



International Civil Aviation Organization

**STUDY NOTE**

METPWGMOG/7/SN/26  
22/03/18

**MEETING OF THE METEOROLOGY PANEL (METP)  
WORKING GROUP MOG (WAFS)**

**SEVENTH MEETING**

**Offenbach, Germany, 11 to 13 April 2018**

**Agenda Item            3.3 Matters in support of WAFS Developments**

**AMENDMENT 80 TO ANNEX 3**

(Presented by the WAFC Provider States)

**SUMMARY**

This Study Note provides the opportunity for the group to review a proposed update to ICAO Annex 3, for Amendment 80 (applicable November 2022) in relation to SIGWX changes.

Action by the METP-WG/MOG is in paragraph 4.

**1. INTRODUCTION**

1.1 This paper provides the opportunity for the group to review proposed changes required in Annex 3 to support the planned upgrades to the WAFC data sets.

**2. DISCUSSION**

2.1 Appendix A contains shows the proposed changes to Annex 3 for Amendment 80, applicable November 2022 (or PANS-MET). The changes detailed in Appendix A relate to the following changes which are proposed in METP-WG/MOG7 SN22 and SN23:

- 2.1.1 The provision of SIGWX forecasts for multiple time-steps, issued four times daily.
- 2.1.2 The removal of jet depth, squall line, duststorm and sandstorm forecast information from SIGWX WX forecasts.
- 2.1.3 Changes to the criteria and descriptions for SIGWX forecasts of cumulonimbus clouds, icing, turbulence and tropical cyclones.
- 2.1.4 The retirement of SIGWX forecasts issued in the BUFR code form.
- 2.1.5 The retirement of select regional medium-level SIGWX forecasts as the vertical range of global SIGWX information is proposed to extend from FL100 to FL530.

### 3. CONCLUSION

3.1 Having considered the revisions to Annex 3 presented in Appendix A the WAFs invite the meeting to consider whether to propose these changes to METP/4.

**Action 7/xx — Amendment 80 to Annex 3 (SIGWX)**

That a detailed summary of the proposed changes to WAFS information planned for implementation in November 2022 be presented at METP/4 for endorsement.

### 4. ACTION BY THE METP-WG/MOG

4.1 The METP-WG/MOG is invited to:

- a) note the information contained in this paper; and
- b) agree to the action in 3.1.

## APPENDIX A

- New text to Annex 3 for Amendment 79 is shaded in grey.
- Deleted text for Amd 79 is shown with red ~~strikeout~~
- For Amd 80 or PANS-MET 2022:
  - New text for 2022 is in blue (without ~~strikeout~~)
  - Deleted text for 2022 is in blue ~~strikeout~~.

---

# CHAPTER 9. SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

...

## 9.1 General provisions

...

9.1.3 Meteorological information supplied to operators and flight crew members shall be up to date and include the following information, as agreed between the meteorological authority and the operators concerned:

- a) forecasts of:
- 1) upper wind and upper-air temperature;
  - 2) upper-air humidity;
  - 3) geopotential altitude of flight levels;
  - 4) flight level and temperature of tropopause;
  - 5) direction, speed and flight level of maximum wind;
  - 6) SIGWX phenomena; and
  - 7) cumulonimbus clouds, icing and turbulence;

*Note 1.— Forecasts of 1) through 5) ~~upper air humidity and geopotential altitude of flight levels~~ are intended for ~~used only in~~ automatic flight planning and need not be displayed.*

*Note 2.— Forecasts of cumulonimbus clouds, icing and turbulence are intended to be processed and, if necessary, visualized according to the specific thresholds relevant to user operations.*

...

9.1.6 Charts generated from the IWXXM form ~~digital~~ forecasts provided by the WAFCs shall be ~~for the fixed valid times and coverage of the route of the flight made available~~, as required by operators., ~~for fixed areas of coverage as shown in~~

[Appendix 8, Figures A8-1, A8-2 and A8-3.](#)

9.1.7 ~~When forecasts of upper wind and upper air temperature listed under 9.1.3 a) 1) are supplied in chart form, they shall be fixed time prognostic charts for flight levels as specified in Appendix 2, 1.2.2 a).~~ When forecasts of SIGWX phenomena listed under 9.1.3 a) 6) are supplied in chart form, they shall be fixed time prognostic charts for an atmospheric layer limited by flight levels ~~between 250 and 630. as specified in Appendix 2, 1.3.2 and Appendix 5, 4.3.2.~~

9.1.8 The forecasts of upper wind and upper-air temperature and of SIGWX phenomena ~~above flight level 100 requested for pre-flight planning and in-flight replanning by the operator shall be made available~~ supplied as soon as ~~technically feasible they become available, but not later than 3 hours before departure.~~ Other meteorological information requested for pre-flight planning and in-flight replanning by the operator shall be supplied as soon as is practicable.

...

## APPENDIX 1. FLIGHT DOCUMENTATION — MODEL CHARTS AND FORMS

...

~~MODEL IS — Upper wind and upper air temperature chart for standard isobaric surface  
— Example 1. Arrows, feathers and pennants (Mercator projection)  
— Example 2. Arrows, feathers and pennants (Polar stereographic projection)~~

MODEL SWH Significant weather chart (high level)  
Example. Polar stereographic projection (~~showing the jet stream vertical extent~~)

~~MODEL SWM — Significant weather chart (medium level)~~

...

~~UPPER WIND AND UPPER AIR TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE — MODEL IS  
Example 1. Arrows, feathers and pennants (Mercator projection)~~

<Remove chart>

...

~~UPPER WIND AND UPPER AIR TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE — MODEL IS  
Example 2. Arrows, feathers and pennants (Polar stereographic projection)~~

<Remove chart>

...

SIGNIFICANT WEATHER CHART (HIGH LEVEL) MODEL SWH  
Example. Polar stereographic projection (~~showing the jet stream vertical extent~~)

<New SWH to be prepared and given to WMO, which removes Tropopause Heights>

<New SWH to be prepared and given to WMO, which removes jet depths and CB bases>

...

SIGNIFICANT WEATHER CHART (MEDIUM LEVEL) MODEL SWM

<Remove chart>

...

SHEET OF NOTATIONS USED IN FLIGHT DOCUMENTATION MODEL SN

<New text to be prepared for Table 2 and given to WMO, which removes Tropopause Heights>

<New text to be prepared and given to WMO to remove jet depths as well as CB bases>

...

## APPENDIX 2. TECHNICAL SPECIFICATIONS RELATED TO WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL OFFICES

### 1. WORLD AREA FORECAST SYSTEM

...

#### 1.2 Upper-air gridded forecasts

<See separate paper for proposed changes>

...

#### 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 in accordance with Table X-5 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 e~~ Each forecast shall be completed made available in the SWIM environment as soon as technically feasible but not later than 9 7 6 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.~~

1.3.1.23 **Recommendation.** ~~From xx November 2021, in addition to 1.3.1.2,~~ SIGWX forecasts shall ~~should~~ be made available in the SWIM environment in IWXXM form in accordance with Table X-5.

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

1.3.1.3 SIGWX forecasts shall be made available PNG form in accordance with Table X-5.

1.3.1.4 SIGWX forecasts shall be issued for flight levels between 100 and 530.

#### 1.3.2 Types of SIGWX forecasts

~~SIGWX forecasts shall be issued as high level SIGWX forecasts for flight levels between 250 and 630.~~

*Note.— Medium level SIGWX forecasts for flight levels between 100 and 250 for limited geographical areas will continue to be issued until such time that flight documentation to be generated from the gridded forecasts of cumulonimbus clouds, icing and turbulence fully meets user requirements*

#### 1.3.3 Items included in SIGWX forecasts

SIGWX forecasts shall include the following items:

- ~~a) tropical cyclone provided that the maximum of the 10 minute mean surface wind speed is expected to reach or exceed 17 m/s (34 kt);~~
- ~~b) severe squall lines;~~
- ae) moderate or severe turbulence ~~(in cloud or clear air)~~ not associated with thunderstorms;
- bd) moderate or severe icing not associated with thunderstorms;

*Note.— Icing to be included on SIGWX in IWXXM form but not in SIGWX in PNG form.*

- ~~e) widespread sandstorm/duststorm;~~
- cf) cumulonimbus clouds associated with thunderstorms ~~and with a) to e)~~;

*Note.— Non convective cloud areas associated with in cloud moderate or severe turbulence and/or moderate or severe icing are to be included in the SIGWX forecasts.*

- g) flight level of tropopause;
- dh) jet streams;
- eh) information on the location of a tropical cyclone, meeting the criteria of a tropical cyclone advisory, comprising: the tropical cyclone symbol at the location of the centre of the cyclone in accordance with Table X-5 and, in a separate text box on the chart, the name of the tropical cyclone. In addition, the legend of SIGWX charts should indicate “CHECK SIGMET, ADVISORIES FOR TC.”;
- fi) information on the location of volcanic eruptions that are producing ash clouds of significance to aircraft operations, comprising: volcanic eruption symbol at the location of the volcano and, in a separate text box on the chart, the volcanic eruption symbol, the name of the volcano (if known) and the latitude/longitude of the eruption. In addition, the legend of SIGWX charts should indicate “CHECK SIGMET, ADVISORIES FOR TC AND VA, AND ASHTAM

AND NOTAM FOR VA”; and

- g) information on the location of a release of radioactive materials into the atmosphere of significance to aircraft operations, comprising: the radioactive materials in the atmosphere symbol at the location of the release and, in a separate text box on the chart, the radioactive materials in the atmosphere symbol, latitude/longitude of the site of the release, and (if known) the name of site of the radioactive source. In addition, the legend of SIGWX charts on which a release of radiation is indicated should contain “CHECK SIGMET AND NOTAM FOR RDOACT CLD”.

*Note 1.— Medium level SIGWX forecasts include all the items above.*

*Note 2.— Items to be included in low-level SIGWX forecasts (i.e. flight levels below 100) are included in Appendix 5 of Annex 3.*

### 1.3.43 Criteria for including items in SIGWX forecasts

The following criteria shall be applied for SIGWX forecasts:

~~a) items a) to d) in 1.3.3 shall only be included if expected to occur between the lower and upper levels of the SIGWX forecast;~~

a) the abbreviation “CB” shall only be included when it refers to the occurrence or expected occurrence of cumulonimbus clouds:

1) affecting an area with a maximum spatial coverage of 50 per cent or more of the area concerned;

2) along a line with little or no space between individual clouds; or

3) embedded in cloud layers or concealed by haze;

*Note. – CB forecasts will be based on probabilistic information; thus the area is a probability that closely matches 50 per cent or more spatial coverage.*

b) the inclusion of “CB” shall be understood to include all weather phenomena normally associated with cumulonimbus clouds, i.e. thunderstorm, moderate or severe icing, moderate or severe turbulence and hail;

c) where a volcanic eruption or a release of radioactive materials into the atmosphere warrants the inclusion of the volcanic eruption symbol or the radioactive materials in the atmosphere symbol in SIGWX forecasts, the symbols shall be included on SIGWX forecasts irrespective of the height to which the ash column or radioactive material is reported or expected to reach; and

d) in the case of co-incident or the partial overlapping of items fa), g) and h) in 1.3.3, the highest priority shall be given to item fi), followed by items gj) and ea). The item with the highest priority shall be placed at the location of the event, and an arrow shall be used to link the location of the other item(s) to its associated symbol or text box.

## 2. AERODROME METEOROLOGICAL OFFICES

### 2.1 Use of world area forecast system (WAFS) products

...

2.1.2 In order to ensure uniformity and standardization of flight documentation, the WAFS GRIB ~~and BUFR~~ and 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 WAFC concerning significant discrepancies

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

- a) icing, turbulence, and cumulonimbus clouds ~~that are obscured, frequent, embedded or occurring at a squall line, and sandstorms/duststorms~~; and
- b) volcanic eruptions or a release of radioactive materials into the atmosphere, of significance to aircraft operations.

The WAFC receiving the message shall acknowledge its receipt to the originator, together with a brief comment on the report and any action taken, using the same means of communication employed by the originator.

*Note.*— *Guidance on reporting significant discrepancies is provided in the Manual of Aeronautical Meteorological Practice (Doc 8896).*

---

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

...

## 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 and in-flight replanning shall be in the BUFR IWXXM 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.**— *From xx November 2021, in addition to 2.2.1, information on significant weather supplied by WAFCs for pre-flight and in-flight replanning should be in the IWXXM form.*~~

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



...

Table X-5: SIGWX forecast fixed valid times and tropical cyclone information

Time	SIGWX forecast fixed valid times		Time	Tropical cyclone information on SIGWX <sup>1</sup>	
	IWXXM form	PNG form		IWXXM form	PNG form
T+6 hours	X		T+6 hours	X	
T+9	X		T+9		
T+12	X		T+12	X	
T+15	X		T+15		
T+18	X		T+18	X	
T+21	X		T+21		
T+24	X	X	T+24	X	X
T+27	X		T+27		
T+30	X		T+30		
T+33	X		T+33		
T+36	X		T+36		
T+39	X		T+39		
T+42	X		T+42		
T+45	X		T+45		
T+48	X		T+48		

Note. –

1. Tropical cyclone information is supplied by the TCACs in accordance with Table A2-2.