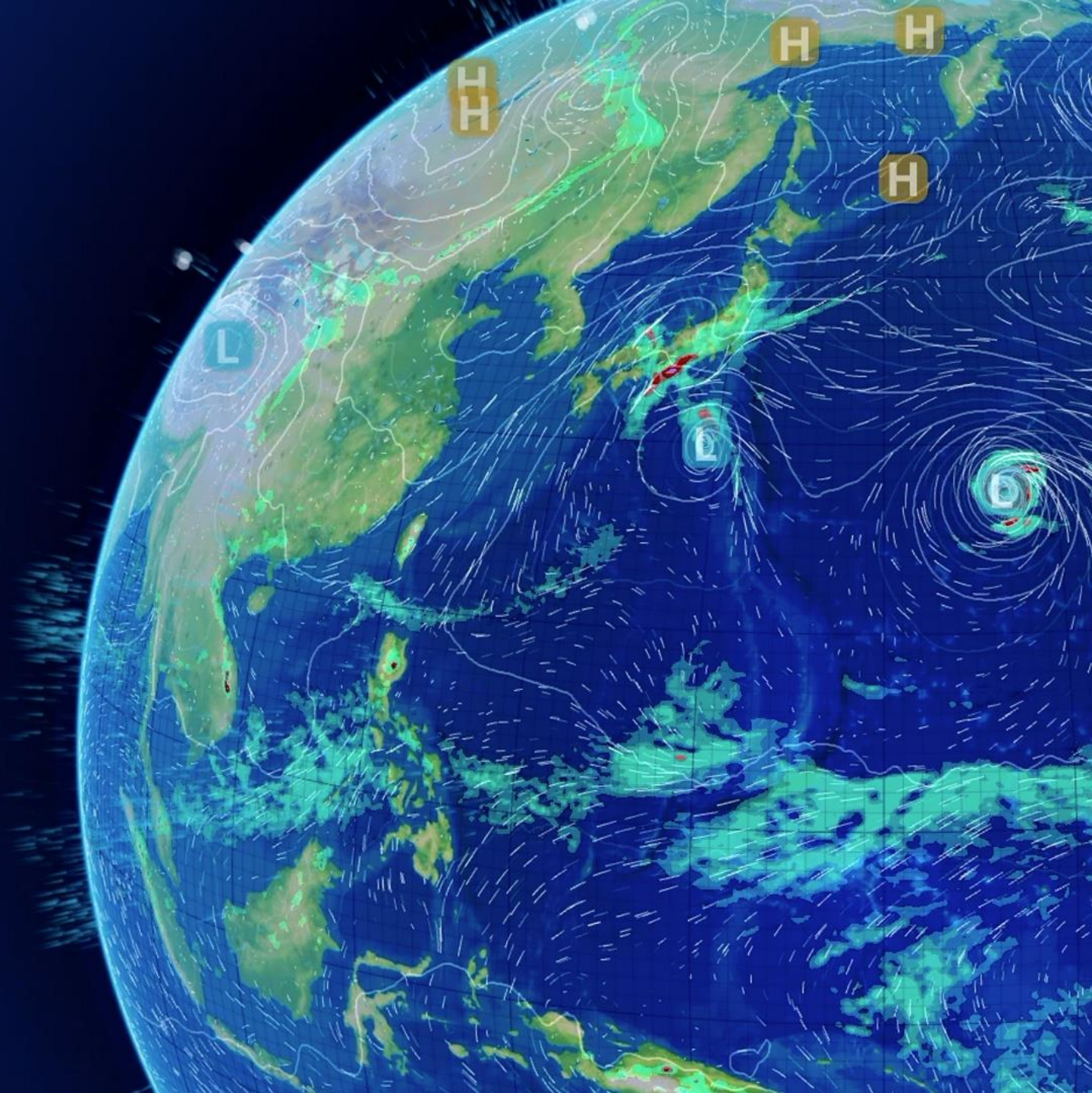


World Area Forecast System (WAFS) SIGWX upgrade

26 November 2024





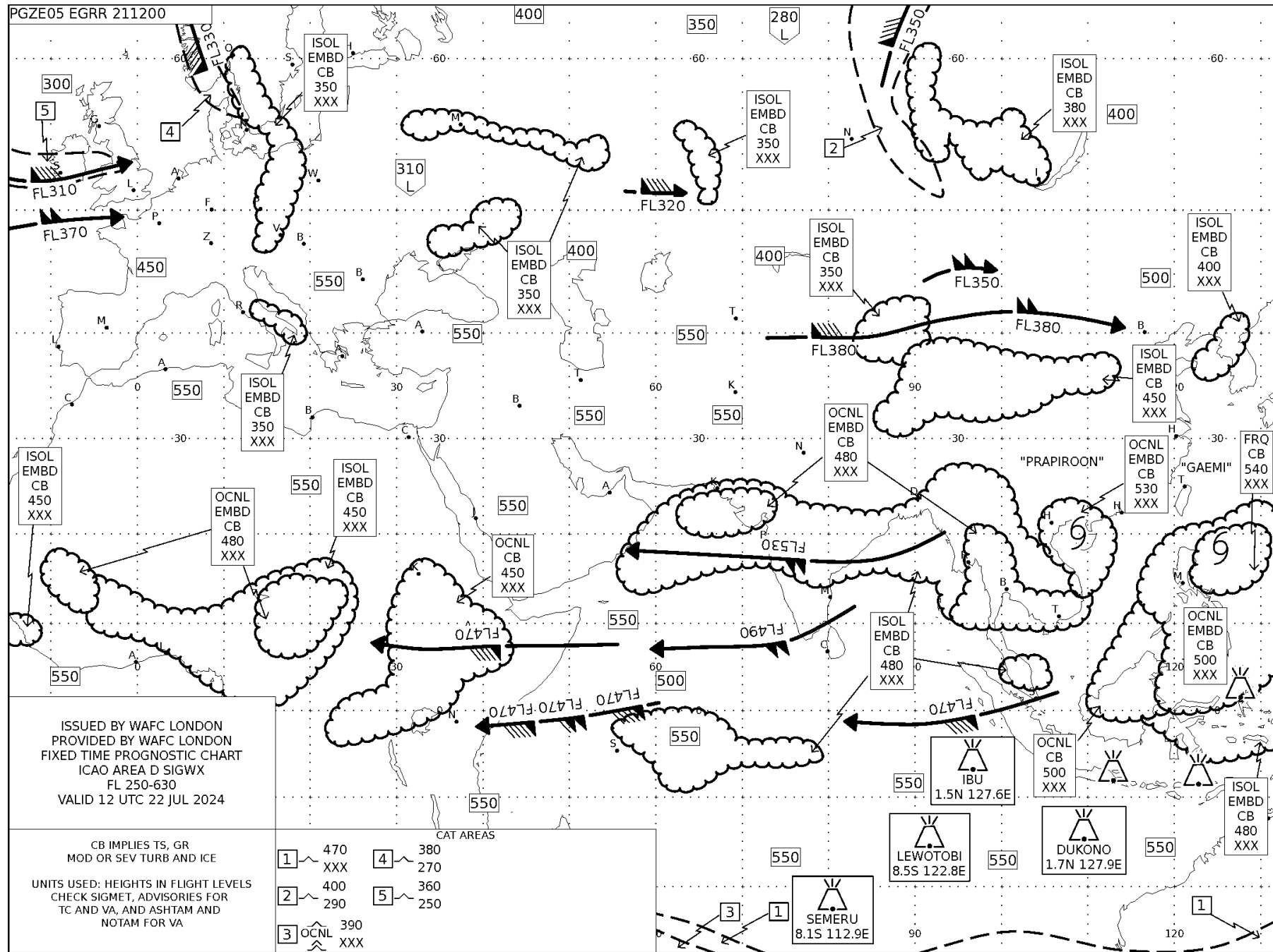
Presenter: Karen Shorey, WAFC London and SADIS Manager, Met Office.

Agenda:

Presentation to explain the upcoming changes to the World Area Forecast System (WAFS) Upper-Air Significant Weather (SIGWX) Forecasts

First introduced in 1984,
and largely unchanged
since then.

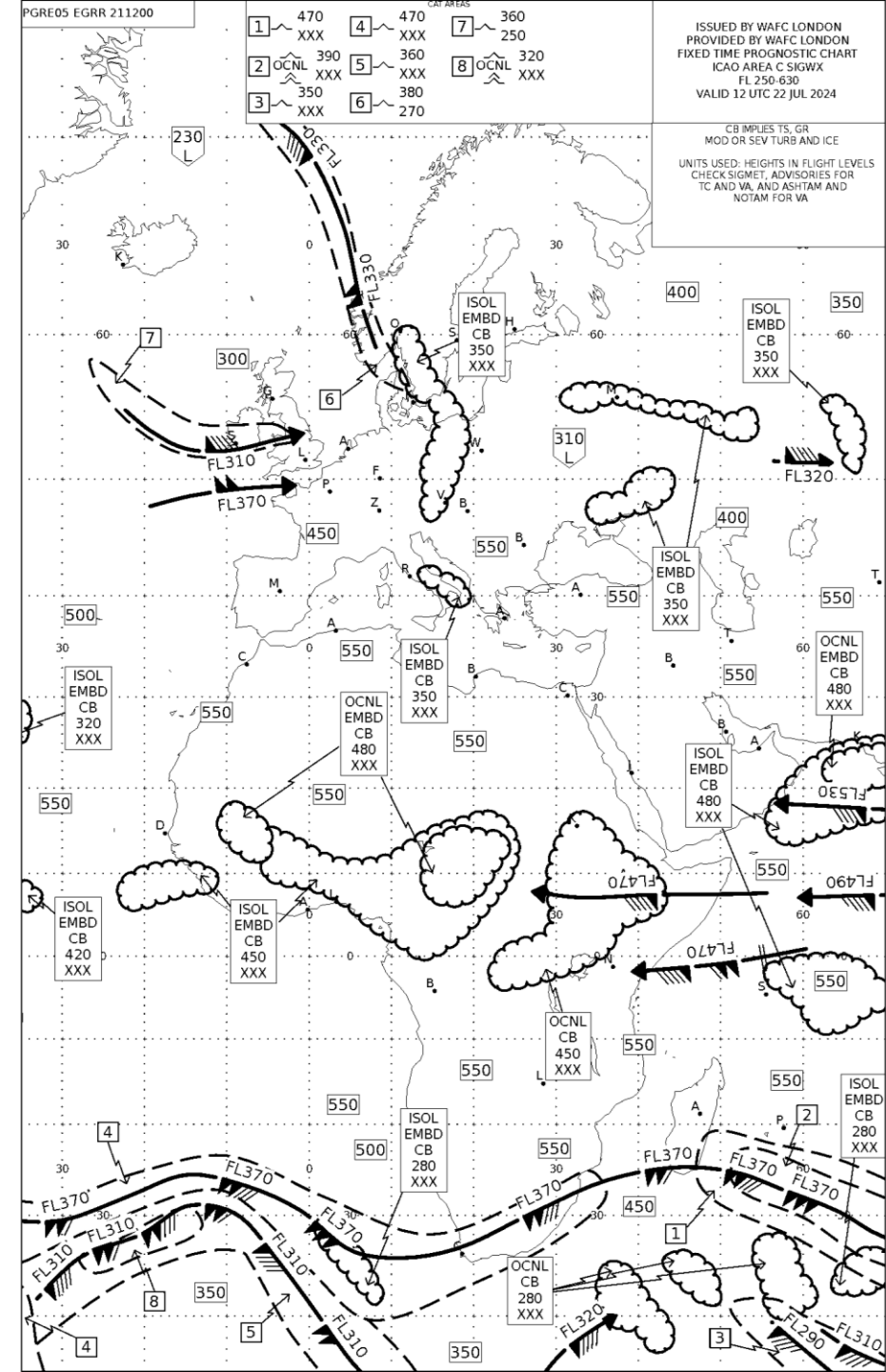
Comprises of :
18 fixed charts (14 high level
SIGWX, and 4 medium level
SIGWX) and a digital data set



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

They are hand drawn by two teams of meteorologists one in the UK and another in the US.

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

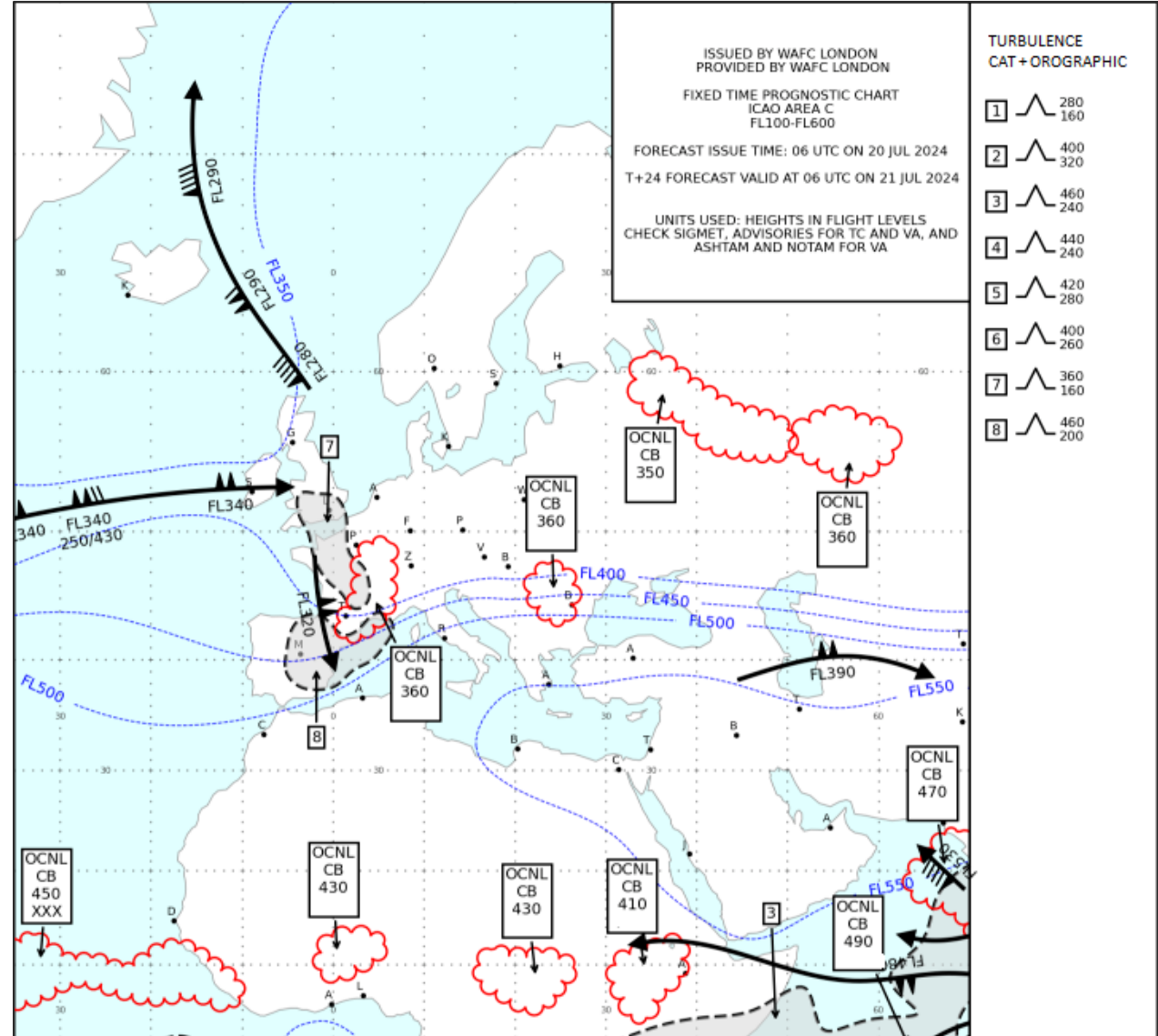


WAFS SIGWX CHANGES COMING ON 26 NOVEMBER 2024

- Multi-timestep WAFS Significant Weather (SIGWX) forecasts will be introduced
- There will be some changes to the content of the current T+24 SIGWX forecasts
- World Area Forecast Centre (WAFC) London operated by the Met Office, and WAFC Washington operated by the National Oceanic and Atmospheric Administration) will both make changes at the same time.

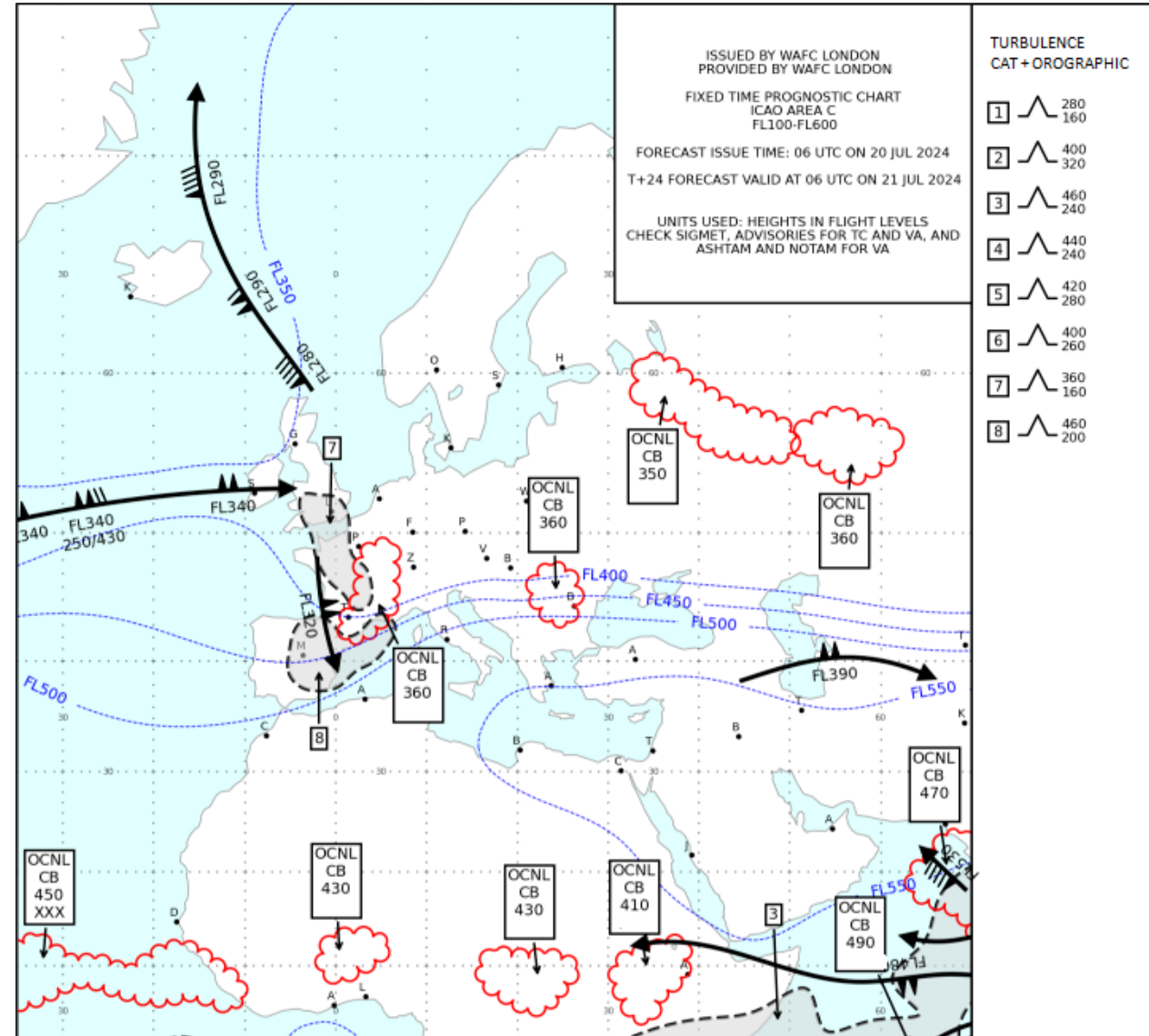
NEW WAFS SIGWX FORECASTS

- 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 – WHAT WILL THEY CONTAIN?

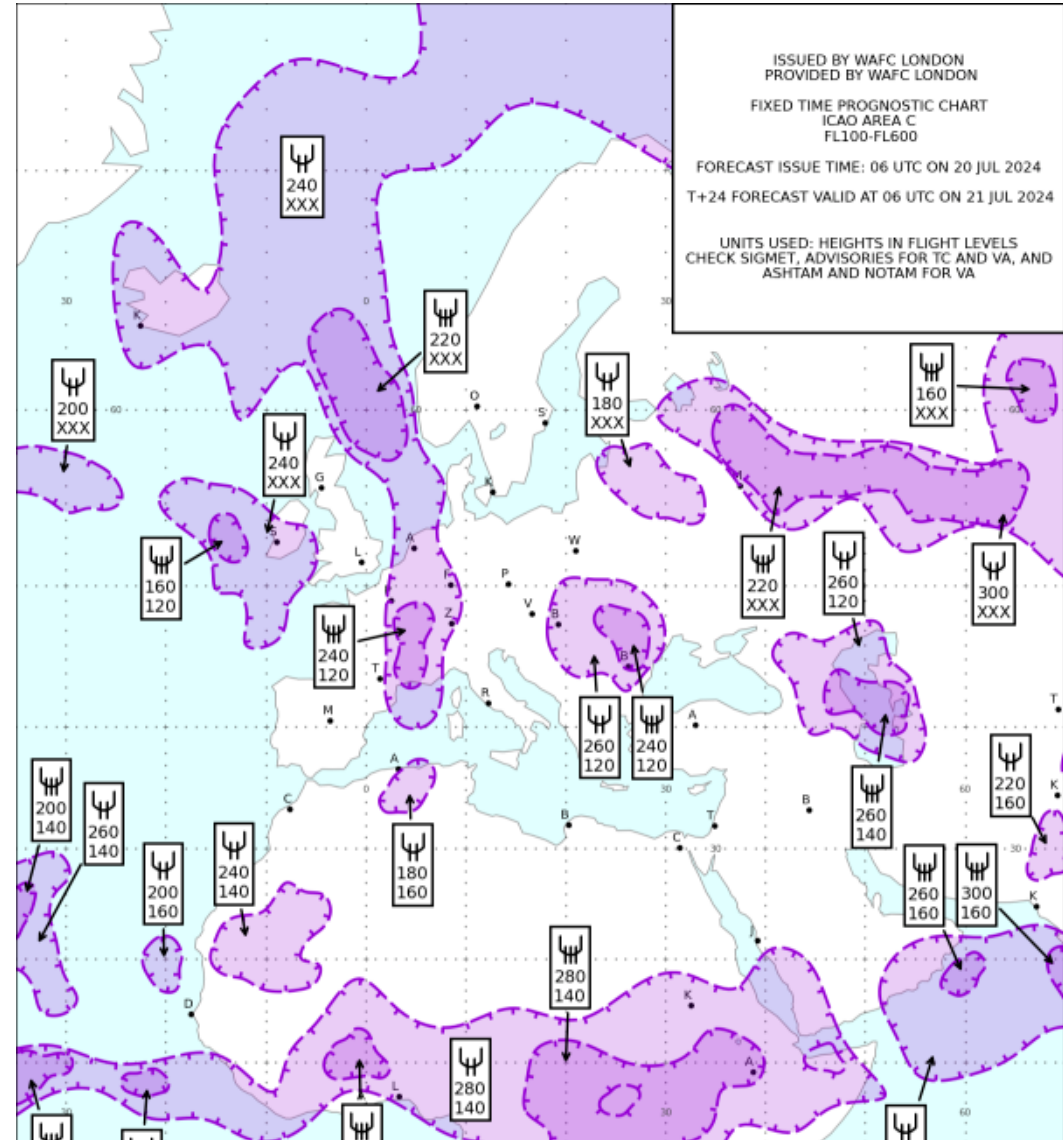
- Jet stream information
- Tropopause height contours
- Areas of occasional (OCNL) and frequent (FRQ) cumulonimbus (CB) and the flight level of the CB cloud tops
- Areas of moderate (MOD) and severe (SEV) “turbulence” areas will be forecast. This includes both clear air turbulence (CAT) and turbulence generated by mountains (orographic) turbulence types



NEW WAFS SIGWX FORECASTS – WHAT WILL THEY CONTAIN?

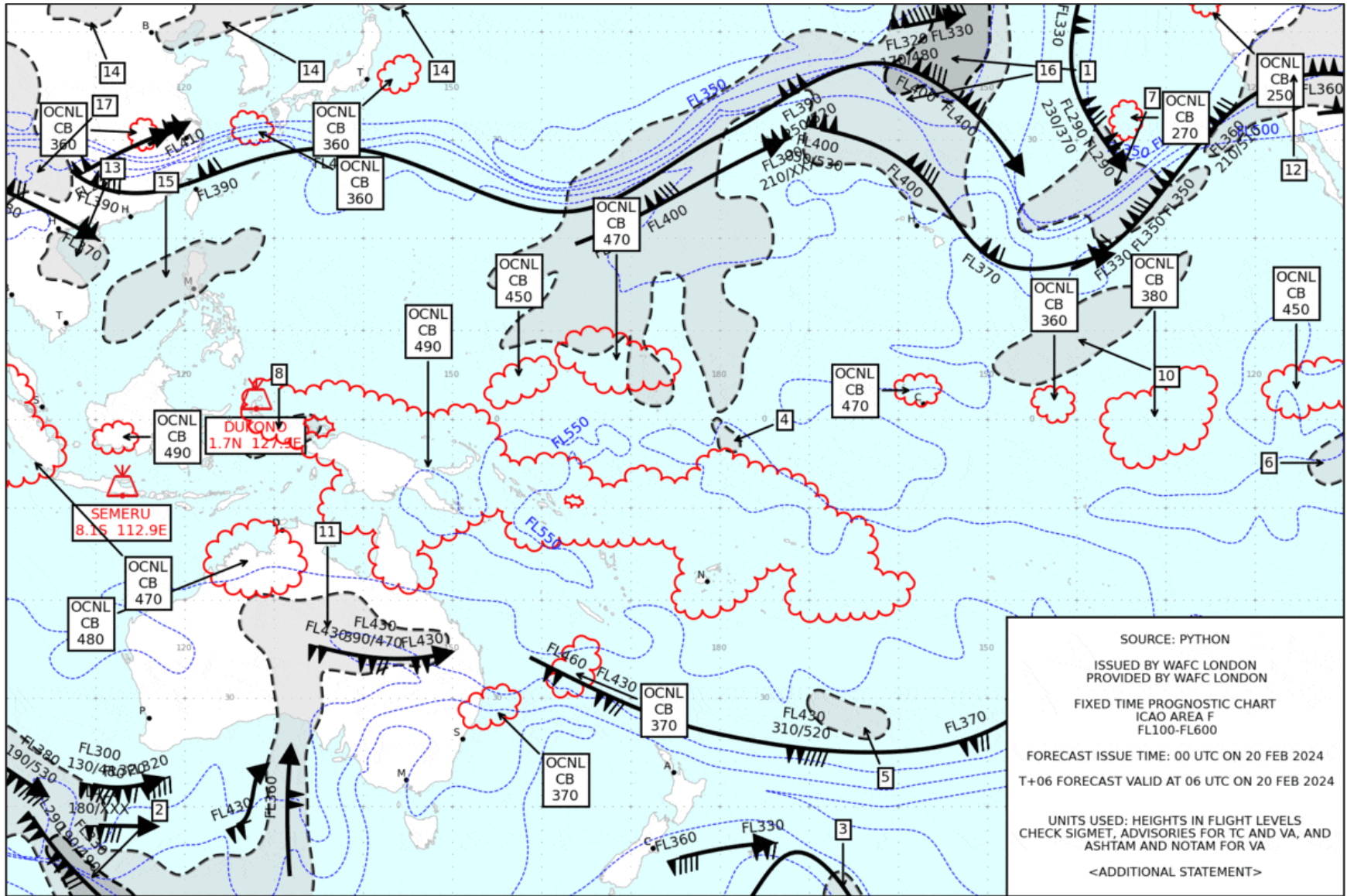
- Areas of MOD and SEV icing (with global coverage)
- Information on active volcanic eruptions, tropical cyclone positions and radioactive releases.

Note: tropical cyclone information will only be included from T+6 to T+24.



BENEFITS OF THE NEW SIGWX FORECASTS?

- Provision of multiple forecast timesteps 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
- They are 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) and even filtered to only show features that lie between a particular vertical range.
- Movement and evolution of features with time can be seen

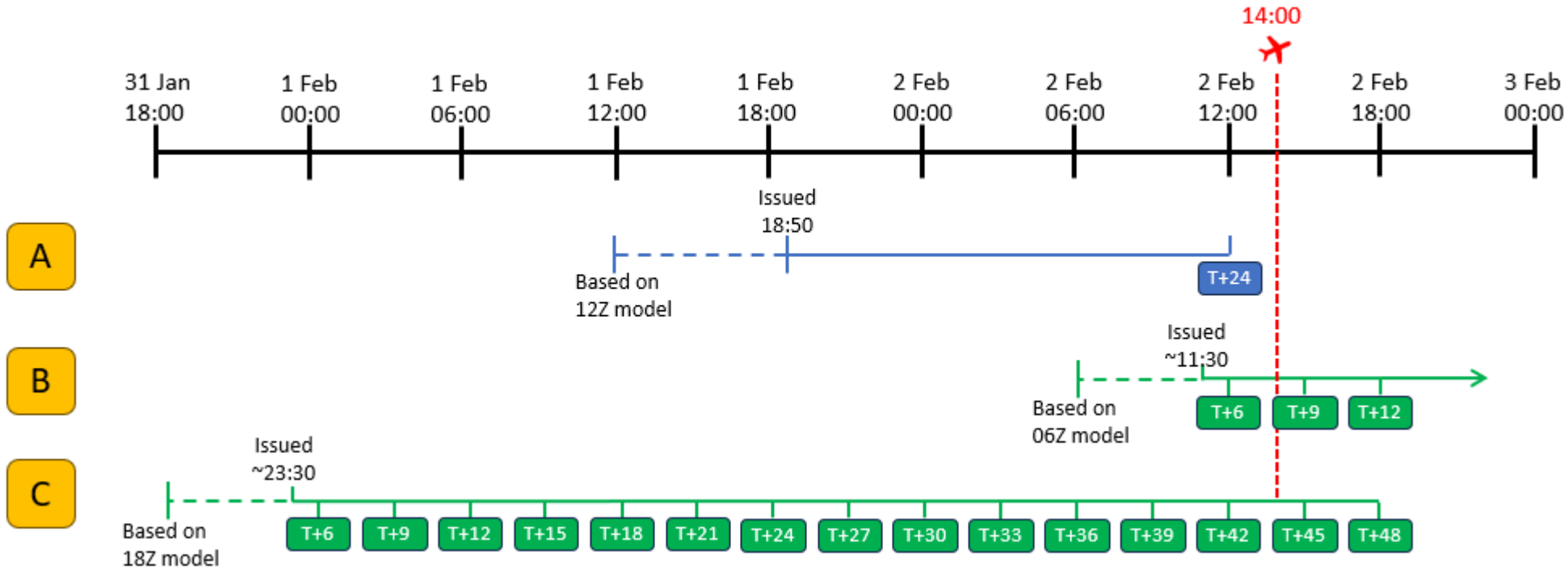


SOURCE: PYTHON
 ISSUED BY WAFC LONDON
 PROVIDED BY WAFC LONDON
 FIXED TIME PROGNOSTIC CHART
 ICAO AREA F
 FL100-FL600
 FORECAST ISSUE TIME: 00 UTC ON 20 FEB 2024
 T+06 FORECAST VALID AT 06 UTC ON 20 FEB 2024
 UNITS USED: HEIGHTS IN FLIGHT LEVELS
 CHECK SIGMET, ADVISORIES FOR TC AND VA, AND
 ASHTAM AND NOTAM FOR VA
 <ADDITIONAL STATEMENT>

TURBULENCE AREAS NOT ASSOCIATED WITH CONVECTIVE CLOUD

1	370 170	3	330 160	5	430 260	7	450 160	9	440 160	11	460 160	13	440 320	15	440 290	16	460 160	17	460 160
2	270 160	4	450 380	6	450 300	8	460 380	10	460 300	12	450 160	14	440 160						

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>

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    <iwxxm:boundingVolume>
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        <gml:upperCorner srsDimension="2" axisLabels="Lat Long" srsName="http://www.opengis.net/def/crs
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```

NEW WAFS SIGWX FORECASTS

- 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.
- 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).

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 (serves Europe, Africa, Middle East and Asia):

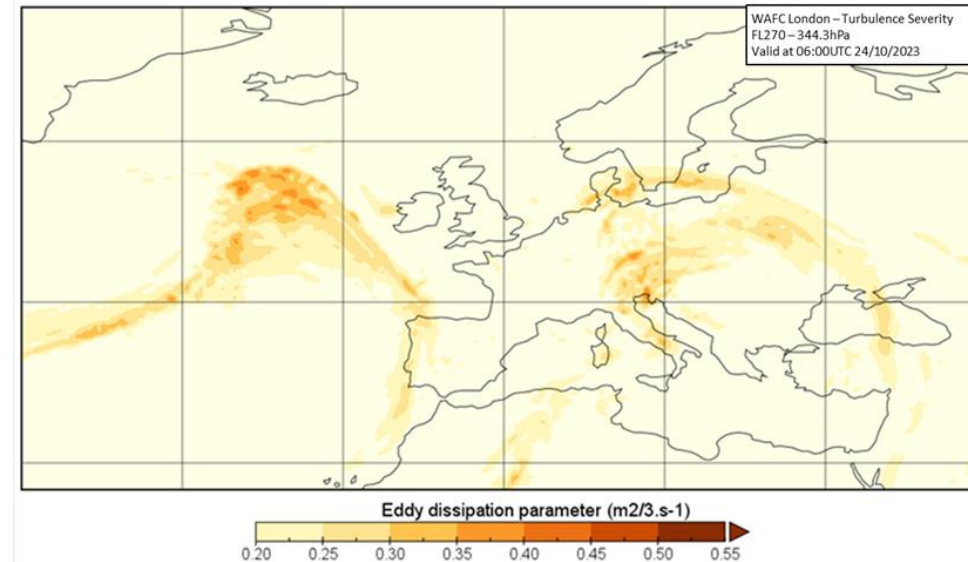
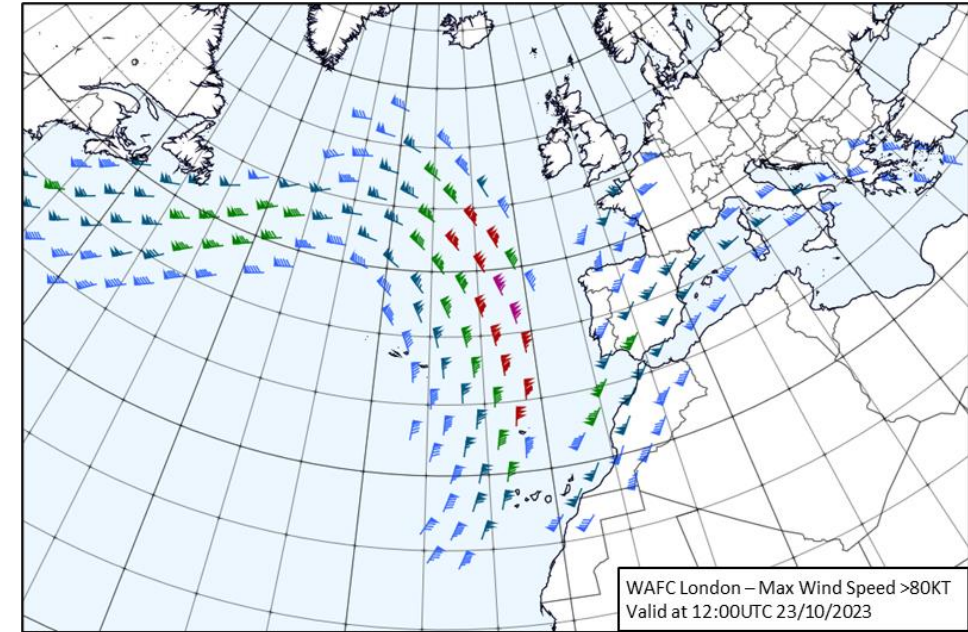
<https://www.metoffice.gov.uk/services/transport/aviation/regulated/sadis/info/sadis-api>

WIFS (serves North, Central and South America, Caribbean and Asia):

<https://aviationweather.gov/wifs/>

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

- New WAFS gridded data sets with a higher horizontal 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 sure your colleagues 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:

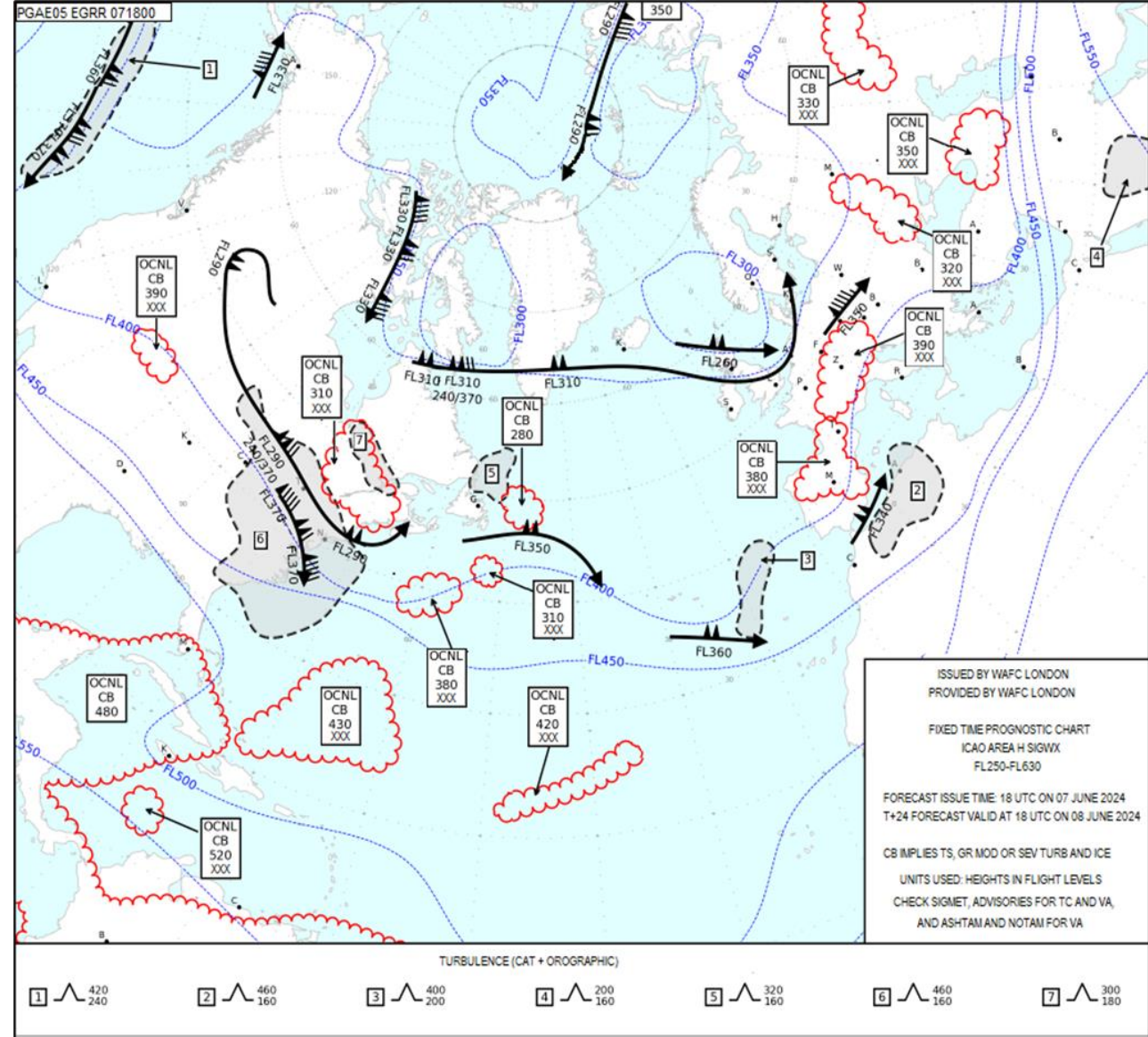
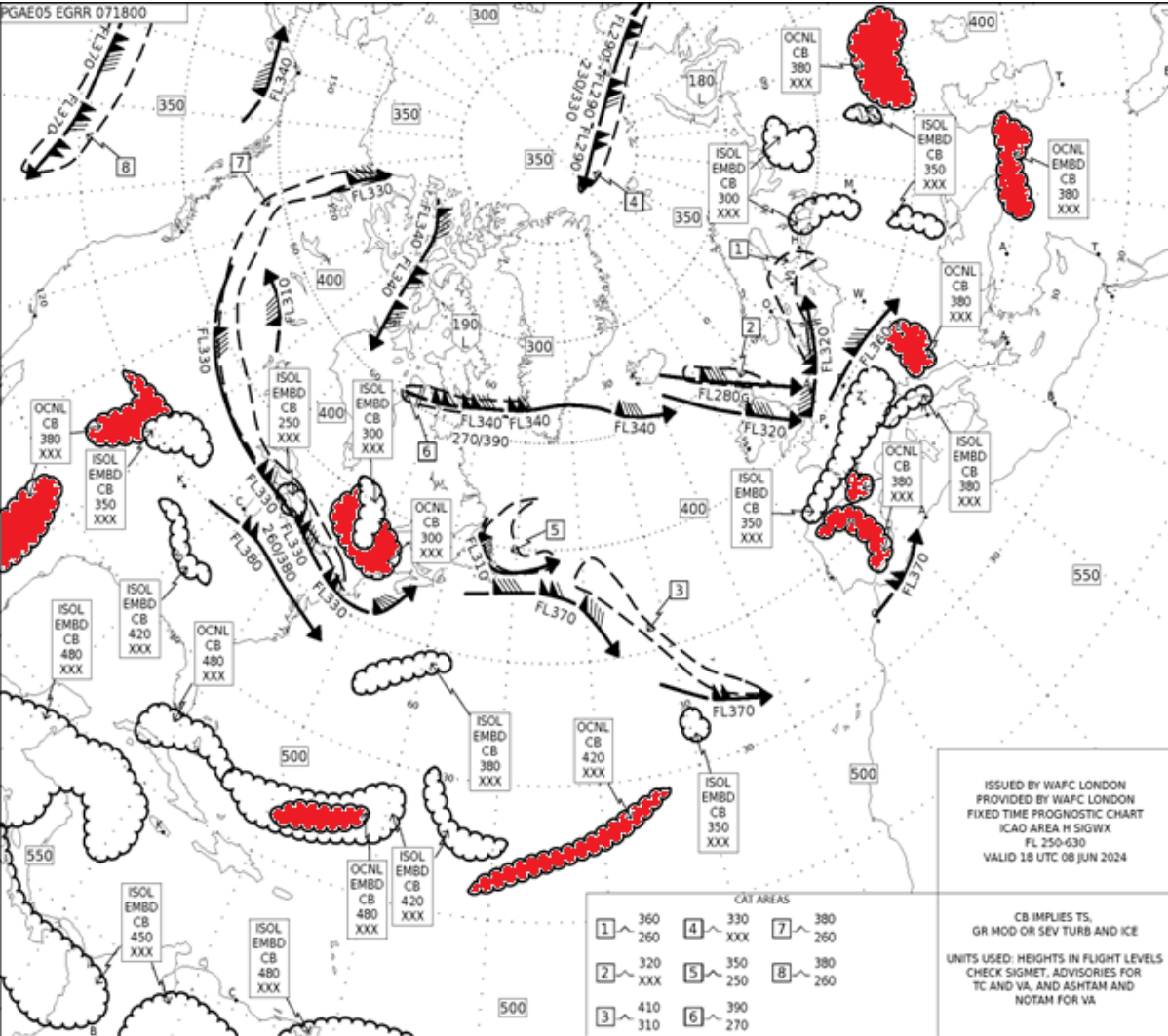
- They will be provided in colour
- The high level SIGWX will change to span FL250 to FL600 (changing from FL250 to FL630).
- They will be produced earlier than they are now (by approx. 1 hr)

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

- 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.

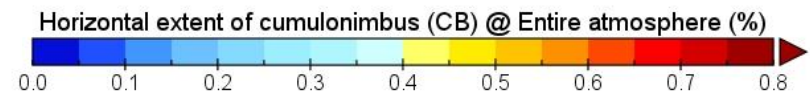
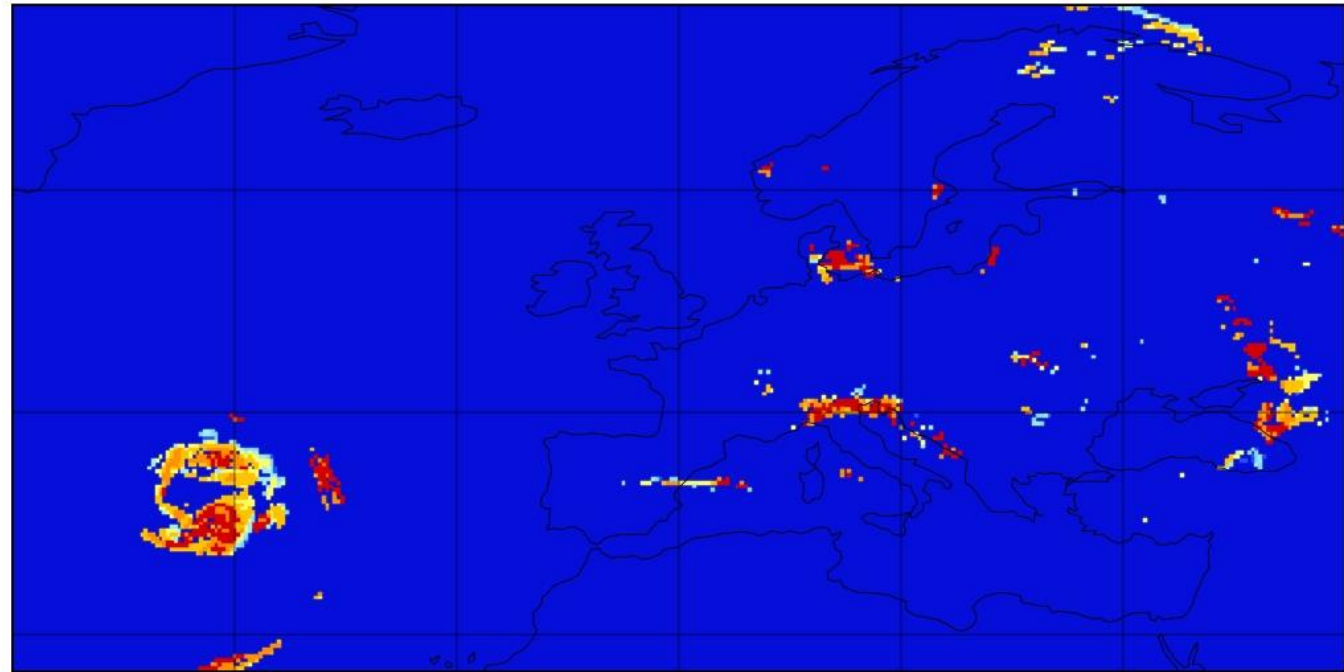


WHAT WILL CHANGE IN THE OLD T+24 SIGWX CHARTS?

- Embedded cumulonimbus cloud will not be included.

WAFS gridded data sets showing cumulonimbus extent can be used to identify area of more isolated cumulonimbus clouds.

Horizontal extent of cumulonimbus



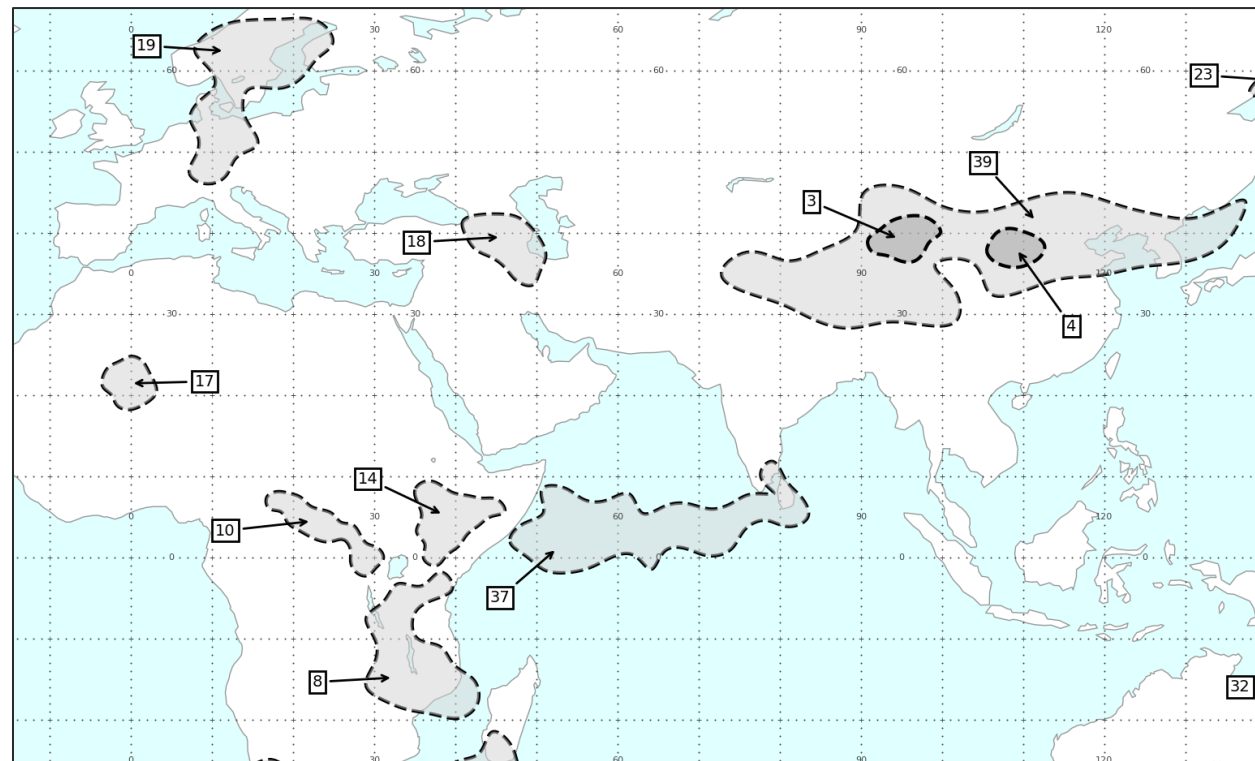
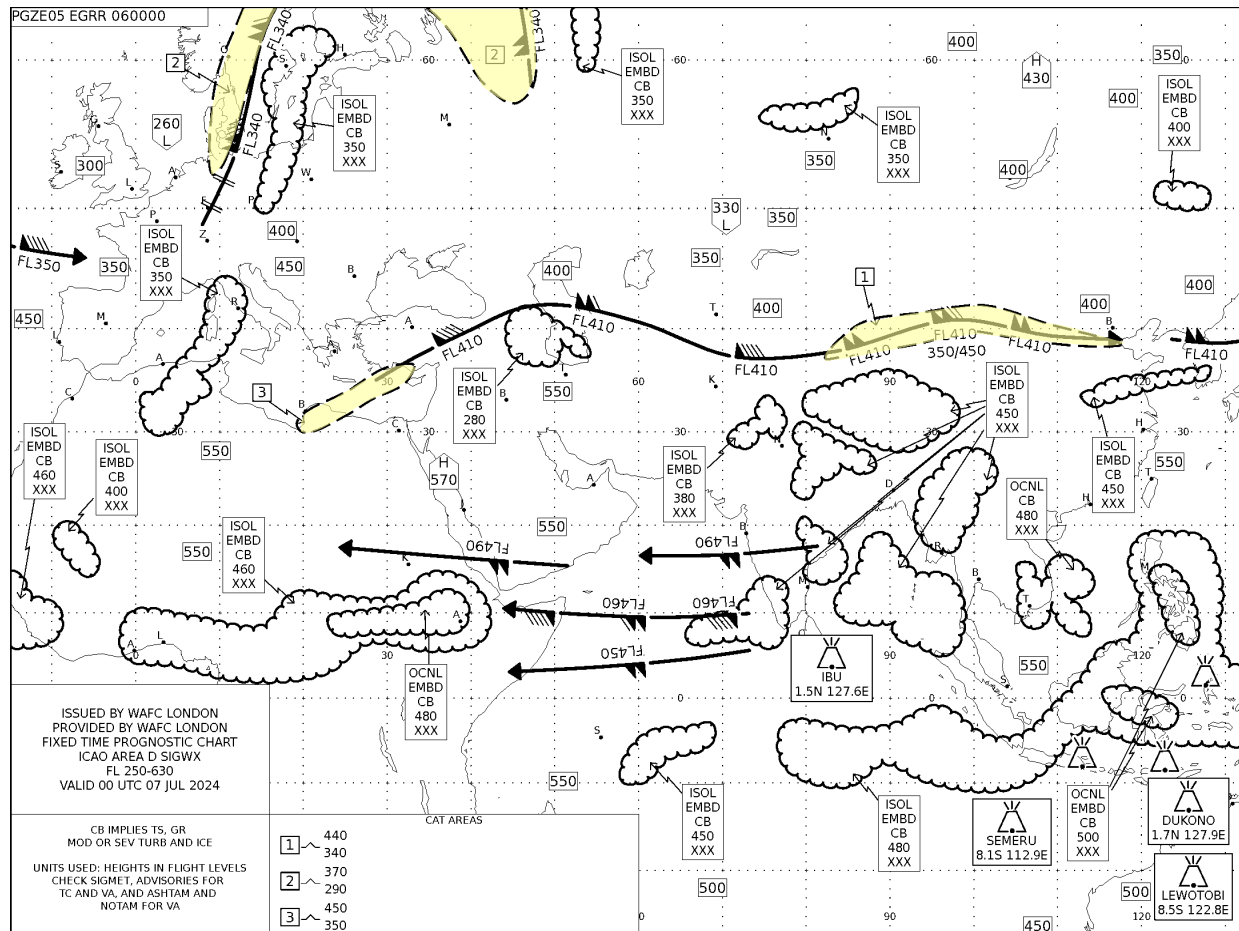
WHAT WILL CHANGE IN THE OLD T+24 SIGWX CHARTS?

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



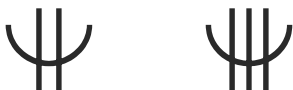
Clear Air Turbulence is caused by horizontal wind shear, often around jet streams.

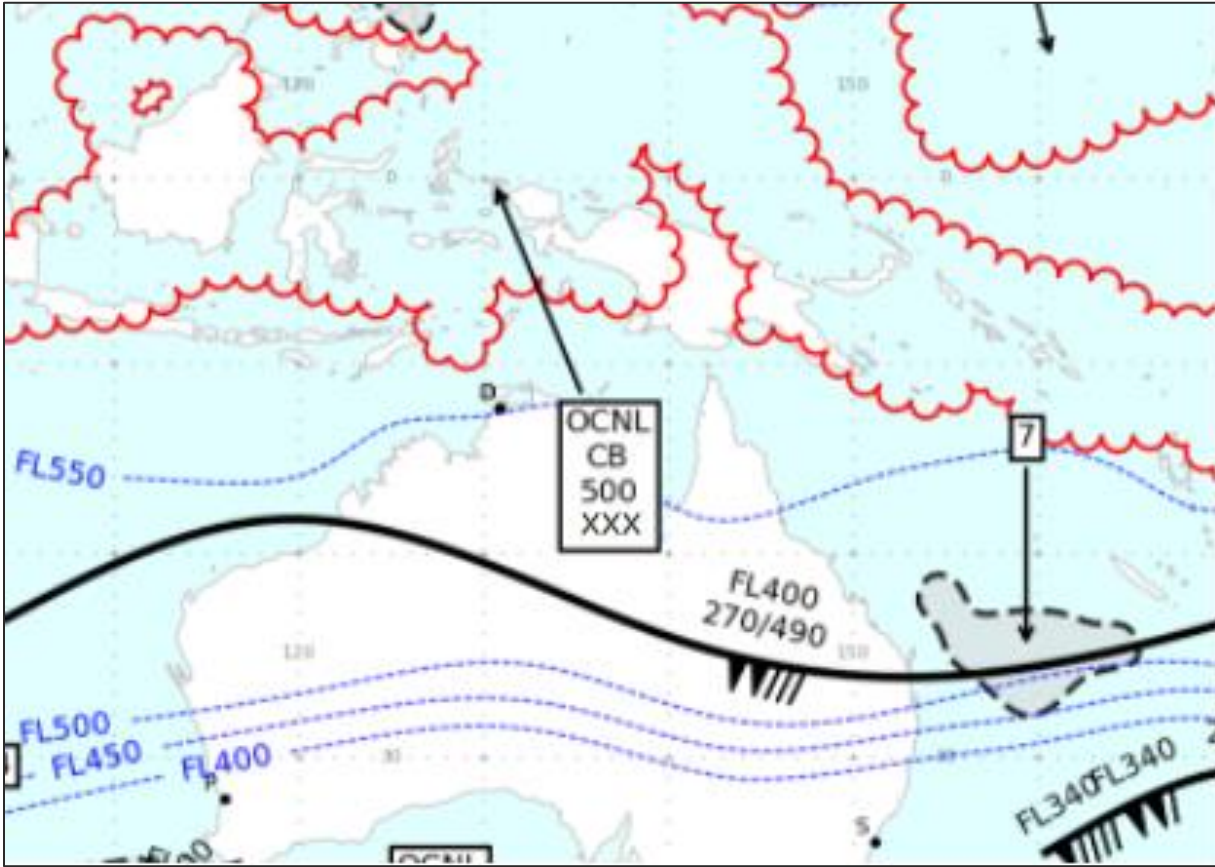
Orographic or mountain wave turbulence also has a vertical component to the wind shear in addition to horizontal wind shear.



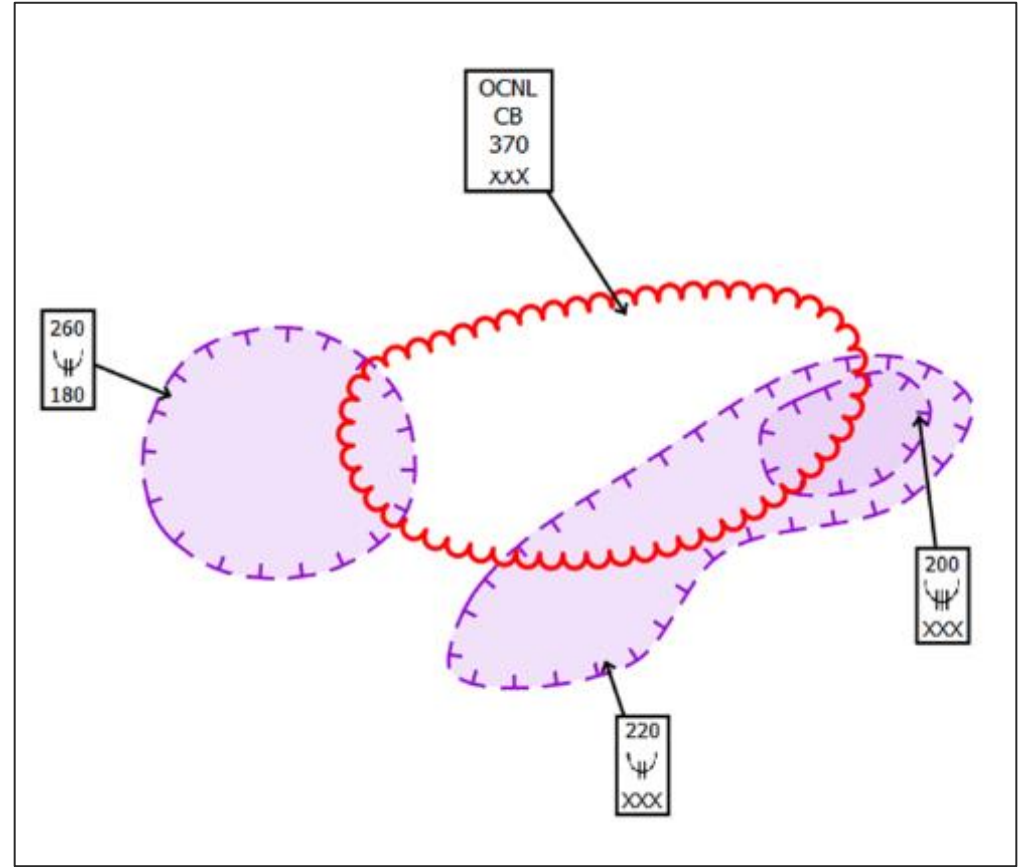
WHAT WILL CHANGE IN THE OLD T+24 SIGWX CHARTS?

- 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 combined in-cloud turbulence and icing areas will change to only show icing intensity areas (MOD and SEV).





Blue tropopause contours



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



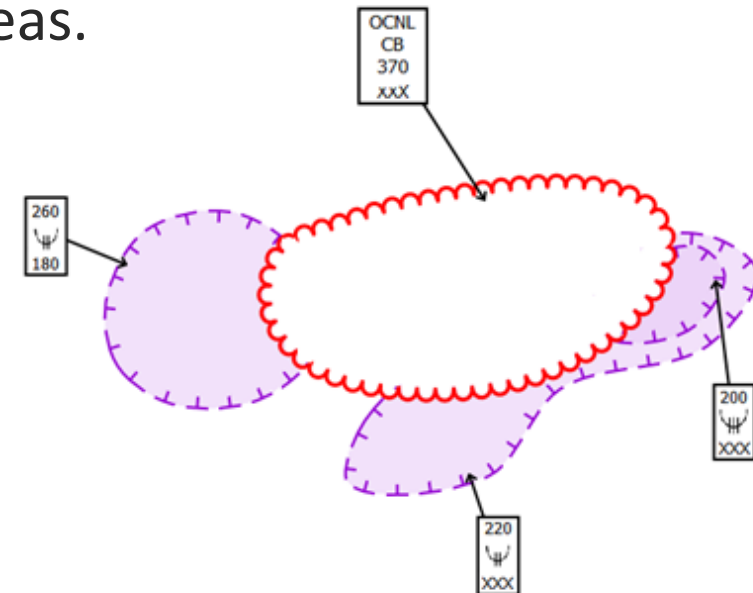
SIGWX VERIFICATION

Satellite imagery, lightning observations and aircraft turbulence measurements have been used to ensure the new T+24 SIGWX is at least as accurate as the manually drawn SIGWX forecasts.

We aren't trying to make the new T+24 forecasts match the manually drawn T+24 forecasts as they aren't "the truth". We have tuned the new SIGWX forecasts to achieve highest forecast performance we can.

T+24 SIGWX DIGITAL BUFR DATA

- 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 level will still be in the form of spot heights.
 - Icing objects will not go through cumulonimbus areas.



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 26 November 2024 to November 2025 (when Amendment 83 to ICAO Annex 3 - *Meteorological Service for International Air Navigation* becomes effective).

The UK CAA has issued an Aeronautical Information circular that regarding the upcoming SIGWX changes.

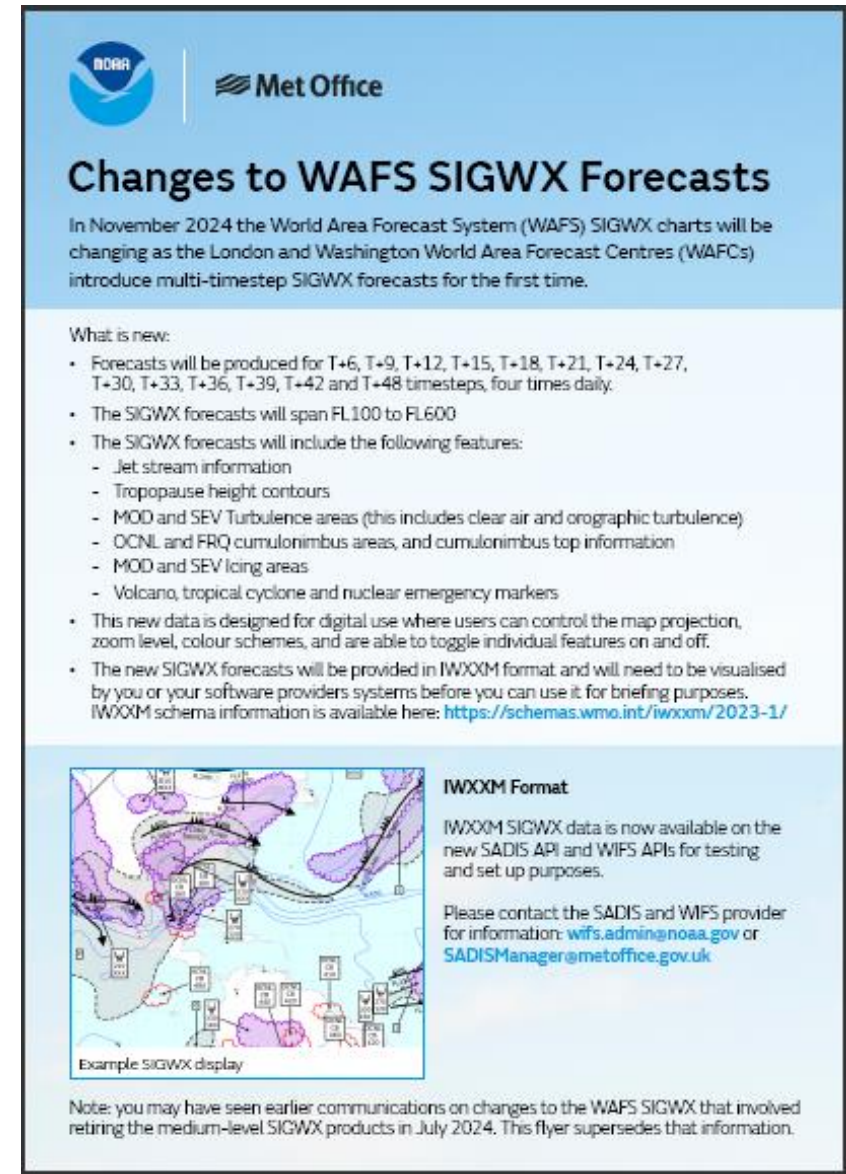
<https://www.aurora.nats.co.uk/htmlAIP/Publications/2024-07-25/html/eAIC/EG-eAIC-2024-131-P-en-GB.html>

It is important to prepare for the upcoming SIGWX changes on 26 November 2024 now.

Please share the flyer (available via the link below) 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

Further information

<https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-2023>



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/>

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

Example SIGWX display



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.

Please tell your IT department or software provider that you would like to use the new multi-timestep SIGWX!

Software and briefing system providers - please get in touch to arrange access to the SADIS or WIFS API.

Further information

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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.

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.