET message examples
Forecast position (C) ^{20, 21, 25-26, 27, 33}	Forecast position of phenomenon at the end of the validity period of the SIGMET message. ³²	<p>Nnn[nn] Wnnn[nn] or Nnn[nn] Ennn[nn] or Snn[nn] Wnnn[nn] or Snn[nn] Ennn[nn]</p> <p>or</p> <p>N OF Nnn[nn] or S OF Nnn[nn] or N OF Snn[nn] or S OF Snn[nn] [AND] W OF Wnnn[nn] or E OF Wnnn[nn] or W OF Ennn[nn] or E OF Ennn[nn]</p> <p>or</p> <p>N OF Nnn[nn] or N OF Snn[nn] AND S OF Nnn[nn] or S OF Snn[nn]</p> <p>or</p> <p>W OF Wnnn[nn] or W OF Ennn[nn] AND E OF Wnnn[nn] or E OF Ennn[nn]</p> <p>or</p> <p>N OF LINE²² or NE OF LINE²² or E OF LINE²² or SE OF LINE²² or S OF LINE²² or SW OF LINE²² or W OF LINE²² or NW OF LINE²² Nnn[nn]</p> <p>or</p> <p>Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]</p> <p>[– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]] [AND N OF LINE²² or NE OF LINE²² or E OF LINE²² or SE OF LINE²² or S OF LINE²² or SW OF LINE²² or W OF LINE²² or NW OF LINE²² Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]</p>	—	<p>N30 W170</p> <p>N OF N30</p> <p>S OF S50 AND W OF E170</p> <p>S OF N46 AND N OF N39</p> <p>NE OF LINE N35 W020 – N45 W040</p> <p>SW OF LINE N48 W020 – N43 E010 AND NE OF LINE N43 W020 – N38 E010</p> <p>WI N20 W090 – N05 W090 – N10 W100 – N20 W100 – N20 W090</p> <p>APRX 50KM WID LINE BTN N64 W017 – N57 W005 – N55 E010 – N55 E030</p> <p>ENTIRE FIR ENTIRE UIR ENTIRE FIR/UIR</p> <p>ENTIRE CTA</p> <p>NO VA EXP</p> <p>WI 30KM OF N6030 E02550[†]</p> <p>WI 150NM OF TC CENTRE</p>	—

[†] Applicable as of 7 November 2019

Element	Detailed content	SIGMET template	AIRMET template	SIGMET message examples	AIRMET message examples
		<p>or WI^{22,23} Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]</p> <p>or APRX nnKM WID LINE²² BTN (nnNM WID LINE²² BTN) Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] [– Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]</p> <p>or ENTIRE FIR or ENTIRE UIR or ENTIRE FIR/UIR or ENTIRE CTA or²²⁸ NO VA EXP</p> <p>or²²⁵ WI nnKM (or nnNM) OF Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]</p> <p>or²⁴ WI nnnKM (nnnNM) OF TC CENTRE</p>			
Repetition of elements (C) ²²⁹	Repetition of elements included in a SIGMET message for volcanic ash cloud or tropical cyclone	[AND] ²²⁹	—	AND	—

OR

Cancellation of SIGMET/ AIRMET (C) ²³⁰	Cancellation of SIGMET/AIRMET referring to its identification	CNL SIGMET [n][n] nnnnnn/nnnnnn or ²²⁸ CNL SIGMET [n][n] nnnnnn/nnnnnn VA MOV TO nnnn FIR	CNL AIRMET [n][n] nnnnnn/nnnnnn	CNL SIGMET 2 101200/101600 CNL SIGMET A13 251030/251430 VA MOV TO YUDO FIR ²	CNL AIRMET 05 151520/151800
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Notes.—

- ...
19. The use of cumulonimbus (CB) and towering cumulus (TCU) is restricted to AIRMETS in accordance with 2.1.4.
20. In the case of volcanic ash cloud or cumulonimbus clouds associated with a tropical cyclone covering more than one area within the FIR, these elements can be repeated, as necessary. Each location and forecast position is to be preceded by an observed or forecast time.
21. In the case of cumulonimbus clouds associated with a tropical cyclone covering more than one area within the FIR, these elements can be repeated as necessary. Each location and forecast position must be preceded by an observed or forecast time.
22. A straight line is to be used between two points drawn on a map in the Mercator projection or between two points which crosses lines of longitude at a constant angle.
23. The number of coordinates should be kept to a minimum and should not normally exceed seven.
24. Only for SIGMET messages for tropical cyclones.
25. Only for SIGMET messages for radioactive cloud. When detailed information on the release is not available, a radius of up to 30 kilometres (or 16 nautical miles) from the source may be applied; and a vertical extent from surface (SFC) to the upper limit of the flight information region/upper flight information region (FIR/UIR) or control area (CTA) is to be applied. [Applicable from 7 November 2019 until 4 November 2020]
26. Only for SIGMET messages for radioactive cloud. When detailed information on the release is not available, a radius of up to 30 kilometres (or 16 nautical miles) from the source may be applied; and a vertical extent from surface (SFC) to the upper limit of the flight information region/upper flight information region (FIR/UIR) or control area (CTA) is to be applied. [Applicable 5 November 2020]
27. The elements "forecast time" and "forecast position" are not to be used in conjunction with the element "movement or expected movement".
28. The levels of the phenomena remain fixed throughout the forecast period.
29. Only for SIGMET messages for volcanic ash.
30. To be used for two or more volcanic ash clouds or two centres of tropical cyclones cumulonimbus clouds associated with a tropical cyclone simultaneously affecting the FIR concerned.
31. End of the message (as the SIGMET/AIRMET message is being cancelled).
32. The term CB is to be used when the forecast position for the cumulonimbus cloud is included.
33. The forecast position for cumulonimbus (CB) cloud occurring in connection with tropical cyclones relate to the forecast time of the tropical cyclone centre position, not to the end of the validity period of the SIGMET message.
34. For SIGMET messages for radioactive cloud, only within (WI) is to be used for the elements "location" and "forecast position".
35. For SIGMET messages for radioactive cloud, only stationary (STNR) is to be used for the element "movement or expected movement".

Table A6-1B. Template for special air-reports (uplink)

Key: M = inclusion mandatory, part of every message;
 C = inclusion conditional, included whenever applicable;
 = = a double line indicates that the text following it should be placed on the subsequent line.

Note.— The ranges and resolutions for the numerical elements included in special air-reports are shown in Table A6-4 of this appendix.

Element	Detailed content	Template ^{1,2}	Examples
Identification (M)	Message identification	ARS	ARS
Aircraft identification (M)	Aircraft radiotelephony call sign	nnnnn	VA812 ³
Observed phenomenon (M)	Description of observed phenomenon causing the issuance of the special air-report ⁴	TS TSGR SEV TURB SEV ICE SEV MTW HVY DS HVY SS VA CLD VA [MT nnnnnnnnn]	TS TSGR SEV TURB SEV ICE SEV MTW HVY DS HVY SS VA CLD VA

<i>Element</i>	<i>Detailed content</i>	<i>Template^{1,2}</i>	<i>Examples</i>
		MOD TURB MOD ICE	VA MT ASHVAL ⁵ MOD TURB MOD ICE
Observation time (M)	Time of observation of observed phenomenon	OBS AT nnnnZ	OBS AT 1210Z
Observed Location (C)	Location (referring to latitude and longitude (in degrees and minutes)) of observed phenomenon	NnnnnWnnnnn or NnnnnEnnnnn or SnnnnWnnnnn or SnnnnEnnnnn	N2020W07005 S4812E01036
Observed Level (C)	Flight level or altitude of observed phenomenon	FLnnn or FLnnn/nnn or nnnnM (or [n]nnnnFT)	FL390 FL180/210 3000M 12000FT

...

Example A6-4. SIGMET message for radioactive cloud

YUCC SIGMET 2 VALID 201200/201600 YUDO –
 YUCC AMSWELL FIR RDOACT CLD OBS AT 1155Z WI 30KM OF N6030 E02550 SFC/FL550 STNR
~~S5000 W14000 S5000 W13800 S5200 W13800 S5200 W14000 S5000 W14000 SFC/FL100 WKN~~
 FCST AT 1600Z WI ~~S5200 W14000 S5200 W13800 S5300 W13800 S5300 W14000 S5200~~
~~W14000~~

Meaning:

The second SIGMET message issued for the AMSWELL* flight information region (identified by YUCC Amwell area control centre) by the Donlon/International* meteorological watch office (YUDO) since 0001 UTC; the message is valid from 1200 UTC to 1600 UTC on the 20th of the month; radioactive cloud was observed at 1155 UTC within 30 kilometres of 60 degrees 30 minutes north 25 degrees 50 minutes east between the surface and flight level 550. The radioactive cloud is stationary ~~an area bounded by 50 degrees 0 minutes south 140 degrees 0 minutes west to 50 degrees 0 minutes south 138 degrees 0 minutes west to 52 degrees 0 minutes south 138 degrees 0 minutes west to 52 degrees 0 minutes south 140 degrees 0 minutes west to 50 degrees 0 minutes south 140 degrees 0 minutes west~~ and between the surface and flight level 100; the radioactive cloud is expected to weaken in intensity; at 1600 UTC ~~the radioactive cloud is forecast to be located within an area bounded by 52 degrees 0 minutes south 140 degrees 0 minutes west to 52 degrees 0 minutes south 138 degrees 0 minutes west to 53 degrees 0 minutes south 138 degrees 0 minutes west to 53 degrees 0 minutes south 140 degrees 0 minutes west to 52 degrees 0 minutes south 140 degrees 0 minutes west.~~

* Fictitious location

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**APPENDIX 8. TECHNICAL SPECIFICATIONS
RELATED TO SERVICE FOR OPERATORS
AND FLIGHT CREW MEMBERS**

(See Chapter 9 of this Annex.)

...

**2. SPECIFICATIONS RELATED TO INFORMATION FOR
PRE-FLIGHT PLANNING AND IN-FLIGHT REPLANNING**

...

2.2 Format of information on significant weather

2.2.1 Information on significant weather supplied by WAFCs for pre-flight planning and in-flight replanning shall be in the BUFR code form.

Note.— The BUFR code form is contained in the Manual on Codes (WMO-No. 306), Volume I.2, Part B — Binary Codes.

2.2.2 **Recommendation.**— *As of 4 November 2021, in addition to 2.2.1, information on significant weather supplied by WAFCs for pre-flight planning and in-flight replanning should be in IWXXM GML form.*

Note 1.— Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).

Note 2. — Geography markup language (GML) is an encoding standard of the Open Geospatial Consortium (OGC).

...

4.2 Charts in flight documentation

4.2.1 Characteristics of charts

4.2.1.1 **Recommendation.**— *Charts included in flight documentation should have a high standard of clarity and legibility and should have the following physical characteristics:*

...

- g) *labels on the charts for flight documentation should be clear and simple and should present the name of the world area forecast centre or, for non-world area forecast system (WAFS) products, the originating centre, the type of chart, date and valid time and, if necessary, the types of units used in an unambiguous way.*

Note.— When plotting shapes, particularly polygons, on maps, appropriate corrections are necessary if plotted on projections different to that used in the production of the original forecast area.

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**APPENDIX 10. TECHNICAL SPECIFICATIONS RELATED TO
REQUIREMENTS FOR AND USE OF COMMUNICATIONS**

(See Chapter 11 of this Annex.)

1. SPECIFIC REQUIREMENTS FOR COMMUNICATIONS

1.1 Required transit times of operational meteorological information

AFTN messages and bulletins containing operational meteorological information shall achieve transit times of less than 5 minutes, unless otherwise determined to be lower by regional air navigation agreement.

...

2.1.4 Structure Transmission of bulletins containing operational meteorological information

Meteorological bulletins containing operational meteorological information shall be transmitted via the AFTN aeronautical fixed service (AFS) ~~shall be encapsulated in the text part of the AFTN message format.~~

...

**ATTACHMENT E. SPATIAL RANGES
AND RESOLUTIONS FOR SPACE WEATHER
ADVISORY INFORMATION**

(See Appendix 2, 6.1 of this Annex.)

<i>Element to be forecast</i>	<i>Range</i>	<i>Resolution</i>
Flight level affected by radiation	250 – 600	310
Longitudes for advisories (degrees)	000 – 180	15
Latitudes for advisories (degrees)	00 – 90	10
...

...