International Civil Aviation Organization

INFORMATION PAPER (IP/05)

ICAO Asia and Pacific (APAC)
Twenty-Eighth Meeting of the Meteorology Sub-Group (MET SG/28)

Bangkok, Thailand, 08 to 12 July 2024

Agenda Item 6: Research, development and other initiatives

SADIS/WIFS AND WAFS

(Submitted by WAFC London)

SUMMARY

This information paper provides information on the new SADIS and WIFS API services, new higher resolution World Area Forecast System (WAFS) gridded data sets, and WAFS Significant Weather (SIGWX) forecasts.

On 26 November 2024 when the new WAFS SIGWX forecasts are introduced there will be changes to the content and appearance of the T+24 high and medium level SIGWX forecasts.

1. INTRODUCTION

1.1 This paper provides some information on the recent upgrade to the WAFS gridded sets, introduction of the new WAFS SIGWX forecasts and the introduction of the new SADIS and WIFS API systems for distributing the WAFS data.

1.2 All of these changes have been agreed though the ICAO Met Panel Meteorological Operations Group (MOG) at its annual meetings.

1.3 Information specifically relating to changes to the T+24 WAFS SIGWX forecasts will be presented at the Workshop that proceeds this meeting (on 8 July). The slides are included as Attachment B for completeness.

2. DISCUSSION

SADIS API AND WIFS API

2.1 WAFC London and WAFC Washington have worked closely together to develop the next generation of SADIS (operated by WAFC London) and WIFS (operated by NOAA). Both systems are SWIM compliant, and use the Open Geospatial Consortium Environmental Data Retrieval (OGC-EDR) API framework https://ogcapi.ogc.org/edr/. There is a high degree of harmonization in how data is requested and returned by both systems.

2.2 There are three parts to data available on the SADIS API and WIFS API:

- WAFS Gridded data (fully operational on SADIS API and WIFS API)
- WAFS OPMET data (fully operational on SADIS API and WIFS API)
- WAFS SIGWX data (available in test mode on the SADIS API. Not yet available on the WIFS API but will soon be made available via the WIFS test server). New WAFS SIGWX forecasts are expected to become operational on 26 November 2024.

2.3 Existing SADIS and WIFS users are encouraged to register for these new systems to retrieve data, and to start setting up their systems to process and visualize the data.

2.4 Information on the API's and how to register can be found via the two links below:

- SADIS: https://www.metoffice.gov.uk/services/transport/aviation/regulated/sadis/info/sadis-api
- WIFS API: https://aviationweather.gov/wifs/

HIGHER RESOLUTION WAFS GRIDDED DATA

2.5 With the introduction of the SADIS API and WIFS API, higher resolution WAFS gridded data sets were introduced. Table 1 gives a summary of what is available gridded WAFS data sets.

2.6 The 0.25 degree data sets are provided as regional tiles, see figure 1, to make the data volume more manageable for those organizations who may struggle with it. A globally coverage data set is also available for anyone who needs it.

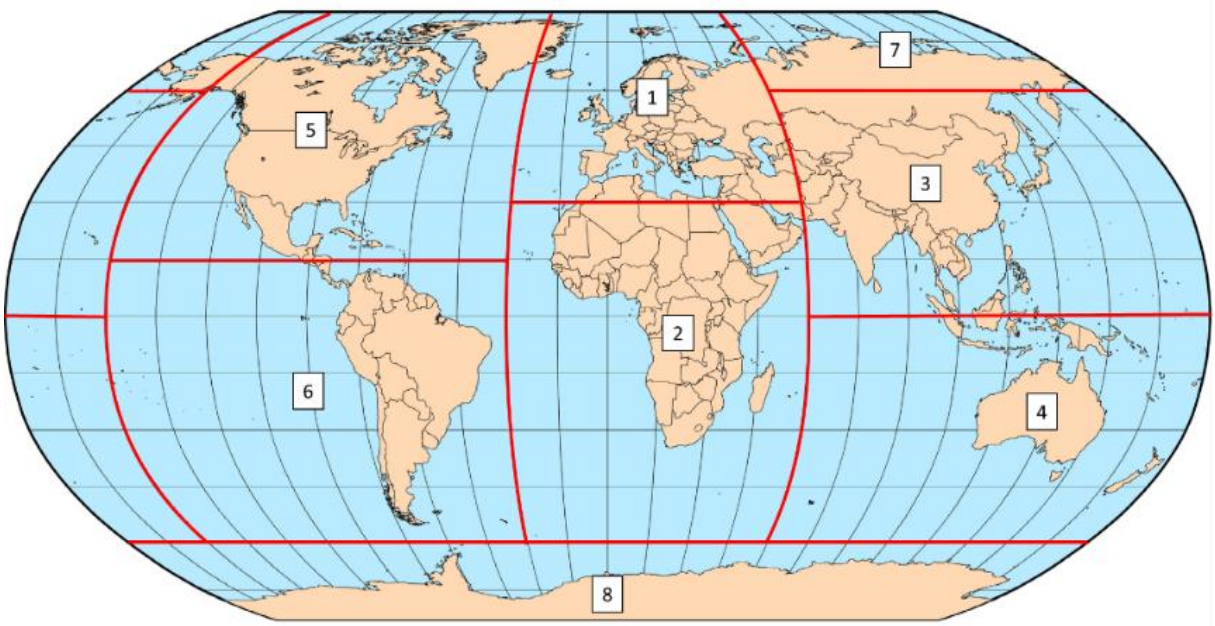


Figure 1 – Regions/Tiles of data that will be made available on the SADIS and WIFS APIs

2.7 The full new WAFS gridded data set is not yet listed in ICAO Annex 3, but will be when Amendment 82 becomes effective which is likely to be in November 2025 (note this amendment will also introduce the new PANS-MET which is where much of the information about the WAFS data will referenced).

0.25-degree horizontal resolution WAFS gridded data	**1.25-degree horizontal resolution WAFS gridded data**
Parameters • Wind U/V – 56 vertical levels from FL050 to FL600 • Temperature – 56 vertical levels from FL050 to FL600 • Geospatial Height – 56 vertical levels from FL050 to FL600 • Relative Humidity – 14 vertical levels from FL050 to FL180 • Tropopause height and Tropopause temperature • Max wind height, and max wind u/v • Icing Severity – 26 vertical levels from FL050 to FL300 • Turbulence Severity – 36 vertical levels from FL100 to FL450 • Cumulonimbus Extent, Base and Top WAFC London and WAFC Washington data is available.	**Parameters** • Wind U/V – 17 vertical levels from FL050 to FL530 • Temperature – 17 vertical levels from FL050 to FL530 • Geopotential Height – 17 vertical levels from FL050 to FL530 • Relative Humidity – 5 vertical levels from FL050 to FL180 • Tropopause height and Tropopause temperature • Max wind height, and max wind u/v WAFC London and WAFC Washington data is available.
Forecast Timesteps: • T+06 to T+24 at 1-hourly intervals • T+27 to T+48 at 3-hourly intervals[1] • T+54 to T+120 at 6-hourly intervals[2] *Note:* *[1]Icing, Turbulence and Cumulonimbus data will stop at T+48* *[2]WAFC London data past T+66 will only be produced for the 00Z and 12Z model runs* Data is available as global and regional tiles	**Forecast Timesteps:** • T+06 to T+36 at 3-hourly intervals Data is available as global tiles only.

Table 1 – WAFS gridded data available on the new SADIS API

WAFS SIGWX

2.8 A presentation regarding the upcoming SIGWX will be given at the APAC Met Seminar on 8 July. The presentation focusses specifically on the upcoming SIGWX changes. The key changes are also summarized in the following sections.

New WAFS SIGWX

2.9 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.

2.10 The SADIS API and WIFS API will provide access to the new WAFS SIGWX forecasts.

2.11 In a change to information presented at the MET SG/27 meeting, the implementation date for the new SIGWX forecasts has been delayed until 26 November 2024. Note this is 2 days prior to the AIRAC date.

2.12 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 accompanying charts that can be used for cross checking that the IWXXM data has been correctly decoded. The charts are not intended to be briefing charts. An example is shown in figure 2.

2.13 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 (CB) and the cumulonimbus top. Information on whether the CB are embedded or not will not be included. Moreover isolated embedded CB will not be included.
- Areas of moderate (MOD) and severe (SEV) turbulence. This turbulence could be clear air turbulence (CAT) or orographic turbulence.

2.14 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.

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

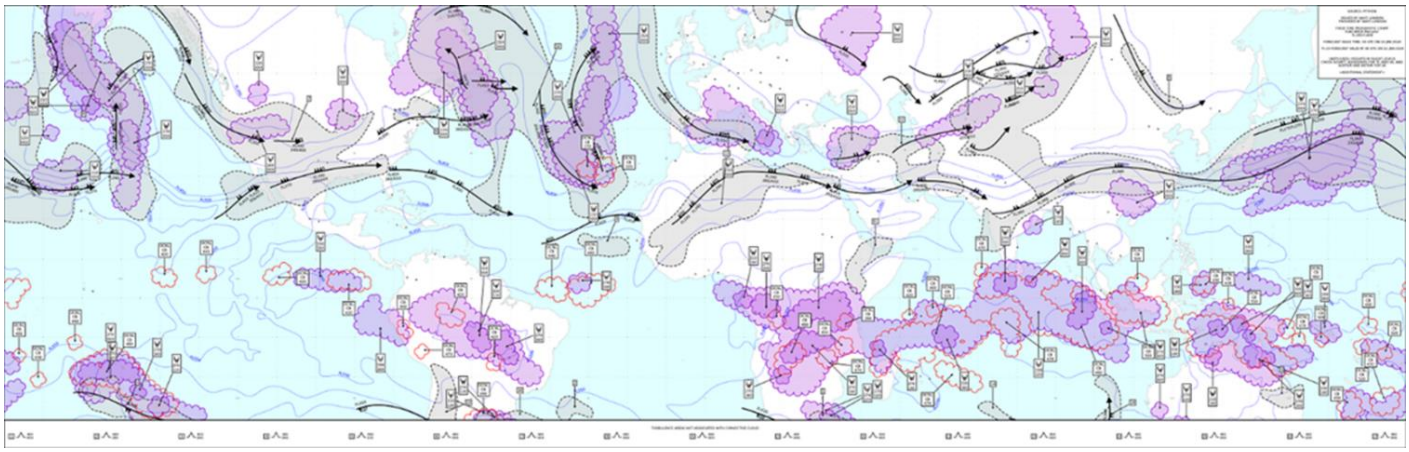


Figure 2 – Example new SIGWX visualization "cross-check chart"

T+24 WAFS SIGWX

2.16 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 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.

2.17 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 November 2026.

2.18 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. States will need to change their charts legends accordingly.
- 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.

2.19 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 3.

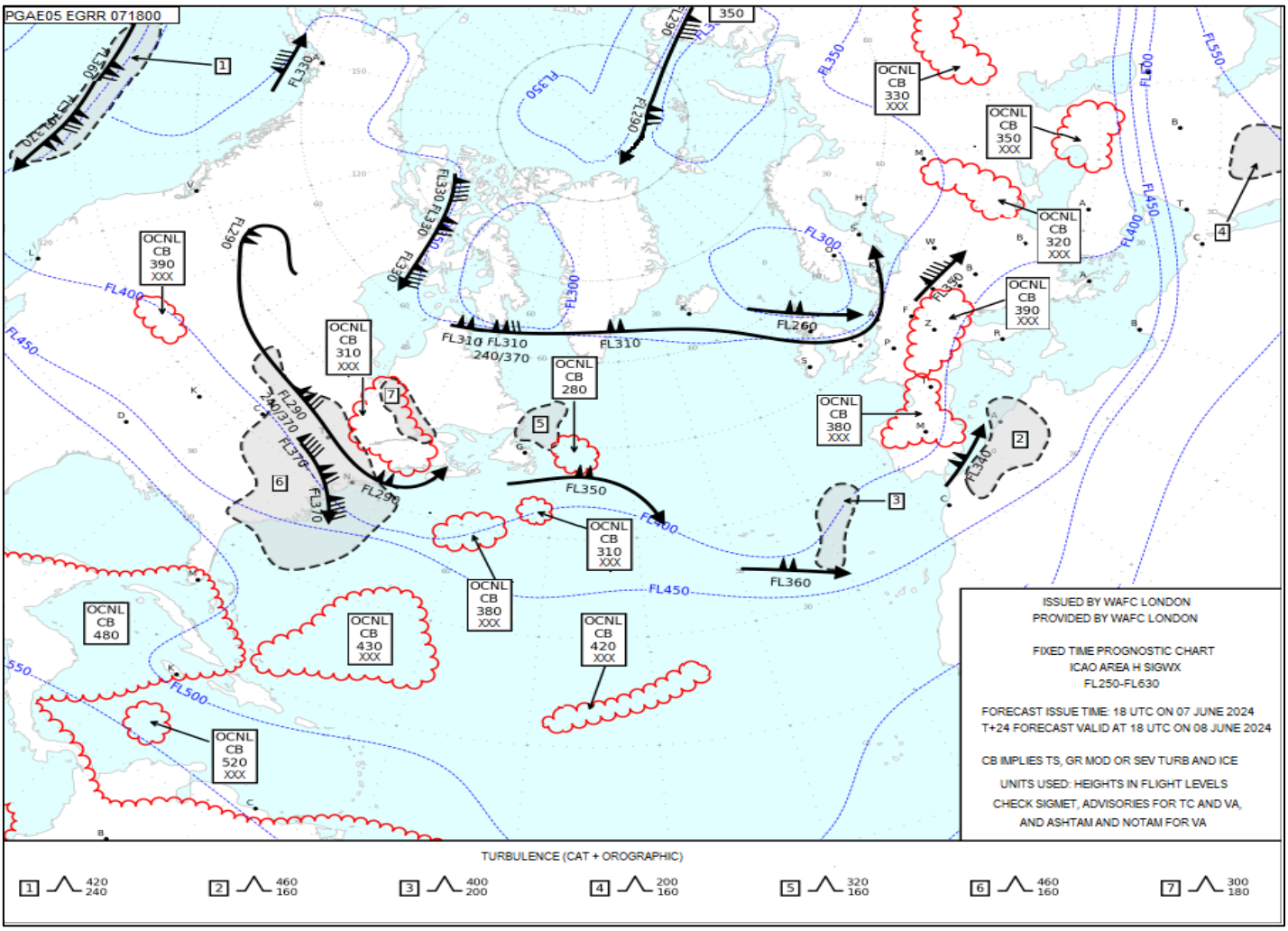


Figure 3 – WAFC produced T+24 high level SIGWX style from 26 November 2024 SIGWX

2.20 On the T+24 medium level SIGWX charts areas of icing will be depicted as shown in figure 4 so that they can be more easily identified, especially if the chart is printed without colour.

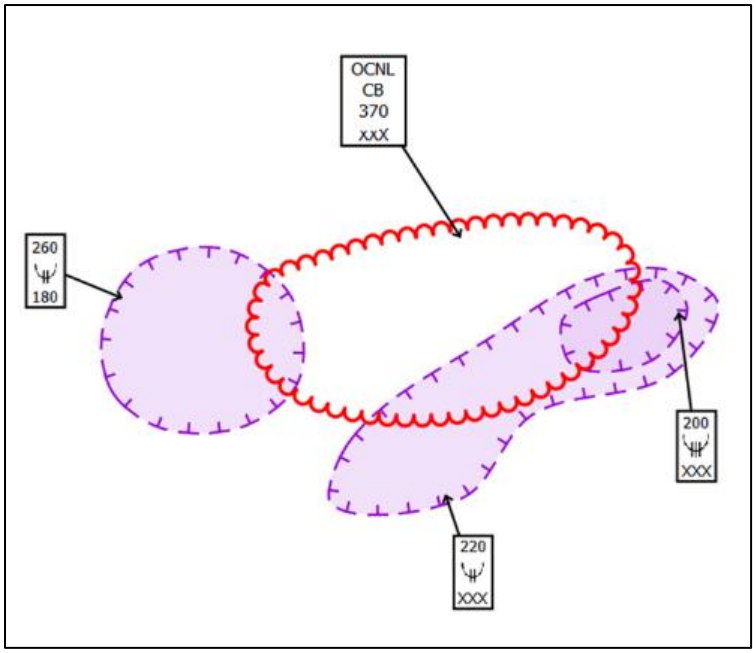


Figure 4, T+24 Medium level icing style from 26 November 2024.

2.21 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 4) so that visualization code is able to use existing rules for clear label placement.

2.22 An updated SIGWX flyer has been produced, and is included as Attachment A. This describes the new SIGWX forecasts as well as the changes to the current T+24 SIGWX forecasts. Additional information on the SIGWX changes is also provided here: https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-2023. Please share the flyer or website address with your regulator, airlines, operators, flight planning organizations and other aviation stakeholders in your State.

2.23 The new WAFS SIGWX forecasts will not be included in ICAO Annex 3 when they launch, but will be included when Amendment 82 likely 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 26 November 2024 and November 2025 (when Amendment 82 to Annex 3 becomes effective).

CONCLUSION

2.24 The WAFCs have now implemented a major upgrade to the provision of WAFS gridded data sets, and users are encouraged to start getting their systems set up to use this new data and the new APIs.

2.25 Introduction of the new SIGWX forecasts in November 2024 brings a big improvement in the SIGWX forecast provision and aviation users are encouraged to move over to use the new IWXXM format SIGWX data sets as soon as possible after 26 November 2024. There will be changes to the existing T+24 forecasts that operators and relevant stakeholders in your State should be made aware of these changes, and the flyer included as Attachment A is shared with them.

2.26 WAFC London will be running a series of webinars (each will have the same content) explaining the SIGWX changes, and WAFCs encourage you to share these links the operators, flight planning companies and other relevant stakeholders in your State.

Webinar Date	**Sign up link**
23 July 2024 08:00-09:00 UTC	https://events.teams.microsoft.com/event/8970440d-1bb7-4212-b1a7-266b8e710ada@17f18161-20d7-4746-87fd-50fe3e3b6619
6 August 2024 15:00 - 16:00 UTC	https://events.teams.microsoft.com/event/3e0a2ae6-4f5b-4585-a83a-924e57806d9d@17f18161-20d7-4746-87fd-50fe3e3b6619
8 August 2024 08:00 – 09:00 UTC	https://events.teams.microsoft.com/event/3c45eddc-956f-4744-90c3-9786dbd5c946@17f18161-20d7-4746-87fd-50fe3e3b6619

3. ACTIONS BY THE MEETING

3.1 The meeting is invited to:

a) Note the information in this paper

b) Talk to their technical team or software provider about the upcoming SIGWX changes and prepare to start using the new IWXXM format SIGWX data sets.

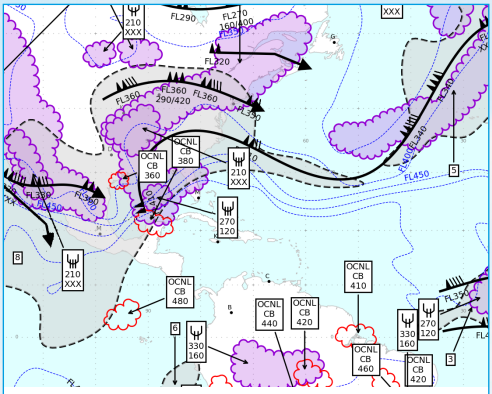
----- END -----

Changes to WAFS SIGWX Forecasts

In November 2024 the World Area Forecast System (WAFS) SIGWX charts will be changing as the London and Washington World Area Forecast Centres (WAFCs) introduce multi-timestep SIGWX forecasts for the first time.

What is new:

- Forecasts will be produced for T+6, T+9, T+12, T+15, T+18, T+21, T+24, T+27, T+30, T+33, T+36, T+39, T+42 and T+48 timesteps, four times daily.
- The SIGWX forecasts will span FL100 to FL600
- The SIGWX forecasts will include the following features:
  - Jet stream information
  - Tropopause height contours
  - MOD and SEV Turbulence areas (this includes clear air and orographic turbulence)
  - OCNL and FRQ cumulonimbus areas, and cumulonimbus top information
  - MOD and SEV Icing areas
  - Volcano, tropical cyclone and nuclear emergency markers
- This new data is designed for digital use where users can control the map projection, zoom level, colour schemes, and are able to toggle individual features on and off.
- The new SIGWX forecasts will be provided in IWXXM format and will need to be visualised by you or your software providers systems before you can use it for briefing purposes. IWXXM schema information is available here: **https://schemas.wmo.int/iwxxm/2023-1/**



Example SIGWX display

IWXXM Format

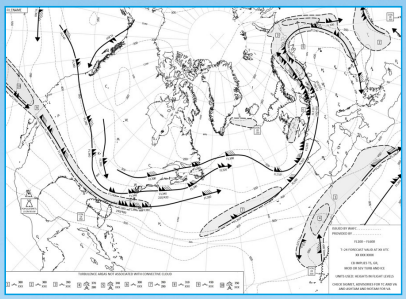
IWXXM SIGWX data is now available on the new SADIS API and WIFS APIs for testing and set up purposes.

Please contact the SADIS and WIFS provider for information: **wifs.admin@noaa.gov** or **SADISManager@metoffice.gov.uk**

Note: you may have seen earlier communications on changes to the WAFS SIGWX that involved retiring the medium-level SIGWX products in July 2024. This flyer supersedes that information.

What about the existing T+24 WAFS SIGWX charts?

- The medium and high level SIGWX charts for 17 map areas that are produced by WAFC London and WAFC Washington will continue to be produced until Nov 2028.
  - Medium level SIGWX will span FL100 to FL450
  - High level SIGWX will span FL250 to FL600 (note: there will be a small decrease in the upper limit from FL630 to FL600)



The appearance of the T+24 WAFC produced SIGWX charts will change a little:

- **Embedded (EMBD) cumulonimbus clouds will no longer be included which means that there will not be any areas of "ISOL EMBD CB",** Only OCNL and FRQ amounts of cumulonimbus will be shown.
- Tropopause will be shown as contours (as a thin dashed line) instead of spot heights.
- CAT areas will become "Turbulence" areas, which encompasses CAT and orographic turbulence types. MOD and SEV Turbulence areas will be shown
- Cumulonimbus bases will not be shown in the cumulonimbus labels. These are almost always "XXX" even in the medium level SIGWX.
- On medium level SIGWX charts, the combined in-cloud icing and turbulence areas will be replaced with areas of MOD and SEV icing.
- Jet stream information, volcano, tropical cyclone and nuclear emergency markers will not change.

Further information on the upcoming SIGWX changes is available on at
https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-2023/

What do you need to do?

1. Make sure that your software provider or IT department is aware of the upcoming changes and encourage them to start setting up systems to pull test data from the new SADIS or WIFS API.
2. Upgrade systems to be able to visualise the new IWXXM format SIGWX data sets.

Users are encouraged to switch to using the new multi-timestep SIGWX forecasts as soon as possible after the go live date in November 2024 as the new SIGWX offers greatly improved situational awareness extending out to the T+48 forecast period as well as the ability to get SIGWX forecasts valid at the time of the flight which were produced from a more recently produced set of UK and US model data.

Note: ICAO Annex 3 will not reflect the new SIGWX forecasts until November 2025. The UK and US will be filing a difference against Annex 3 in November 2024 to facilitate the changes related to embedded cumulonimbus clouds that are described in this flyer.

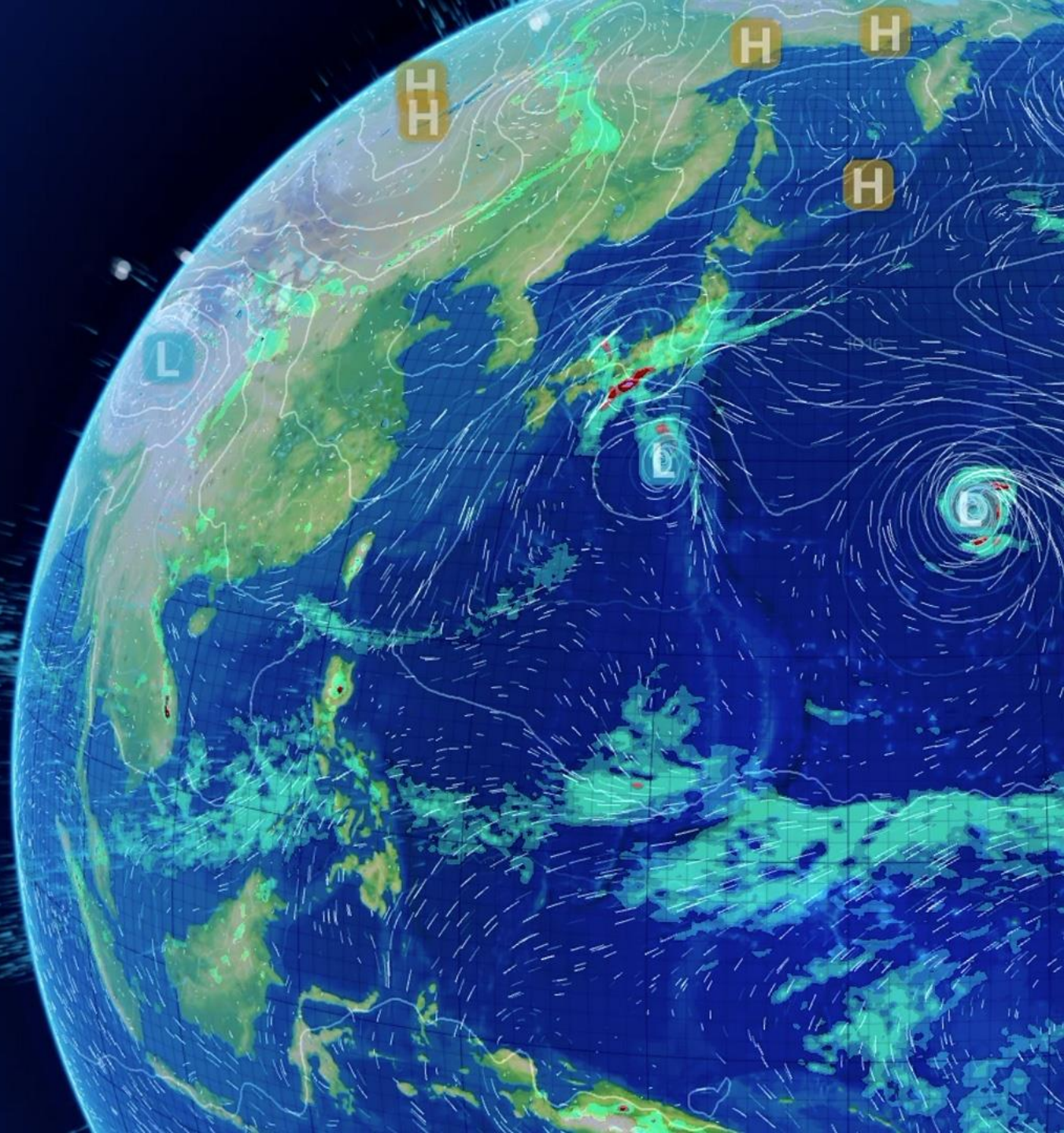
Please contact **wifs.admin@noaa.gov** or **SADISManager@metoffice.gov.uk** for further information on the changes or to arrange access to the SADIS and WIFS API's

Met Office

NOAA

World Area Forecast System (WAFS) SIGWX upgrade

November 2024



WAFS CHANGES COMING IN WITH AMENDMENT 82 TO ANNEX 3 ….

Multi-timestep WAFS Significant Weather (SIGWX) forecasts will be introduced into ICAO Annex 3 with Amendment 82 (expected November 2025).

Important: WAFC London and WAFC Washington will be introducing the new SIGWX forecasts 1 year early on 26 November 2024.

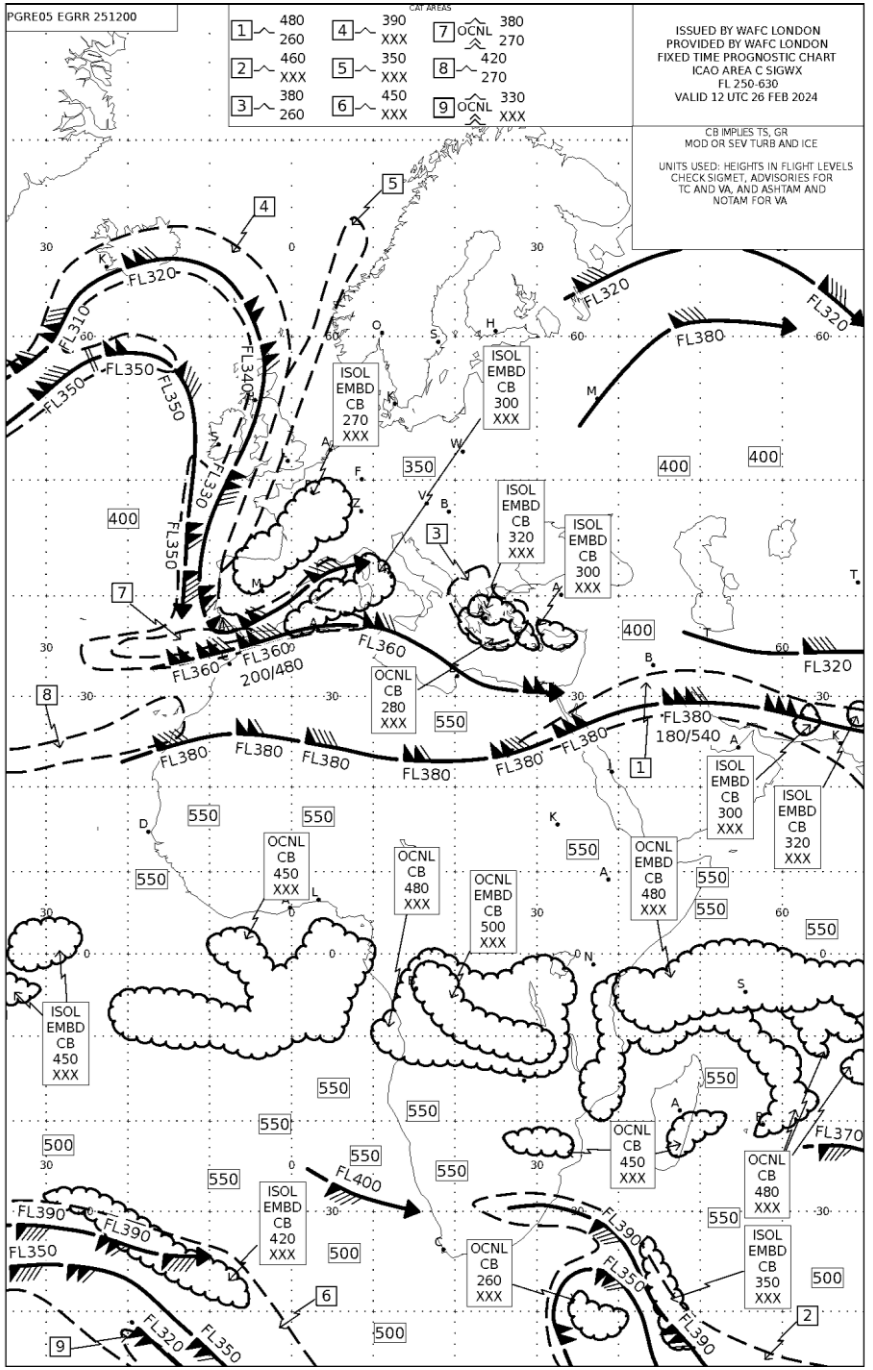
This will introduce some changes to the current T+24 SIGWX forecasts.

NEW WAFS SIGWX FORECASTS

Current SIGWX forecast are produced for T+24 only, with new charts/data issued every 6 hours.

They are hand drawn by a team of meteorologists

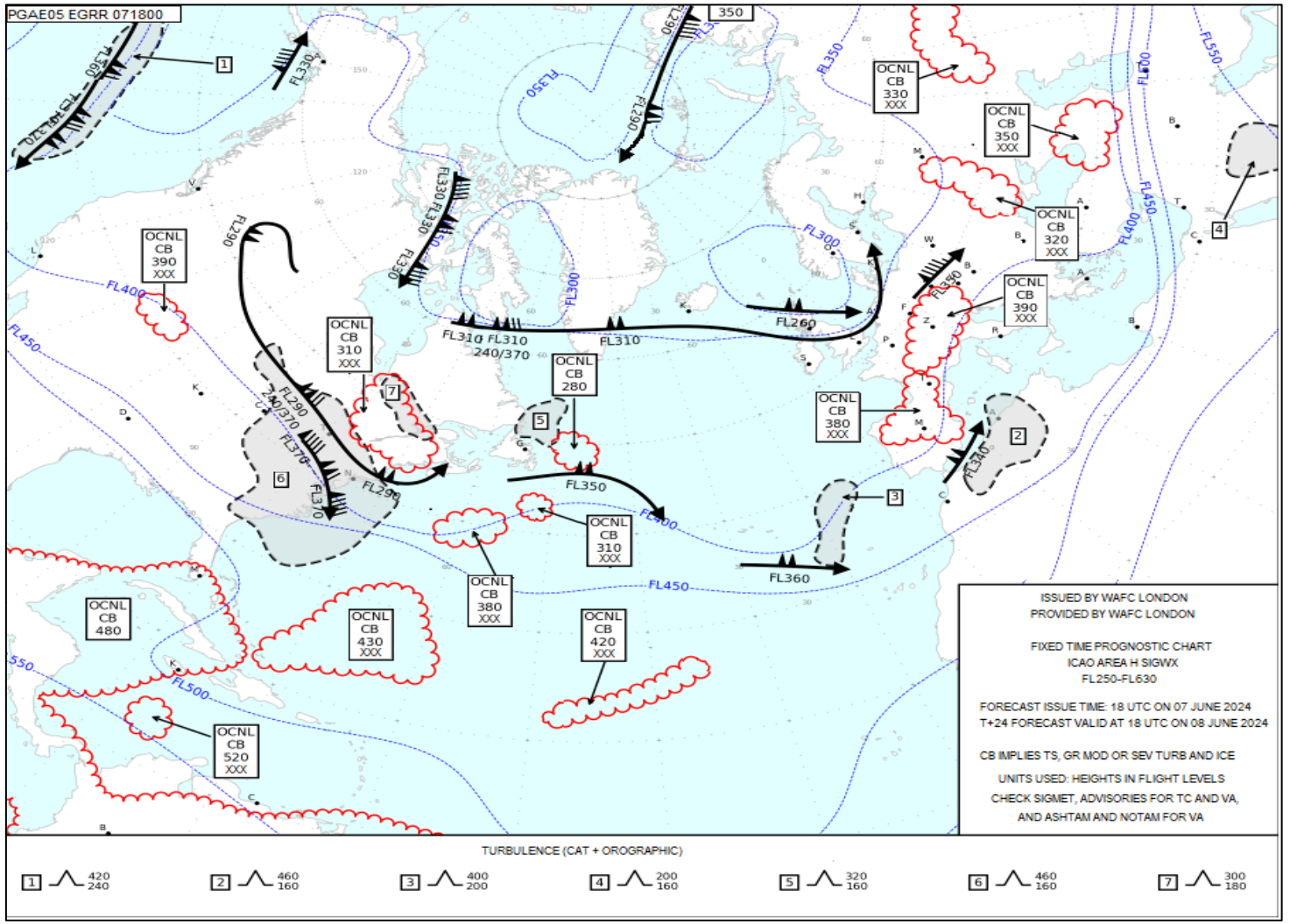
The last time they changed was in 2008 when surface fronts were removed.



NEW WAFS SIGWX FORECASTS

- New automated SIGWX provision will be for T+6 to T+48 at 3-hourly intervals, with new data published every 6 hours.

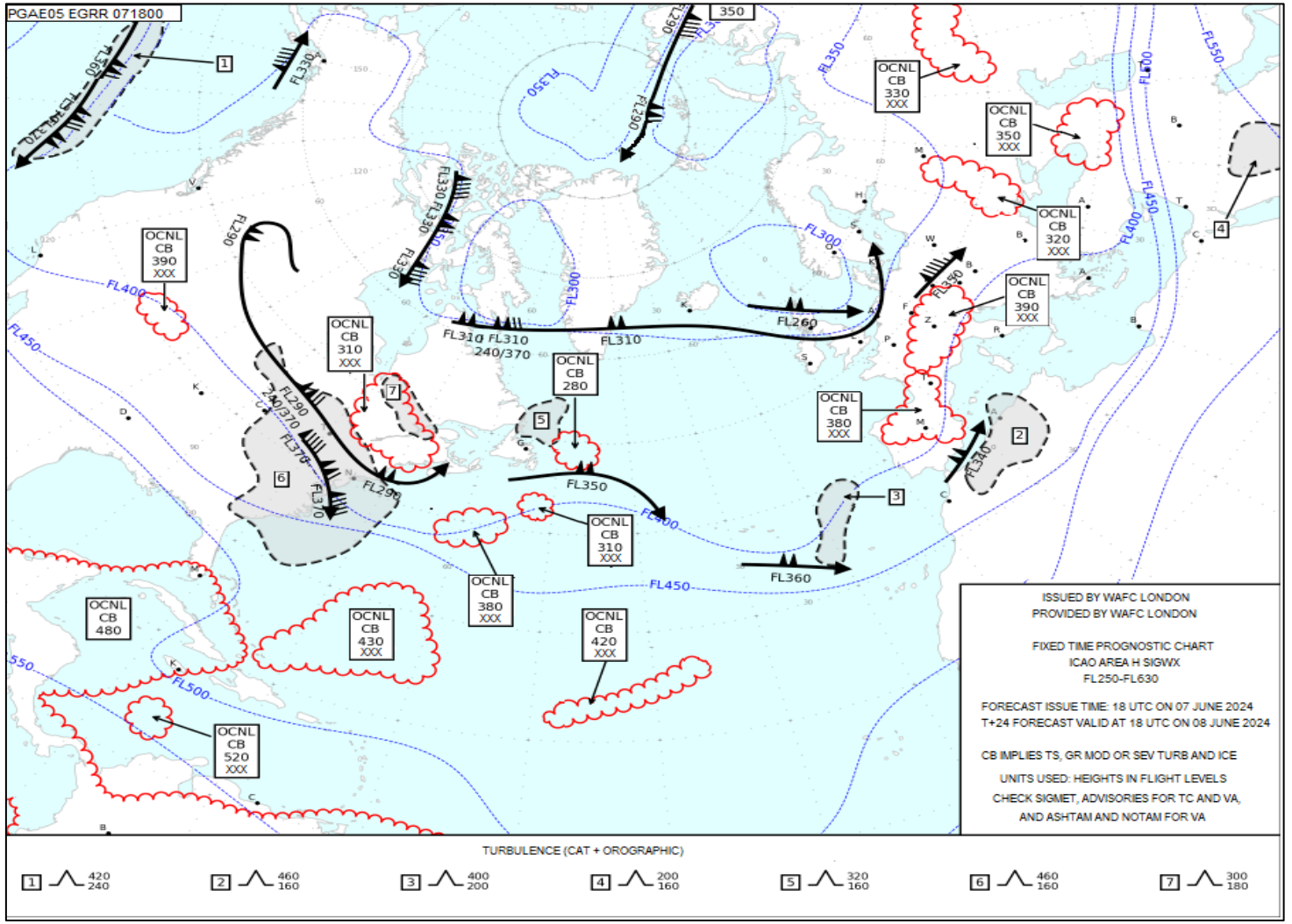
- The new SIGWX will span FL100 to FL600



NEW WAFS SIGWX FORECASTS

The new SIGWX forecasts will contain:

- Jet stream information
- Tropopause height as contours
- Areas of OCNL or FRQ CB (no embedded CB's)
- Areas of MOD and SEV turbulence areas will be forecast based on the grided WAFS Turbulence Severity field (which is CAT + orographic turbulence types)

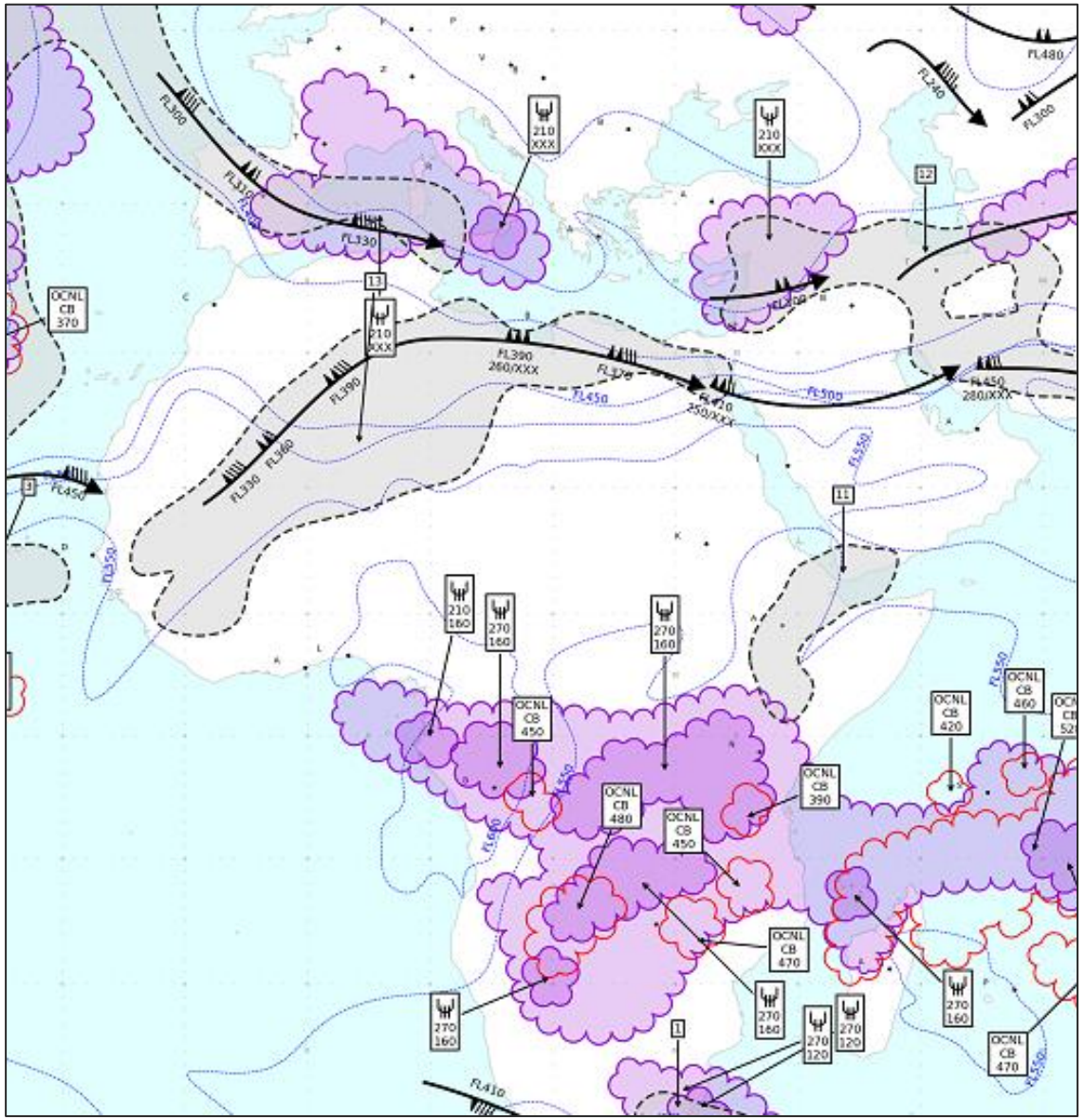


NEW WAFS SIGWX FORECASTS

The new SIGWX forecasts will contain:

- Areas of MOD and SEV icing (with global coverage
- Information on active volcanic eruptions, tropical cyclone positions and radioactive releases.

Note: tropical cyclone markers will only be shown up to and including T+24.



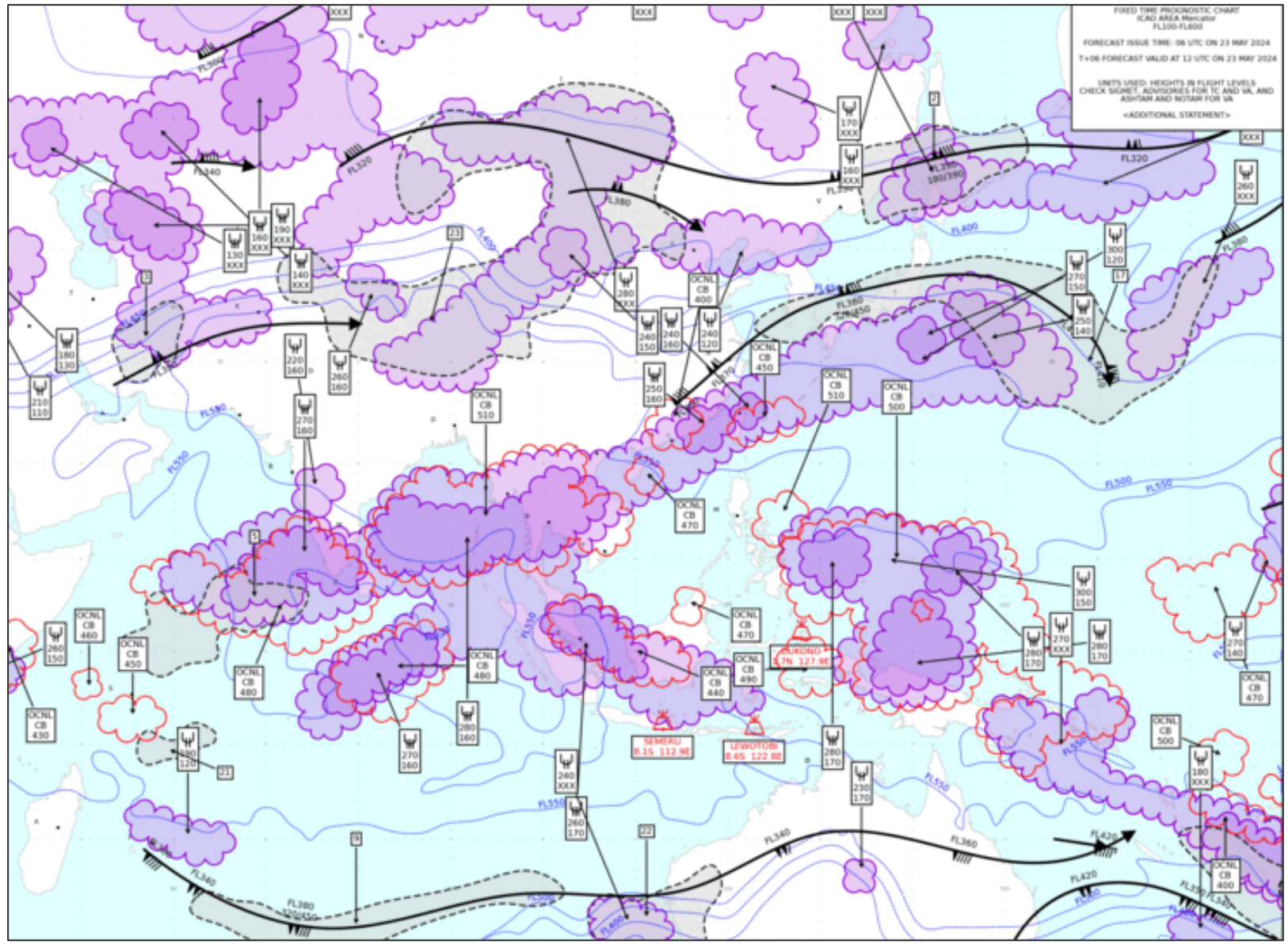
WHY CHANGE THE SIGWX?

Benefits of the new SIGWX forecasts:

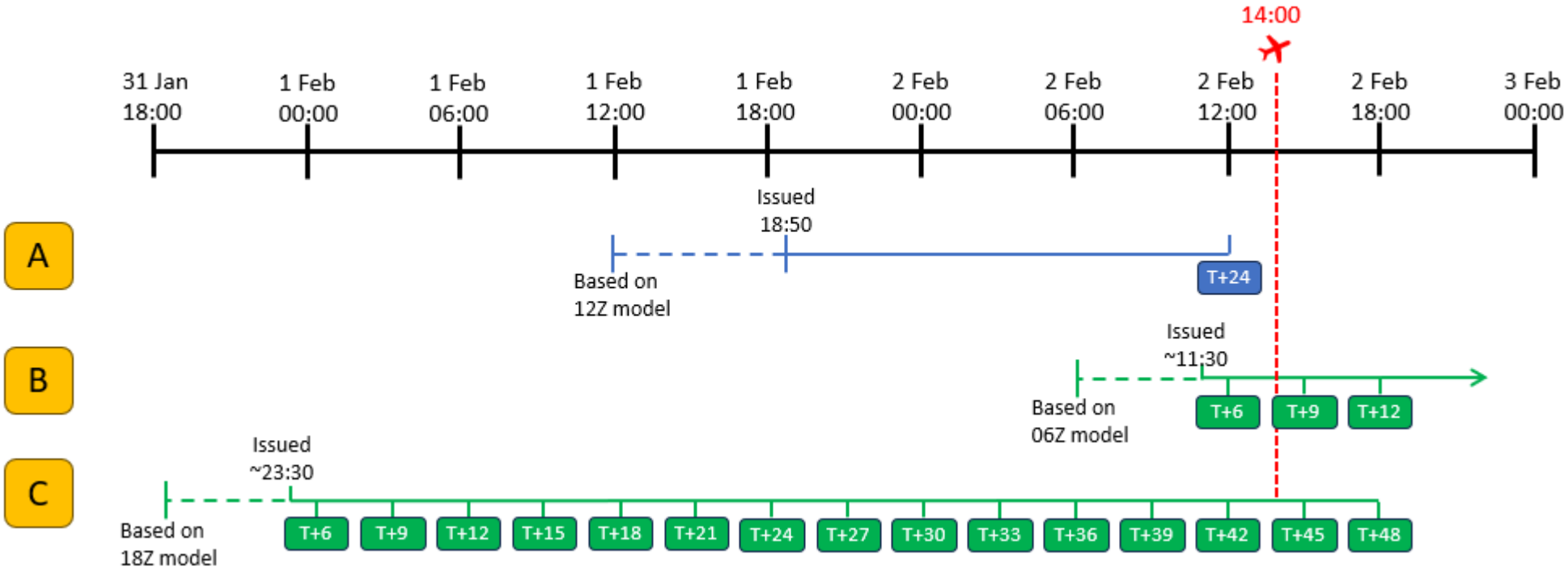
- Need forecasts which are better suited to the needs of the aviation industry particularly for short haul and long-haul flights.
- The gridded WAFS data and SIGWX data sets will be consistent with each other
- Designed for digital use, where users will be able to control the content that is shown on their screen (e.g. toggling layers on and off, changing time-steps)
- Movement and evolution of features with time can be seen

Met Office

NOAA



SIGWX forecasts for a particular validity time will be available with a longer lead time and using more up to date model data.



NEW WAFS SIGWX FORECASTS

The new SIGWX data will be provided in IWXXM format. The schema has been developed and approved by WMO

https://schemas.wmo.int/iwxxm/2023-1/WAFSSigWxFC.xsd

NEW WAFS SIGWX FORECASTS

The new SIGWX data will only be available via the SADIS API and WIFS API.

Information on the APIs, including how to sign up:

SADIS:

https://www.metoffice.gov.uk/services/transport/aviation/regulated/sadis/info/sadis-api

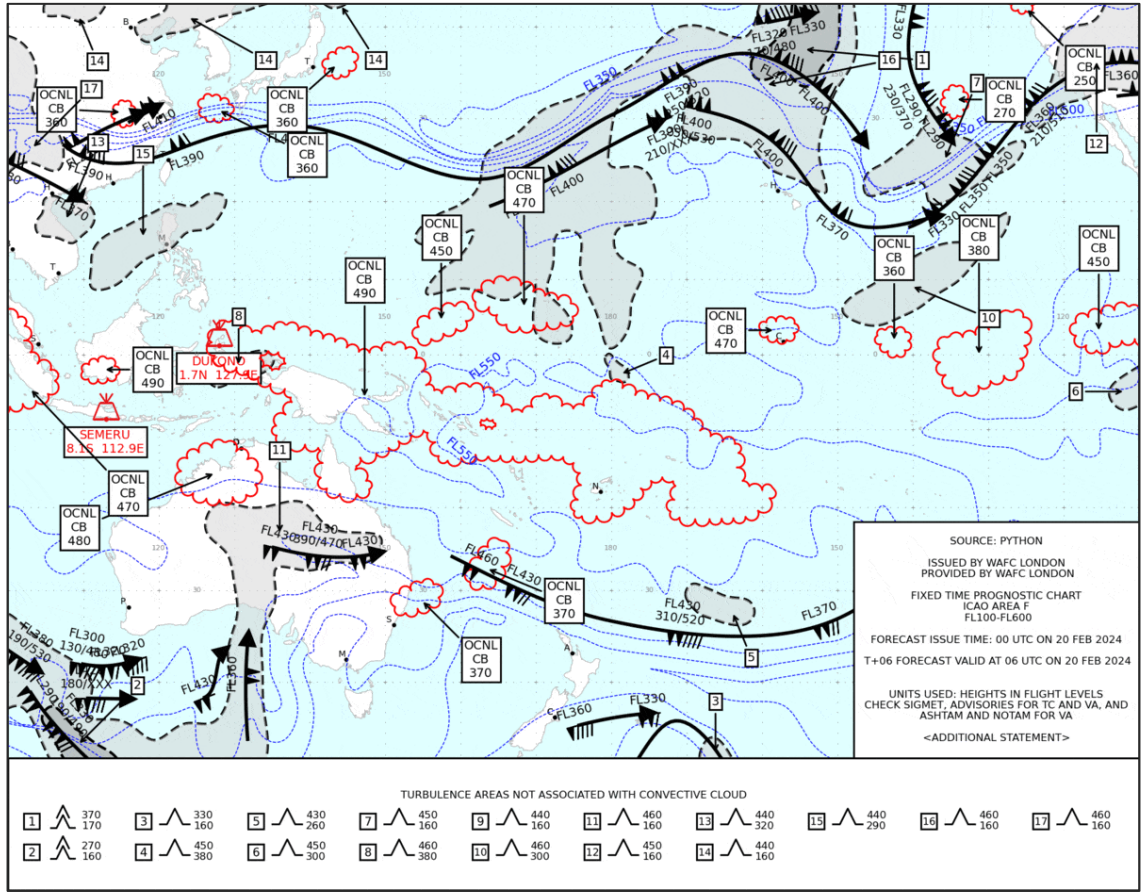
WIFS:

https://aviationweather.gov/wifs/

Note: Briefing quality charts will not be provided for the new SIGWX, but charts that can be used for cross-checking/setup of systems will be available on the API's.

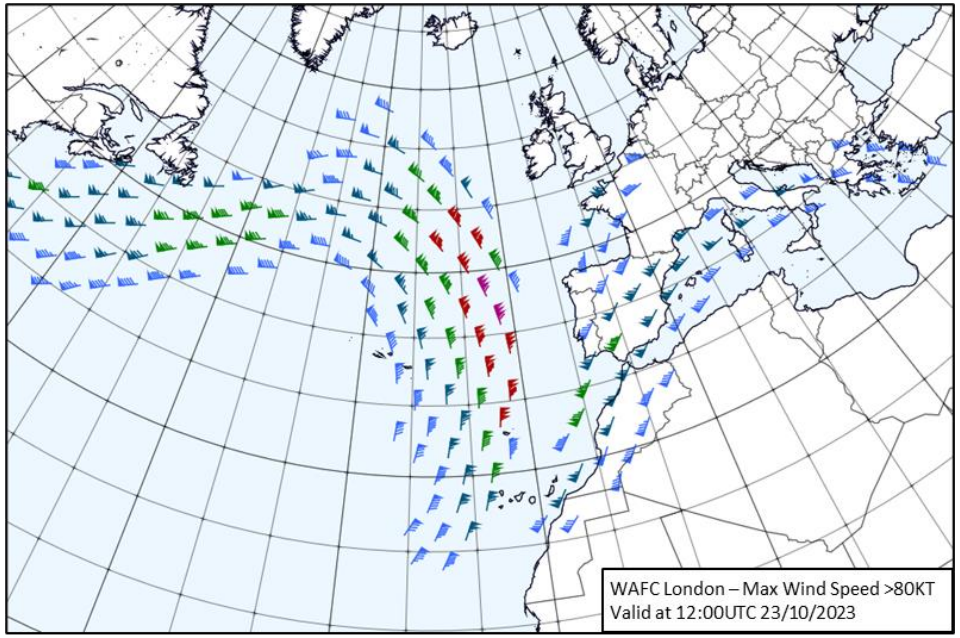
NEW WAFS SIGWX FORECASTS

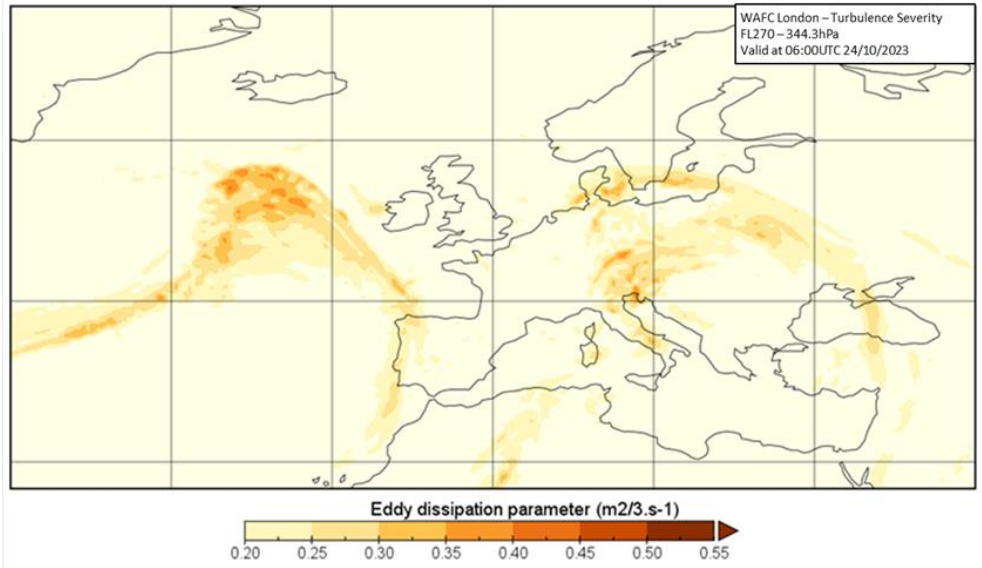
- If briefing charts are required, the user's system/software should create these. Benefits of this approach:
- User specific colour schemes, map areas, and map projections can be applied
- Other features can be overlaid on the SIGWX (e.g. flight paths, wind fields, or other non-WAFS weather parameters.



WHAT ELSE IS AVAILABLE ON THE NEW SADIS AND WIFS APIs?

- The new WAFS gridded data sets with a higher resolution, more vertical levels and more timesteps (including hourly intervals from T+6 to T+24 and at 6-hourly intervals out to T+120)
- “OPMET data” – e.g. TAF, METAR, SIGMET, Volcanic Ash Advisories, Tropical Cyclone Advisories, Space Weather Advisories in traditional alphanumeric format and where available IWXXM format.





IMPORTANT

On 26 November 2024 there will be changes to the existing T+24 forecast charts and BUFR data.

Please make your stakeholders and operators are aware of the upcoming changes.

WHAT WILL CHANGE IN THE OLD T+24 SIGWX CHARTS?

Medium and High level T+24 “Paper copy” (.png) charts will still be provided via SADIS FTP and WIFS until 2028. There will be some change in their content and appearance:

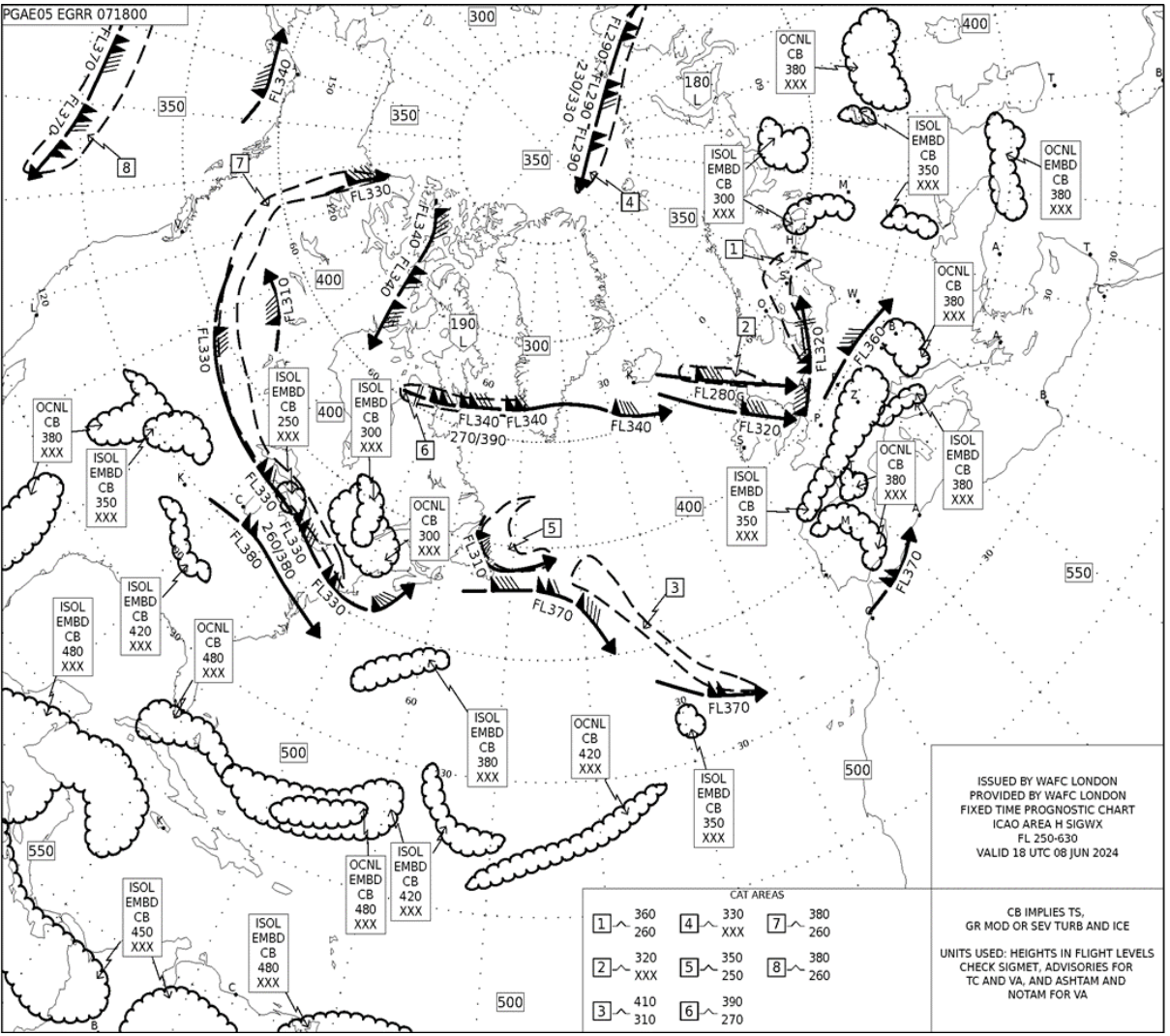
- They will be provided in colour!

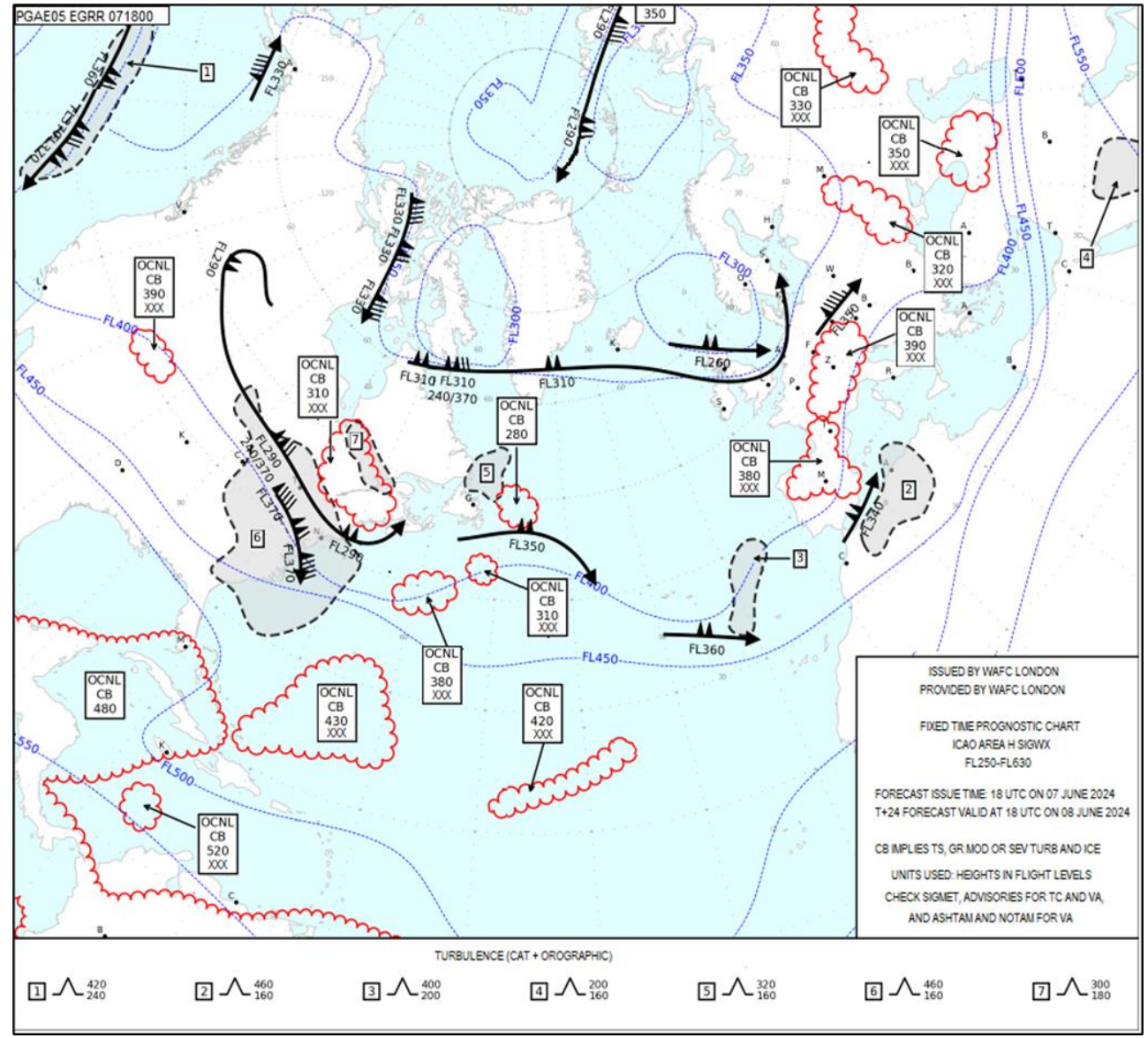
- Embedded cumulonimbus cloud will not be included. This means that ISOL EMBD CB, OCNL EMBD CB and FRQ EMBD will not be shown. Instead only OCNL CB and FRQ CB will be forecast.

  There will be more areas of OCNL CB forecast than they are now.

Met Office

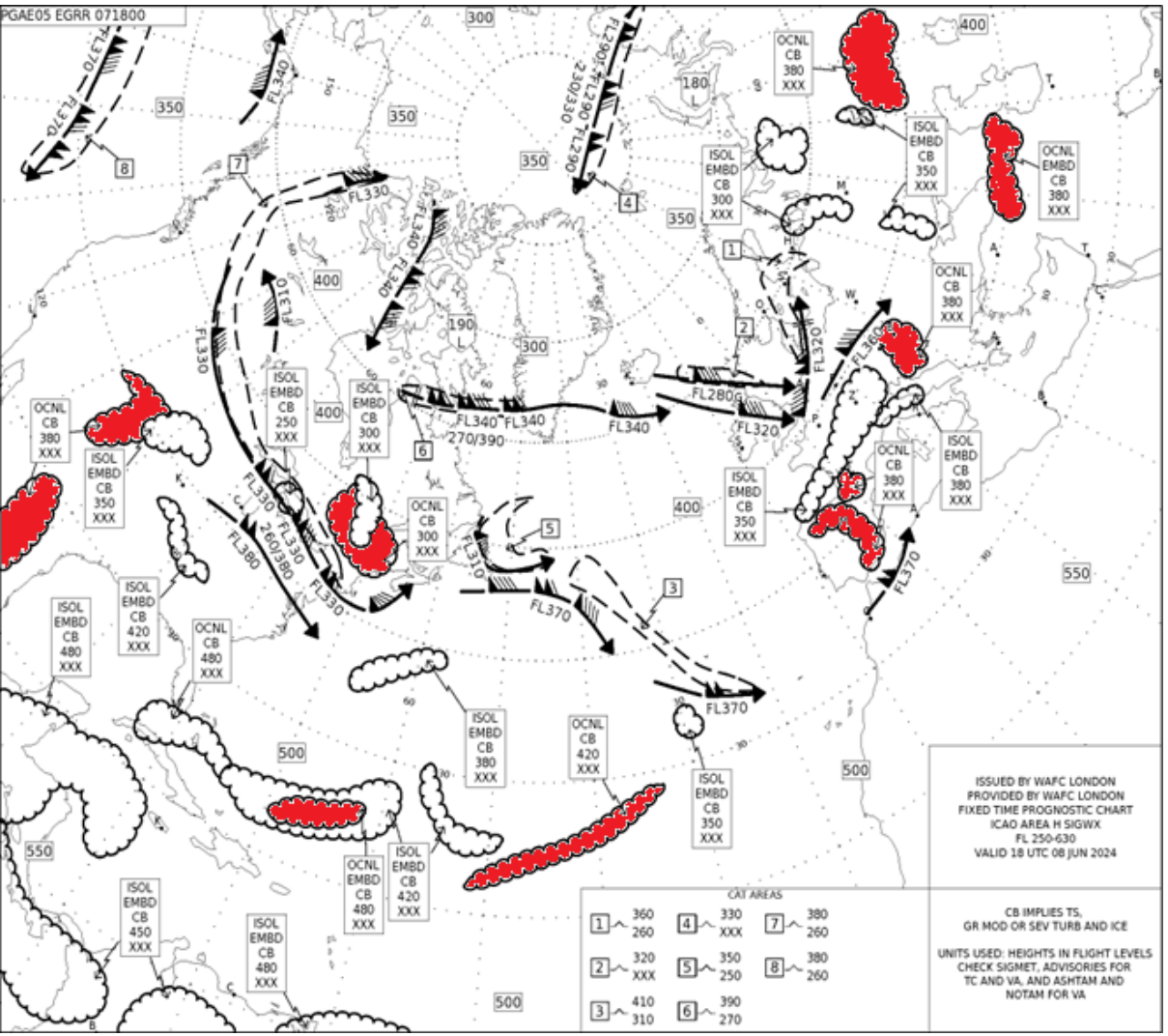
NOAA

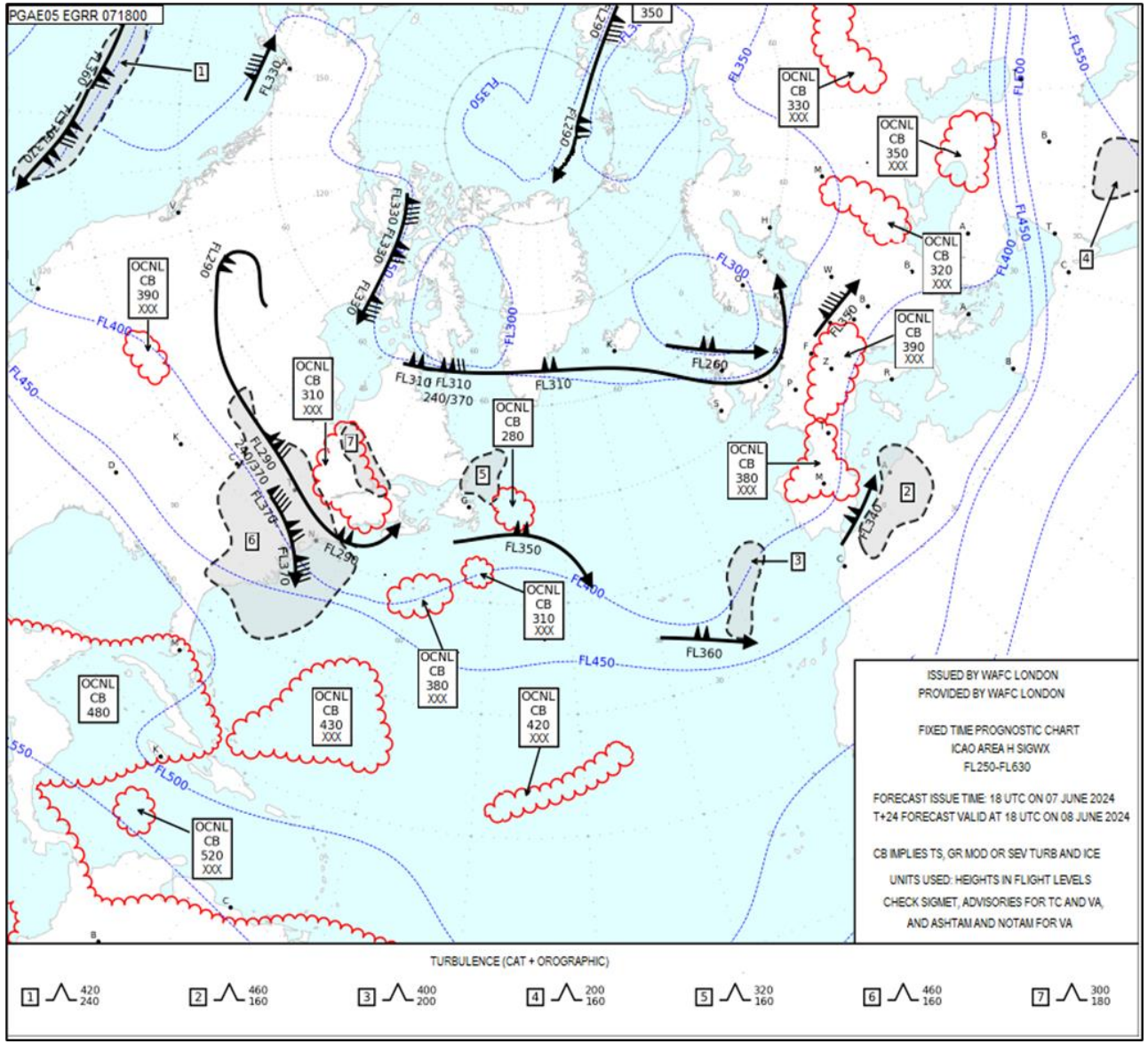




Met Office

NOAA



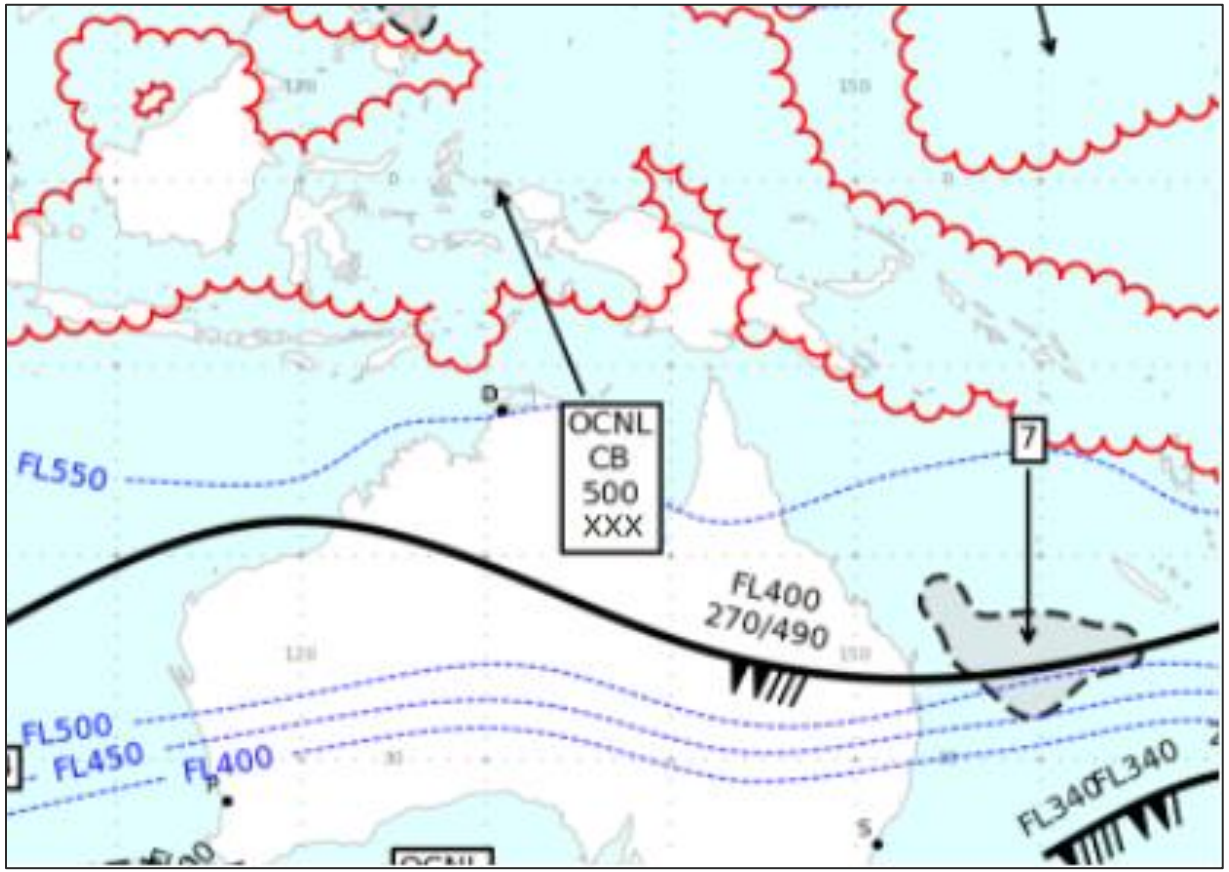


WHAT WILL CHANGE IN THE OLD T+24 SIGWX CHARTS?

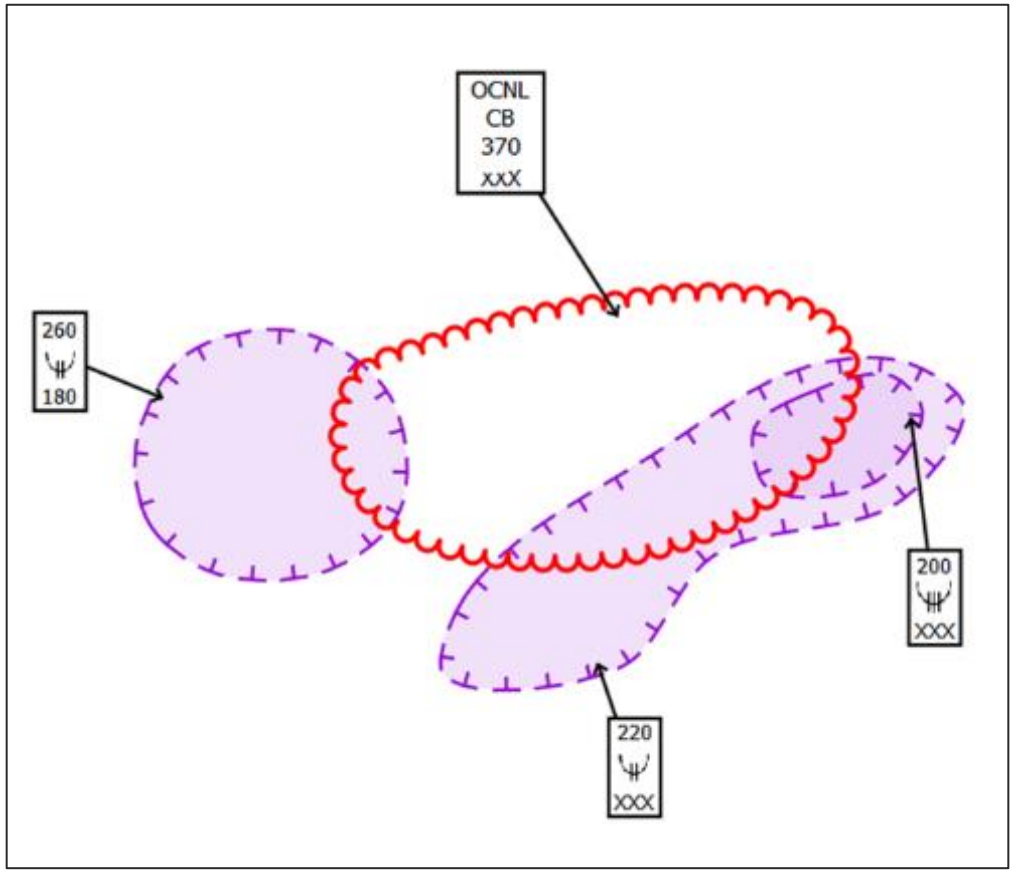
- Clear Air Turbulence (CAT) areas will become “turbulence”. MOD and SEV turbulence areas include turbulence due to CAT and orographic turbulence types and if it is strong enough turbulence within non-convective clouds.

- Tropopause height will be shown as contours spaced at 5000ft vertical intervals. Labels will be in the form FL300, FL350 etc.

- On the medium level SIGWX the in-cloud turbulence and icing areas will become icing only areas.



Blue tropopause contours



Purple icing areas with a new line style to make easier to identify.

WHAT WILL CHANGE IN THE OLD T+24 SIGWX CHARTS?

- The high level SIGWX will change to span FL250 to FL600 (changing from FL250 to FL630).
- They will be produced earlier than they are now (by approx. 1 hr)

- T+24 BUFR data files will continue to be provided via SADIS FTP and WIFS until November 2026. They will reflect most of the changes that have been described for the T+24 SIGWX charts, except:
  - tropopause will still be in the form of spot heights.
  - Icing objects will not go through cumulonimbus areas.

VERIFICATION

- The SIGWX forecasts are based on the WAFS gridded data sets
- Verification has been carried out to ensure the T+24 SIGWX is at least as good as the current hand drawn one. The new SIGWX forecasts will get their final tuning soon.

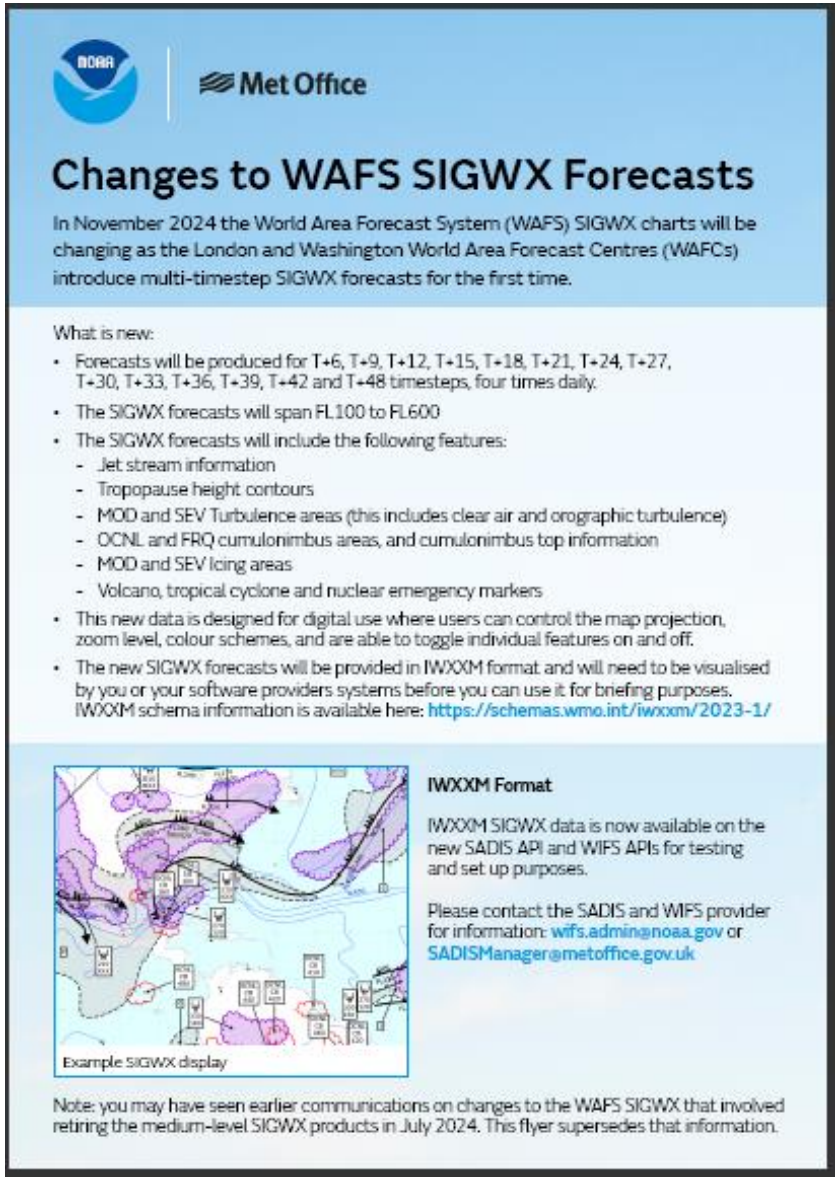
- Verification of the turbulence, icing and cumulonimbus areas has been carried out against processed satellite imagery and aircraft observations of turbulence.
- The new SIGWX is “tuned” to give the best verification scores (i.e. highest level of skill) and is not trying to directly match the existing hand drawn SIGWX forecast.

Both WAFC’s 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 during the period 28 November 2024 to November 2025 (when Amendment 83 to Annex 3 becomes effective).

IMPORTANT

It is important to prepare for the upcoming SIGWX changes now.

Please share the flyer with your State regulator, airlines, operators, flight planning organisations and others in the aviation industry to make them aware of the upcoming changes – especially the changes to the T+24 SIGWX charts



Met Office

Changes to WAFS SIGWX Forecasts

In November 2024 the World Area Forecast System (WAFS) SIGWX charts will be changing as the London and Washington World Area Forecast Centres (WAFCs) introduce multi-timestep SIGWX forecasts for the first time.

What is new:

- Forecasts will be produced for T+6, T+9, T+12, T+15, T+18, T+21, T+24, T+27, T+30, T+33, T+36, T+39, T+42 and T+48 timesteps, four times daily.
- The SIGWX forecasts will span FL100 to FL600
- The SIGWX forecasts will include the following features:
  - Jet stream information
  - Tropopause height contours
  - MOD and SEV Turbulence areas (this includes clear air and orographic turbulence)
  - OCNL and FRQ cumulonimbus areas, and cumulonimbus top information
  - MOD and SEV Icing areas
  - Volcano, tropical cyclone and nuclear emergency markers
- This new data is designed for digital use where users can control the map projection, zoom level, colour schemes, and are able to toggle individual features on and off.
- The new SIGWX forecasts will be provided in IWXXM format and will need to be visualised by you or your software providers systems before you can use it for briefing purposes. IWXXM schema information is available here: https://schemas.wmo.int/iwxxm/2023-1/

Example SIGWX display

IWXXM Format

IWXXM SIGWX data is now available on the new SADIS API and WIFS APIs for testing and set up purposes.

Please contact the SADIS and WIFS provider for information: wifs.admin@noaa.gov or SADISManager@metoffice.gov.uk

Note: you may have seen earlier communications on changes to the WAFS SIGWX that involved retiring the medium-level SIGWX products in July 2024. This flyer supersedes that information.

Further information
https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-2023

WAFC London will be running 3 webinars which will cover the same material as this presentation. Please share the sign-up links below with the operators, flight planning companies and other relevant stakeholders in your State.

Webinar Date	Sign-up link
23 July 2024 08:00 - 09:00 UTC	https://events.teams.microsoft.com/event/8970440d-1bb7-4212-b1a7-266b8e710ada@17f18161-20d7-4746-87fd-50fe3e3b6619
6 August 2024 15:00 - 16:00 UTC	https://events.teams.microsoft.com/event/3e0a2ae6-4f5b-4585-a83a-924e57806d9d@17f18161-20d7-4746-87fd-50fe3e3b6619
8 August 2024 08:00 - 09:00 UTC	https://events.teams.microsoft.com/event/3c45eddc-956f-4744-90c3-9786dbd5c946@17f18161-20d7-4746-87fd-50fe3e3b6619

Thank you for listening

For further information contact:

wifs.admin@noaa.gov

or

SADISManager@metoffice.gov.uk

If you already use SADIS or WIFS please contact the provider of the system you currently use.