International Civil Aviation Organization

MIDANPIRG Meteorology Sub-Group
Twelfth Meeting (MET SG/12)

(Virtual, 12 – 13 November 2024)

Agenda Item 4: MET Planning and Implementation

WAFS SIGWX CHANGES

(Presented by the SADIS Provider)

SUMMARY

This paper provides an update on matters that relate to the introduction of new multi-timestep WAFS Significant Weather (SIGWX) forecasts and changes to the existing T+24 SIGWX forecast products.

1. INTRODUCTION

1.1 This paper reports on upcoming changes to the WAFS SIGWX forecasts, with the introduction of new multi-timestep SIGWX in IWXXM format and changes to the existing T+24 forecasts planned for 23 January 2025. These changes have been agreed though the ICAO Met Panel Meteorological Operations Group (MOG) at its annual meetings.

1.2 A webinar recording discussing the changes detailed in this paper was delivered in August. The recording is available here: https://www.youtube.com/watch?v=zrlrqb5lqkE, and additional information about the upcoming SIGWX changes is available here: https://www.metoffice.gov.uk/services/transport/aviation/regulated/international-aviation/wafc/upcoming-changes

2. New WAFS SIGWX

2.1 Both WAFCs have been working on a major upgrade to the WAFS SIGWX forecasts. Currently only a 24-hour SIGWX forecast is produced 4 times daily (based off the 00, 06, 12 and 18 UTC model data) and this no longer meets the needs of the aviation industry particularly for short-haul flight and ultra-long haul flights. The new automated SIGWX will provide forecasts for 6-hour to 48-hour period (at 3 hourly intervals) and will be issued 4 times daily.

2.2 The SADIS API will provide access to the new WAFS SIGWX forecasts.

2.3 In a change to information presented at the METG/33 meeting, the implementation date for the new SIGWX forecasts has been delayed until 23 January 2025.

2.4 The new SIGWX forecasts will be provided in a new IWXXM format using this schema: https://schemas.wmo.int/iwxxm/2023-1/WAFSSigWxFC.xsd along with a set of three accompanying

charts that can be used for cross checking that the IWXXM data has been correctly displayed. The charts are not intended to be briefing charts. An example is shown in figure 1.

2.5 The new SIGWX covers FL100 to FL600 in a single forecast and includes the following:

- Jet Stream information
- Tropopause contours
- Areas of moderate (MOD) and severe (SEV) icing
- Areas of Occasional (OCNL) and Frequent (FRQ) cumulonimbus clouds and the cumulonimbus top. Information on whether the cumulonimbus clouds are embedded or not will not be included.
- Areas of moderate (MOD) and severe (SEV) turbulence. This turbulence could be clear air turbulence (CAT) or orographic turbulence.

2.6 The new SIGWX is designed for digital use, and will enable different SIGWX features to be toggled on and off, the map area, projection and colours to be customized according to user needs, and the movement and development/dissipation of features identified.

2.7 Users requiring charts for briefing purposes are expected to create them from the digital data set.

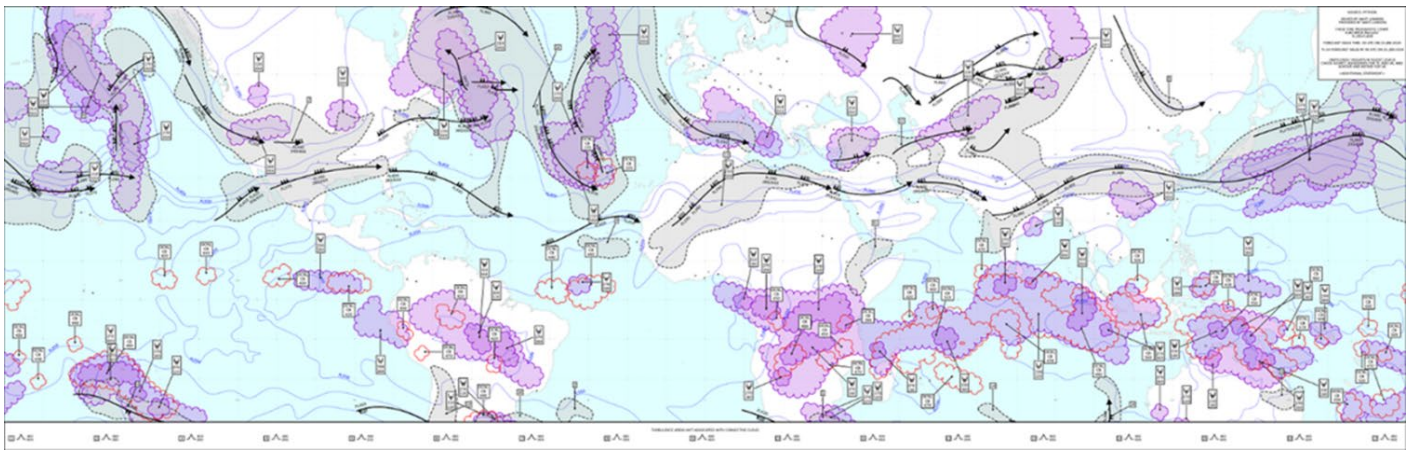

Figure 1a– Example new SIGWX visualization "cross-check chart"

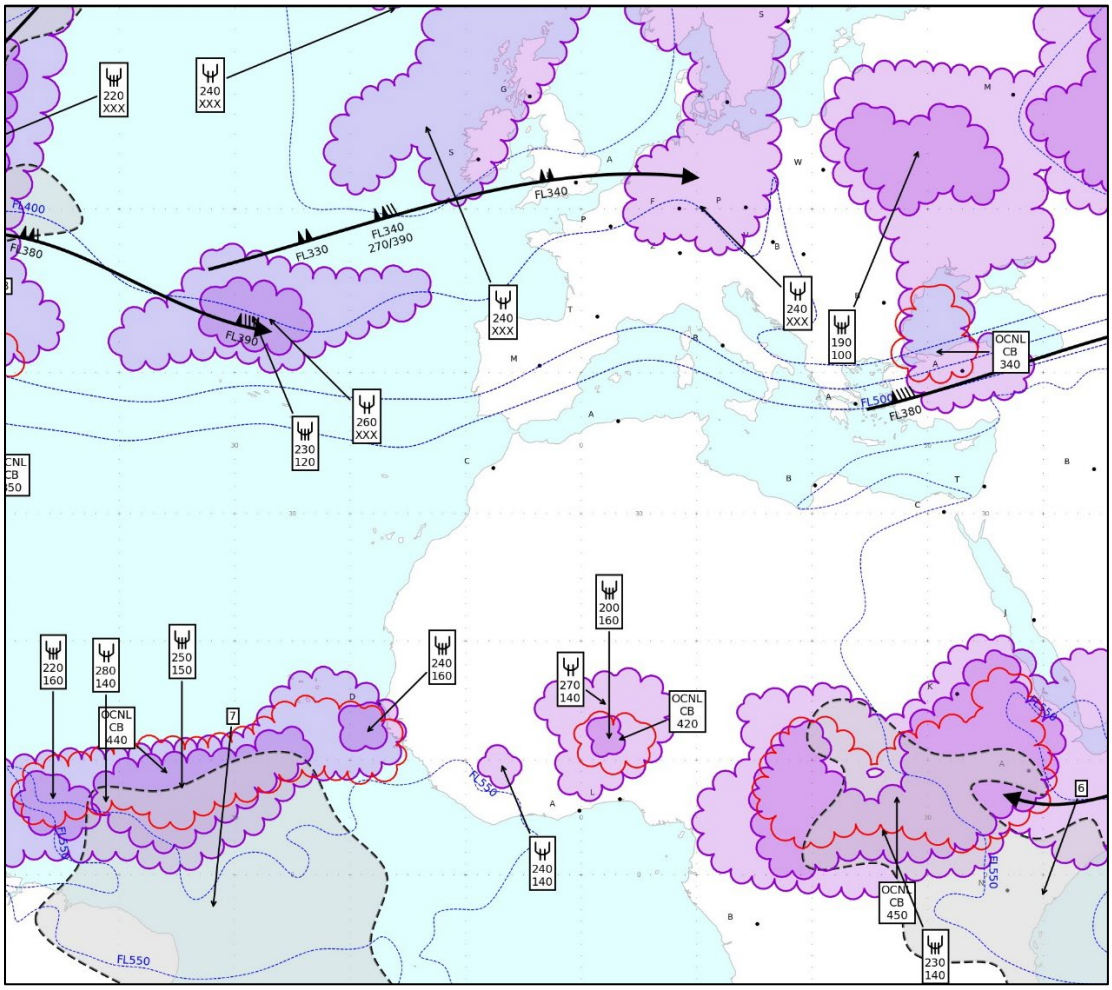

Figure 1b – Zoomed in section of a SIGWX "cross-check chart"

3. T+24 SIGWX

3.1 At the same time the new SIGWX forecasts are introduced there will be changes to the existing T+24 SIGWX forecasts. Previously it was announced that the medium level SIGWX forecasts would be retired but after feedback it the WAFC's have decided to continue to provide them. There will however be changes to the content and appearance of both the high and medium level T+24 forecasts.

3.2 The T+24 SIGWX charts will continue to be provided via the old SADIS FTP and WIFS systems only until November 2028 (when those systems are retired), and the BUFR format SIGWX data will be retired in January 2027.

3.3 The key changes to the T+24 SIGWX forecasts are as follows:

- Embedded cumulonimbus cloud will not be included. This means you will not see ISOL EMBD CB, OCNL EMBD CB or FRQ EMBD CB any more. Instead you will see only areas of OCNL CB (i.e areas where there is between 50 and 75% coverage) and FRQ CB (areas where there is greater than 75% coverage).

  - It is important to note that many of the areas that are currently forecast as ISOL EMBD CB will not simply disappear, but may instead be depicted as OCNL CB.

  - Forecasting EMBD CB is a very subjective exercise and difficult to verify. Hence the current SIGWX provision means that large areas of ISOL EMBD CB are forecast and there is limited ability for users to identify where there are specific concentrations of CB.

- CAT areas will become "turbulence areas" as they will be created from the WAFC turbulence data which forecasts both CAT and orographic turbulence types. Areas of moderate and severe turbulence will be indicated.

- Tropopause height will change to contours on the WAFC produced charts, and will provide users with better information on the characteristics of the tropopause.

- On the medium level SIGWX in-cloud turbulence will not be shown. What are currently combined in-cloud icing and turbulence areas will become icing only.

- The upper boundary of the high level SIGWX forecasts will change from FL630 to FL600.

3.4 The T+24 PNG images produced by the WAFC's will change in appearance with the introduction of colour and a new line style for icing areas. A new style T+24 high level chart is shown in figure 2.

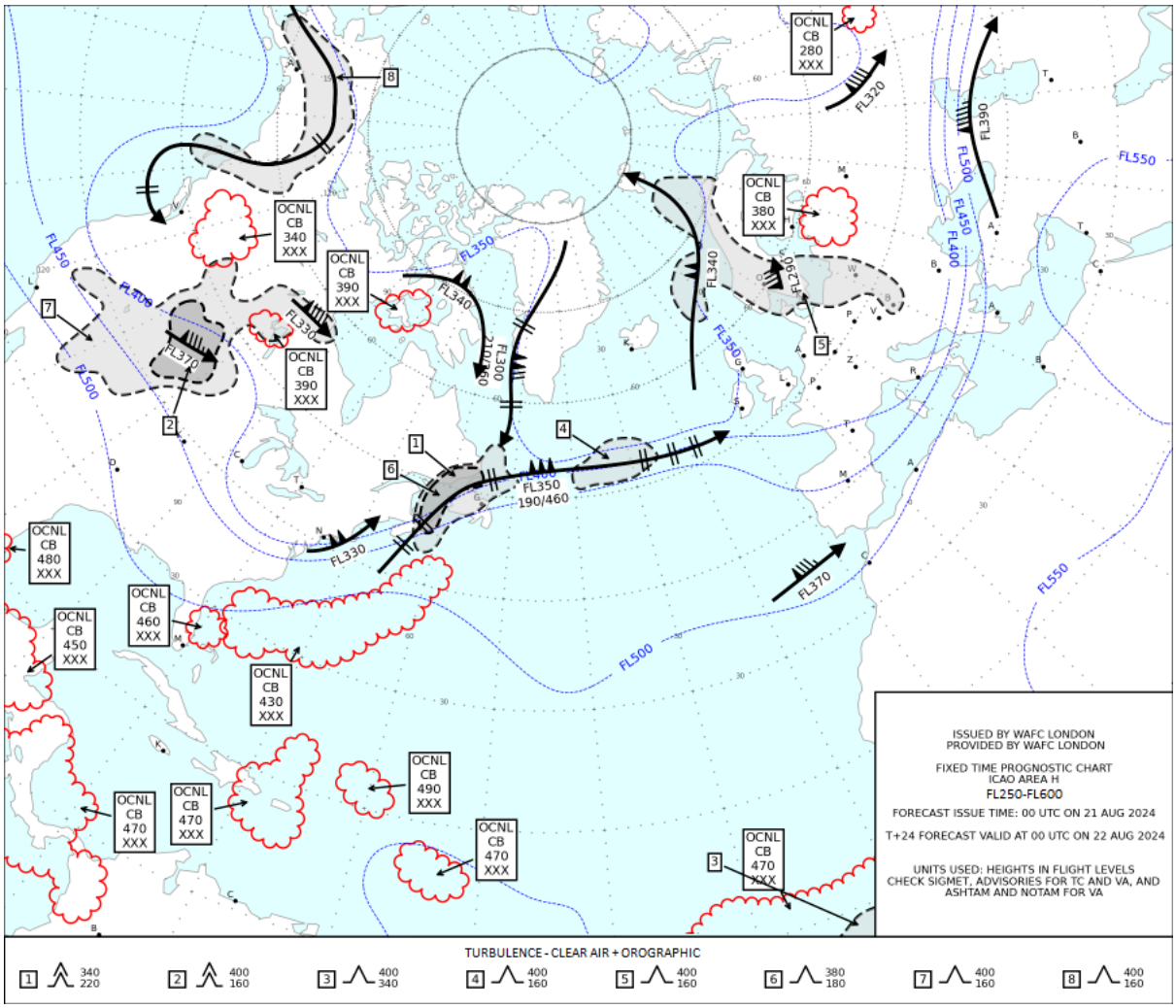

Figure 2 – WAFC produced T+24 high level SIGWX style from 23 January 2025 SIGWX

3.5 On the T+24 medium level SIGWX charts areas of icing will be depicted as shown in figure 3 with a different line style so that they can be more easily identified, especially if the chart is printed without colour.

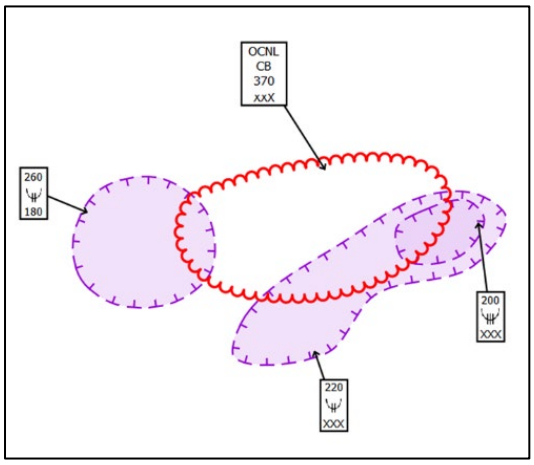

Figure 3, T+24 Medium level icing style from 23 January 2025

3.6 Constraints in what the BUFR code can accommodate means that there will be some differences

between the WAFC produced T+24 charts and those that are created from the BUFR data. Tropopause data will be provided in the form of spot heights (as it is now) and the medium level "MCLOUD" file which contains cumulonimbus and icing information will the cumulonimbus and icing features will not overlap (like they are in figure 3) so that visualization code is able to use existing rules for clear label placement.

3.7 Test BUFR files are available from the SADIS manager on request, and in addition data will be published on https://www.metoffice.gov.uk/services/transport/aviation/regulated/international-aviation/wafc/upcoming-changes.

3.8 Additional information on the SIGWX changes is provided here: https://www.metoffice.gov.uk/services/transport/aviation/regulated/international-aviation/wafc/upcoming-changes including a flyer that can be shared. Please share the flyer or website address with your regulator, airlines, operators, flight planning organizations and other aviation stakeholders in your State.

3.9 The new WAFS SIGWX forecasts will not be included in ICAO Annex 3 when they launch, but will be included when Amendment 82 becomes effective in November 2025. Both WAFCs are liaising with their State regulators to file a difference against the applicable Annex 3 provisions to notify airspace users of the changes to the T+24 SIGWX forecasts between 23 January 2025 and November 2025 (when Amendment 82 to Annex 3 becomes effective).

3.10 The UK Civil Aviation Authority issued an Aeronautical Information Circular about the upcoming SIGWX changes, and it is available here: https://www.aurora.nats.co.uk/htmlAIP/Publications/2024-07-25/html/eAIC/EG-eAIC-2024-131-P-en-GB.html

4. General

4.1 Verification to compare the existing T+24 forecasts with the equivalent forecasts produced using the new system has been carried out, and information is available in the SIGWX performance metrics section of https://www.metoffice.gov.uk/services/transport/aviation/regulated/international-aviation/wafc/upcoming-changes.

4.2 The WAFCs will prepare and publish SIGWX verification information based off the operational SIGWX in due course. Performance for a selection of forecast timesteps will be assessed.

4.3 New SIGWX forecasts in IWXXM format will are available now on the SADIS API in pre-operational mode. Information on the operation of the SADIS API is available here: https://www.metoffice.gov.uk/services/transport/aviation/regulated/international-aviation/sadis/sadis-api/index.

5. CONCLUSION

5.1 The WAFCs work on implementing a new multi-timestep SIGWX product is reaching its conclusion, and they will soon be provided operationally on the SADIS API. Operators and aviation industry users should be encouraged to update their systems to use the new SIGWX.

5.2 Users of the existing T+24 SIGWX charts should be made aware of the upcoming changes planned for 23 January 2025, and the meeting attendees are encouraged to share the information provided on https://www.metoffice.gov.uk/services/transport/aviation/regulated/international-aviation/wafc/upcoming-changes (including the flyer and webinar recording) with the operators and users within their State.

6. ACTION BY THE MEETING

6.1 The meeting is invited to note the contents of this paper.

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