



International Civil Aviation Organization

**MIDANPIRG Meteorology Sub-Group
Eleventh Meeting (MET SG/11)**

(Cairo, Egypt, 14–15 November 2023)

**Agenda Item 4: MET Planning and Implementation issues – Performance Framework
for MET implementation in the MID Region**

WAFS AND SADIS UPGRADE

(Presented by WAFC London)

SUMMARY

This paper outlines upcoming changes to the World Area Forecast System (WAFS) data sets and the introduction of a SWIM compliant version of SADIS, the SADIS API.

1. INTRODUCTION

1.1 This paper and the accompanying presentation reports on the upcoming changes to the World Area Forecast System (WAFS) data sets in 2023 and 2024 as well as the SADIS and WIFS systems that are used to deliver the data.

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

2. DISCUSSION

WAFS Gridded Data Upgrades – End of November 2023

2.1 World Area Forecast Centre (WAFC) London and WAFC Washington have been working closely together to define the next generation WAFS provision, which will bring an upgrade in the horizontal, vertical and temporal resolutions to all WAFS gridded data sets. A full summary of the new data is included in **Appendix A**.

2.2 The new data includes:

- the provision of wind, temperature, relative humidity and geopotential height at 0.25 degree horizontal resolution
- data at 1000ft flight level intervals

- data at 1-hourly intervals from 6-hours to 24-hours, 3-hourly intervals from 27-hours to 48-hours, and wind and temperature data at 6-hourly intervals out to 120-hours.

2.3 These data sets are being added to ICAO Annex 3 - *Meteorological Service for International Air Navigation*, and the new Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157) with Amendment 81 which is applicable in November 2024 however both WAFCs are intending to introduce the new data 1 year earlier in November 2023.

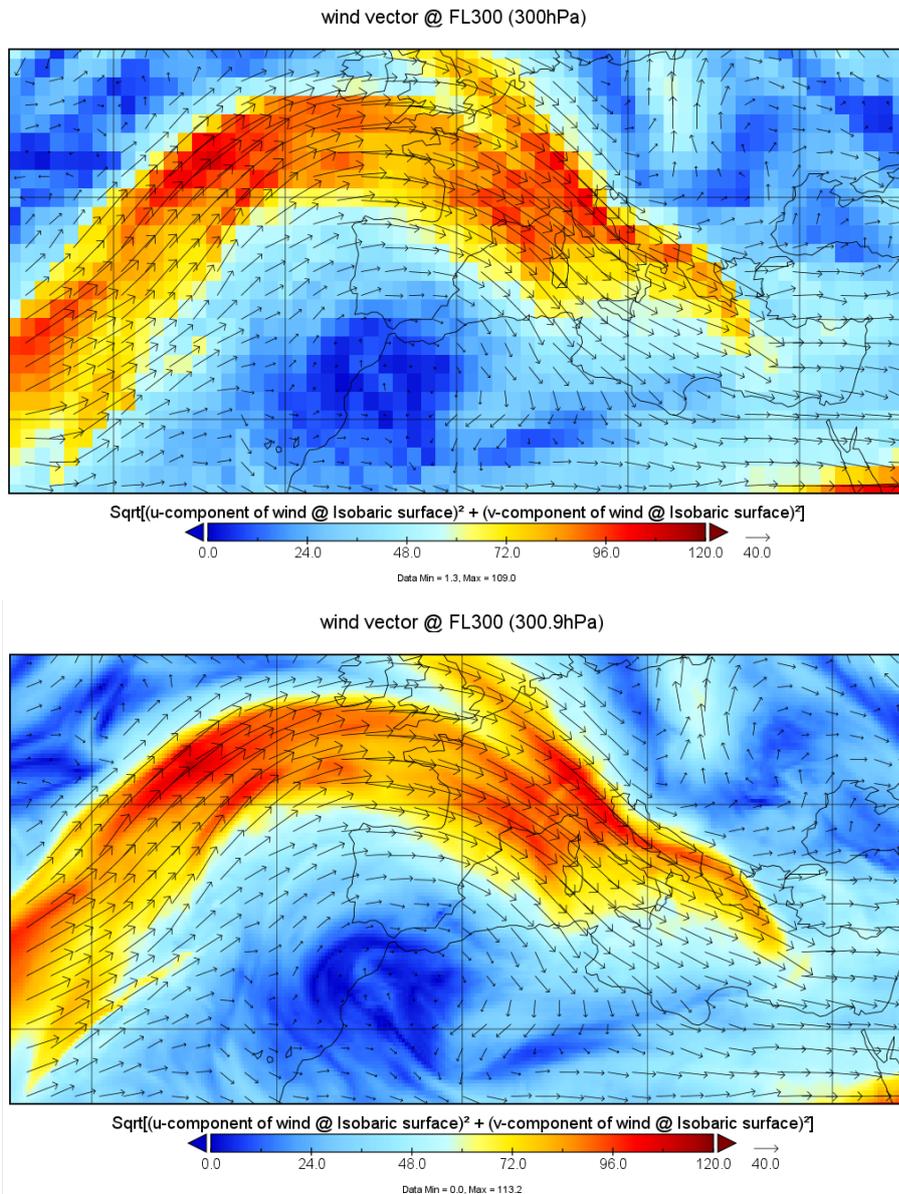


Figure 1 – Comparison of WAFS wind data at 1.25 degree horizontal resolution (top) and 0.25 degree horizontal resolution (bottom)

2.4 The existing 1.25 degree wind, temperature, relative humidity and geopotential height WAFS data sets will be retained, however it is important to note that the 1.25 degree hazard data sets (for cumulonimbus, icing and clear air turbulence) will be retired on 14 November 2023 as these were removed as a requirement from Annex 3 in November 2020.

2.5 In order to deliver the new, much larger, WAFS data sets to users effectively, and in order to comply with the ICAO Global Air Navigation Plan (GANP) requirement to provide meteorological information through SWIM¹ compliant systems an update to the SADIS and WIFS systems is being developed.

2.6 The new SADIS API's will adhere to the EUROCONTROL SWIM yellow profile requirements <https://www.eurocontrol.int/concept/system-wide-information-management> and will be published in the European SWIM registry <https://eur-registry.swim.aero/services>.

2.7 The new SADIS API² will deliver the WAFS gridded data using the Open Geospatial Consortium (OGC) Environmental Data Retrieval (EDR) API <https://ogcapi.ogc.org/edr/> framework. This is an industry standard protocol. The WAFS data will be organized into a series of “collections” from which users can pick and choose the data they require.

2.8 Users will be encouraged to download data on a regional basis if it suits their needs, which will help to reduce the overall volumes of data. Figure 2 shows the regions or “tiles” of data that will be available.

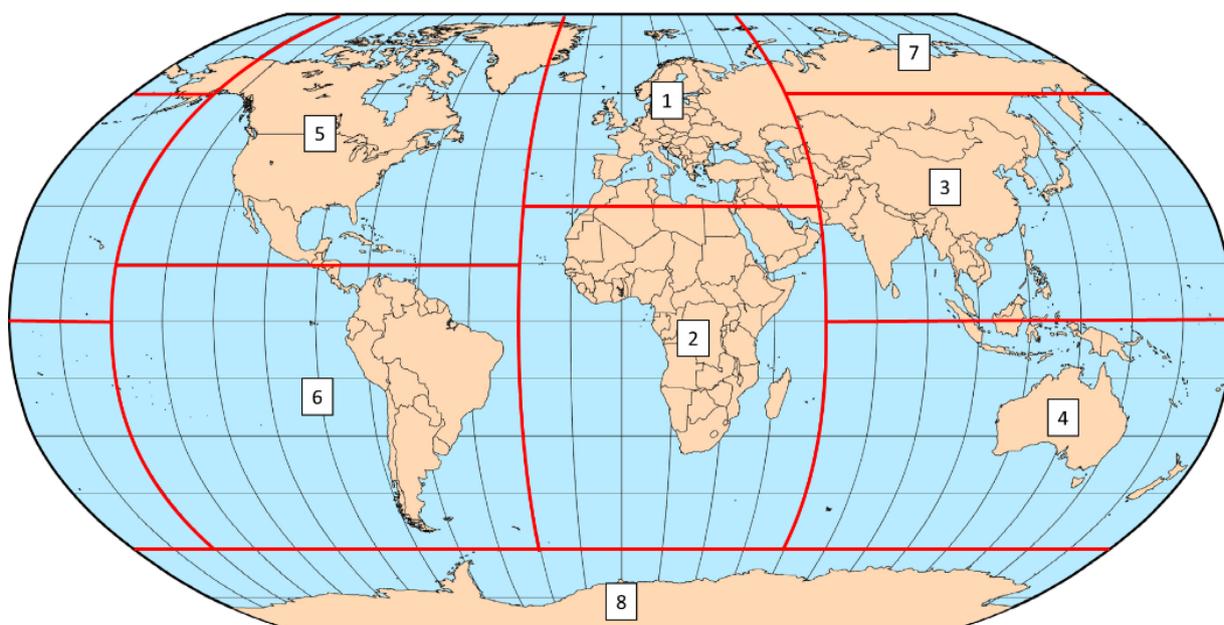


Figure 2 – Regions/Tiles of data that will be made available on the SADIS API

¹ <https://www.eurocontrol.int/concept/system-wide-information-management>

² https://en.wikipedia.org/wiki/Application_programming_interface

2.9 Users will be able to request the data by making a request that looks something like this:

https://xxxxx.api.metoffice.gov.uk/collections/egrr_wafs_windtempgeo_0p25/items/YUVDYA2015_017FLALL

In this example data is being selected from the collection (egrr_wafs_windtempgeo) that contains 0.25 degree wind, temperature and geopotential height information. The code “YUVDYA2015_017FLALL” describes the individual data fields being requested and can be decoded as follows:

Y = WAFS GRIB

UV = u and v wind

D = Deterministic

Y = 0.25 horizontal resolution

A2 = tile area 2

015-017 = forecast timesteps

FLALL = all flight levels.

WAFS SIGWX Upgrades – July 2024

2.10 In addition to the WAFS gridded data changes 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.

2.11 In July 2024 multi timesteps SIGWX forecasts will be introduced, and four times daily forecasts will be produced for the 6-hour to 48-hour period (at 3 hourly intervals).

2.12 Some changes will be made to the WAFS SIGWX forecast content:

- It will cover FL100 to FL600 in a single forecast (i.e. no separate SWM, medium level SIGWX)
- Tropopause spot heights will be replaced by tropopause contours
- Icing objects will be available for the whole globe
- Only occasional (OCNL) and frequent (FRQ) Cumulonimbus cloud will be shown. It is not possible to include embedded [EMBD] cloud
- Turbulence objects will include both clear air and orographic turbulence. There will be no separate in-cloud turbulence field.

2.13 The new SIGWX forecasts will come in a new IWXXM format, and the schema that is going to be used can be found here: <https://schemas.wmo.int/iwxxm/2023-1/WAFSSigWxFC.xsd>.

2.14 A selection of test data sets that users, or their software providers can try to visualize are provided here: <https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-sigwx-test-data>.

ISSUED BY WAFC LONDON, PROVIDED BY XXXX
FIXED TIME PROGNOSTIC CHART. SIGWX FL100-FL600

FORECAST ISSUE TIME: 12UTC 15 FEB 2023 T+18
FORECAST VALID AT 06UTC ON 16 FEB 2023

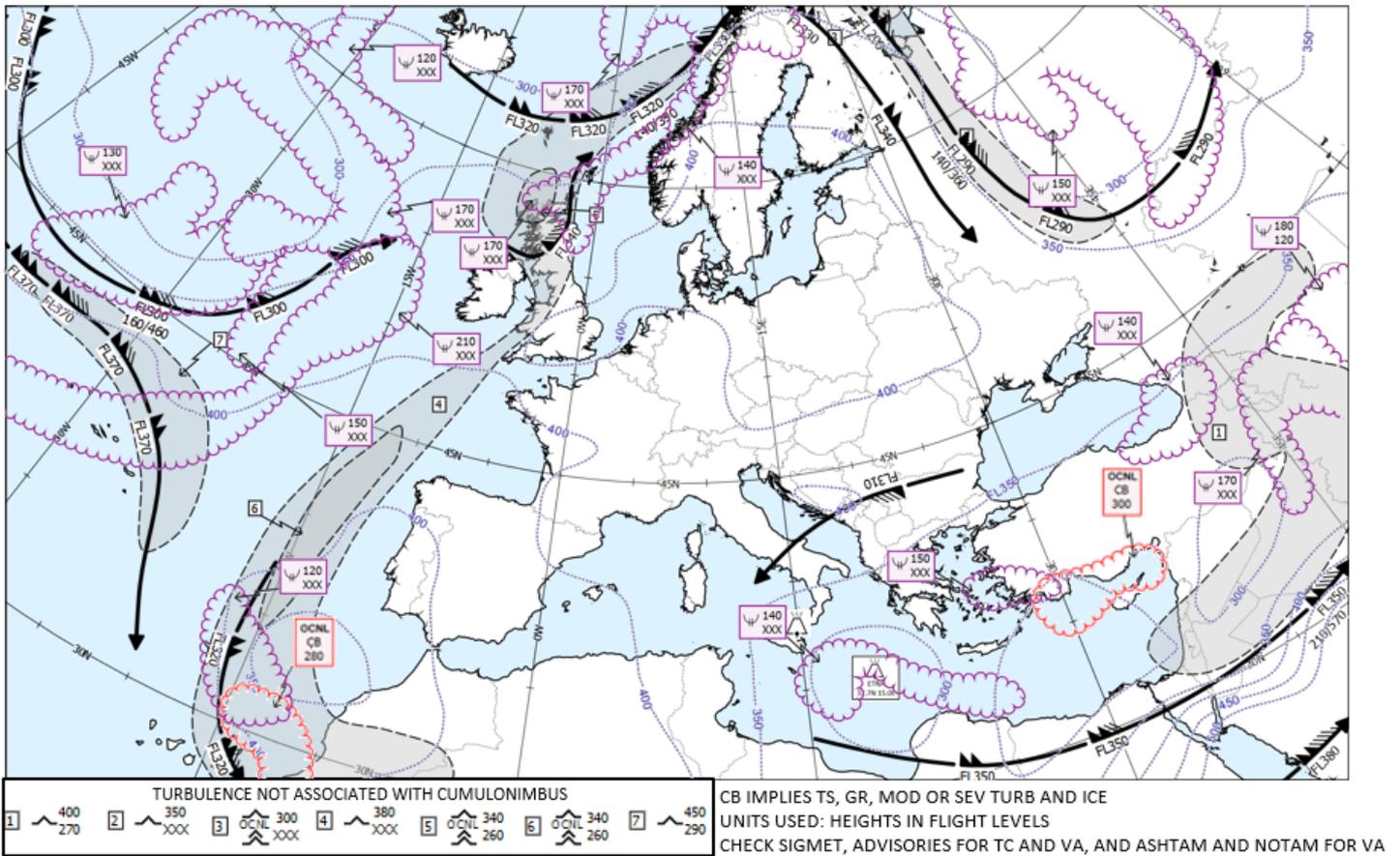


Figure 3 – Example multi timestep SIGWX visualization

2.15 It should be noted that the new multi timestep SIGWX is intended to be used digitally, and therefore sets of briefing charts will not be supplied by the WAFC’s (apart from the 24-hour forecast on the old SADIS FTP). A set of three images will be provided for each forecast timestep that users can use to ensure that their visualizations of the data matches with the WAFC version however it is important to note that these will not be suitable to print out onto A4 paper and used for pilot briefing.

2.16 The new SADIS API will deliver the WAFS SIGWX data and the data will be organized into collections which allows users to choose whether to download the IWXXM data or cross checking images.

2.17 An information sheet that summarises the upcoming SIGWX changes has been included as an attachment to this paper.

OPMET Data

2.18 The SADIS API will provide OPMET data (METAR, TAF, SIGMET etc) to users, organized in a series of collections:

Collection Name	Data format	Collection Content
tac_opmet_reports	TAC Global and regional	TAF, METAR, SPECI, SIGMET (all types), AIRMET, GAMET, AIREP
iwxxm_opmet_reports	IWXXM Global and regional	TAF, METAR, SPECI, SIGMET (all types), AIRMET
tac_advisory_reports	TAC Global only	SWA, VAA, TCA, NEM, NOTAM-ASHTAM
iwxxm_advisory_reports	IWXXM Global only	SWA, VAA, TCA
graphical_reports	PNG Global only	VAG, TCG
Notices	TAC	Relevant “NO” messages.

2.19 All collection types will come in with a “global coverage” option, whilst the “tac_opmet_reports” and “iwxxm_opmet_reports” ones will also have 6 regional groupings to choose from which relate to the ICAO regions. One of these regional groupings will cover the MID region airports, so all data where the CCCC in the WMO header starts with an “O”.

2.20 Users will be encouraged to download data on a regional basis if it suits their needs, which will help to reduce the overall volumes of data, by making a request that looks something like this:

https://xxxxxx.api.management.metoffice.cloud/ads-sadis-opmet/1/collections/iwxxm_advisory_reports/locations/GLOBAL?interval=PT5M--2007-12-14T15:30

2.21 Data will be published at 5 minute intervals (from the time the system received it), and 36-hours worth of data will be held on the system in case users need to recover lost data. The WAFC’s are also looking at publishing data that updates every minute as well.

2.22 This part of the system is expected to become operational in February 2024.

Data on the current SADIS FTP system

2.23 The new SADIS API will provide access to the new WAFS data sets, whilst the current SADIS FTP will be retained up until November 2028 when it will be retired.

2.24 The table that follows summarises what will happen to the different WAFS data sets currently on SADIS FTP.

Data set	Plan
1.25 wind/temp/geopotential/humidity	Retained, with the same levels/timesteps as at present.
1.25 hazard data (CB, icing, CAT)	Retired in November 2023. <i>Note these fields stopped being an ICAO requirement in November 2020.</i>
0.25 hazard data (CB, icing, CAT)	Retained, with the same levels/timesteps as at present.
T+24 SIGWX SWH (High level) BUFR	Retained, but will span FL100-FL600 with some content changes. Will then be retired in July 2026.
T+24 SIGWX SWH (High level) PNG Charts Area A,B,B1,C,D,E,F,G,H,I,J,K and M	Retained, but will span FL100-FL600 with some content changes Will then be retired in November 2028.
T+24 SIGWX SWM (Medium level) BUFR	Retired in July 2024.
T+24 SIGWX SWM (Medium level) PNG Charts Area NAT, EURO, MEA and ASIA SOUTH	Retired in July 2024.
OPMET DATA (METAR, TAF, SIGMET etc)	Retained.

2.25 The T+24 SIGWXs forecast that remain available will change in appearance/content slightly in July 2024. This includes:

- They will be valid for FL100 to FL600
- CB bases will not be shown on the PNG charts
- tropopause spot heights will become contours (and will not be included in the BUFR)
- turbulence areas will look a little different and will include orographic turbulence as well as CAT.

2.26 Users will be strongly encouraged to migrate their systems over to use data from the new SADIS API as soon as possible in order to benefit from the improved data sets.

Using the new APIs

2.27 SADIS FTP users will shortly be invited to start using the new SADIS API components as they are available. The notifications will be sent out as a SADIS Administrative message.

2.28 When it comes to using the new SADIS API system operationally, users will be asked to re-register (so that up to date contact details are captured) and sign up to a user level agreement. Once registration is complete users will be able to get an authentication token that gives access to the system.

2.29 By developing a consistent technology approach for the new SADIS and WIFS APIs the WAFCs will make it far easier for users to switch over to their alternate/backup system in the event of an outage. Users will be expected to re-register to use the WIFS API if they wish to use it.

3. CONCLUSION

3.1 The next year brings big changes to the WAFS data sets, SADIS and WIFS systems, and users will need to make changes to their systems and software in order to benefit from the extra levels and timesteps of WAFS data. <https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-2023> contains further information on the upcoming changes.

3.2 The new APIs will allow a certain degree of user customization of the WAFS data sets for the first time, and will provide data in a SWIM compliant way. Both of these work towards the ICAO goals for modernizing the meteorological data provision to users.

3.3 The group is also invited to consider formulating the following action:

Draft Conclusion 11/XX: WAFS Data

That, the SADIS users be encouraged to prepare their systems for visualizing and creating charts from the new WAFS SIGWX data sets in IWXXM format by using the test data sets available at <https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-sigwx-test-data> & for those with WIFS accounts https://beta.aviationweather.gov/wifs/data/IWXXM_TEST/.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

- a) note the information contained in this paper; and
- b) discuss any relevant matters as appropriate.

Appendix A – WAFS data sets available from November 2023.

Fixed valid times of available WAFS upper-air gridded forecasts with a horizontal resolution of 0.25° of latitude and longitude:

<i>Upper-air gridded forecasts</i>	<i>1-hourly intervals</i>	<i>3-hourly intervals</i>	<i>6-hourly intervals</i>
Wind, temperature, geopotential altitude	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24 hours*	27, 30, 33, 36, 39, 42, 45 and 48 hours*	54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114 and 120 hours*
Flight level and temperature of tropopause			
Direction, speed and flight level of maximum wind			
Humidity			
Horizontal extent, and flight levels of base and top, of cumulonimbus clouds	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24 hours*	27, 30, 33, 36, 39, 42, 45 and 48 hours*	Not provided
Icing			
Turbulence			

* after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based

Availability (marked by X) of WAFS upper-air gridded forecasts with a horizontal resolution of 0.25° of latitude and longitude as a function of flight level

<i>Flight Level</i>	<i>ICAO Standard Atmosphere pressure level (hPa)</i>	<i>Geopotential Altitude</i>	<i>Wind</i>	<i>Temperature</i>	<i>Turbulence</i>	<i>Icing</i>	<i>Humidity</i>
FL 050	843.1	X	X	X	—	X	X
FL 060	812.0	X	X	X	—	X	X
FL 070	781.9	X	X	X	—	X	X
FL 080	752.6	X	X	X	—	X	X
FL 090	724.3	X	X	X	—	X	X
FL 100	696.8	X	X	X	X	X	X
FL 110	670.2	X	X	X	X	X	X
FL 120	644.4	X	X	X	X	X	X
FL 130	619.4	X	X	X	X	X	X
FL 140	595.2	X	X	X	X	X	X
FL 150	571.8	X	X	X	X	X	X
FL 160	549.2	X	X	X	X	X	X
FL 170	527.2	X	X	X	X	X	X
FL 180	506.0	X	X	X	X	X	X
FL 190	485.5	X	X	X	X	X	—
FL 200	465.6	X	X	X	X	X	—
FL 210	446.5	X	X	X	X	X	—
FL 220	427.9	X	X	X	X	X	—
FL 230	410.0	X	X	X	X	X	—
FL 240	392.7	X	X	X	X	X	—
FL 250	376.0	X	X	X	X	X	—

APPENDIX A

A-2

<i>Flight Level</i>	<i>ICAO Standard Atmosphere pressure level (hPa)</i>	<i>Geopotential Altitude</i>	<i>Wind</i>	<i>Temperature</i>	<i>Turbulence</i>	<i>Icing</i>	<i>Humidity</i>
FL 260	359.9	X	X	X	X	X	—
FL 270	344.3	X	X	X	X	X	—
FL 280	329.3	X	X	X	X	X	—
FL 290	314.9	X	X	X	X	X	—
FL 300	300.9	X	X	X	X	X	—
FL 310	287.4	X	X	X	X	—	—
FL 320	274.5	X	X	X	X	—	—
FL 330	262.0	X	X	X	X	—	—
FL 340	250.0	X	X	X	X	—	—
FL 350	238.4	X	X	X	X	—	—
FL 360	227.3	X	X	X	X	—	—
FL 370	216.6	X	X	X	X	—	—
FL 380	206.5	X	X	X	X	—	—
FL 390	196.8	X	X	X	X	—	—
FL 400	187.5	X	X	X	X	—	—
FL 410	178.7	X	X	X	X	—	—
FL 420	170.4	X	X	X	X	—	—
FL 430	162.4	X	X	X	X	—	—
FL 440	154.7	X	X	X	X	—	—
FL 450	147.5	X	X	X	X	—	—
FL 460	140.6	X	X	X	—	—	—
FL 470	134.0	X	X	X	—	—	—
FL 480	127.7	X	X	X	—	—	—
FL 490	121.7	X	X	X	—	—	—
FL 500	116.0	X	X	X	—	—	—
FL 510	110.5	X	X	X	—	—	—
FL 520	105.3	X	X	X	—	—	—
FL 530	100.4	X	X	X	—	—	—
FL 540	95.7	X	X	X	—	—	—
FL 550	91.2	X	X	X	—	—	—
FL 560	87.0	X	X	X	—	—	—
FL 570	82.8	X	X	X	—	—	—
FL 580	79.0	X	X	X	—	—	—
FL 590	75.2	X	X	X	—	—	—
FL 600	71.7	X	X	X	—	—	—

A-3

Availability (marked by X) of WAFS upper-air gridded forecasts with a horizontal resolution of 1.25° of latitude and longitude as a function of flight level

WAFS forecasts with a horizontal resolution of 1.25° will be provided for users unable to process WAFS forecasts with a horizontal resolution of 0.25°.

<i>Flight Level</i>	<i>ICAO Standard Atmosphere pressure level (hPa)</i>	<i>Geopotential Altitude</i>	<i>Wind</i>	<i>Temperature</i>	<i>Humidity</i>
FL 050	843.1	X	X	X	X
FL 080	752.6	X	X	X	X
FL 100	696.8	X	X	X	X
FL 140	595.2	X	X	X	X
FL 180	506.0	X	X	X	X
FL 210	446.5	X	X	X	—
FL 240	392.7	X	X	X	—
FL 270	344.3	X	X	X	—
FL 300	300.9	X	X	X	—
FL 320	274.5	X	X	X	—
FL 340	250.0	X	X	X	—
FL 360	227.3	X	X	X	—
FL 390	196.8	X	X	X	—
FL 410	178.7	X	X	X	—
FL 450	147.5	X	X	X	—
FL 480	127.7	X	X	X	—
FL 530	100.4	X	X	X	—

** after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based.*

Fixed valid times of available WAFS upper-air gridded forecasts with a horizontal resolution of 1.25° of latitude and longitude

<i>Upper-air gridded forecasts</i>	<i>3-hourly intervals</i>
Wind, temperature, geopotential altitude	6, 9, 12, 15, 18, 24, 27, 30, 33 and 36 hours*
Flight level and temperature of tropopause	
Direction, speed and flight level of maximum wind	
Humidity	

** after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based*



METEOROLOGY PANEL 

Improvements to the World Area Forecast System (WAFS) – 2023 and 2024





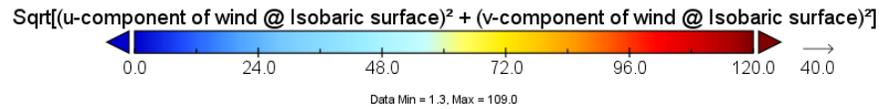
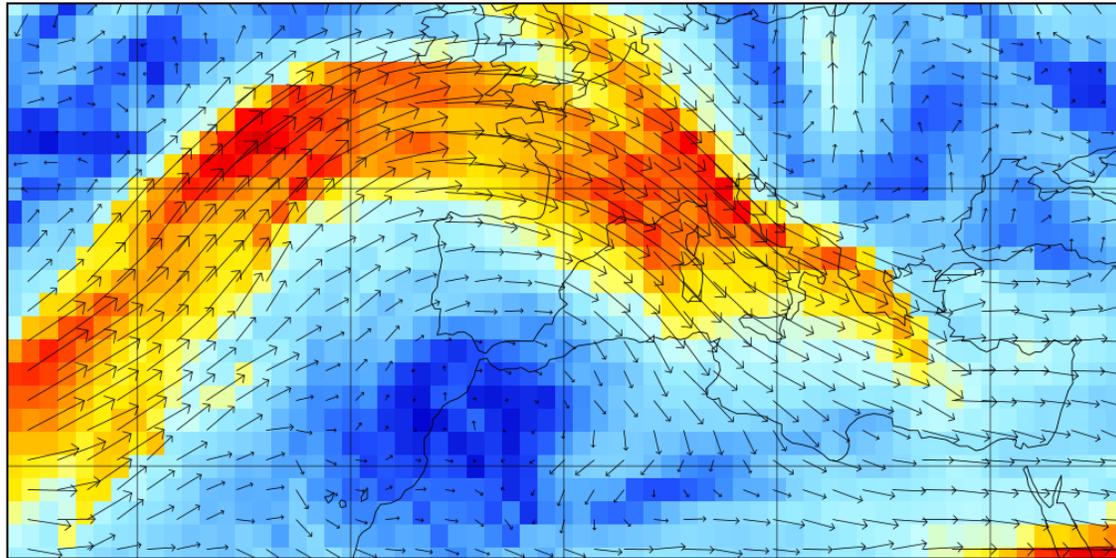
WAFS CHANGES COMING IN WITH AMENDMENT 81 TO ANNEX 3

- WAFS gridded data will get a large upgrade:
 - Many more vertical levels
 - More timesteps
 - Wind, temperature, relative humidity, geopotential height at 0.25 degree resolution
- All changes relate to Amendment 81 to ICAO Annex 3, now due for implementation Nov 2024.
- The proposed changes to Annex 3 were agreed at the ICAO Met Panel Meeting in June 2021, and are now being considered by the ICAO Air Navigation Commission for approval/consultation (SL 2023.1 refers)



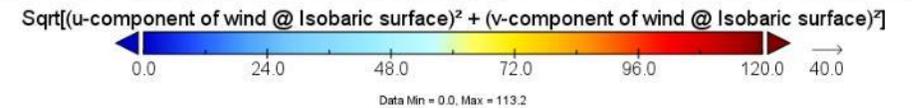
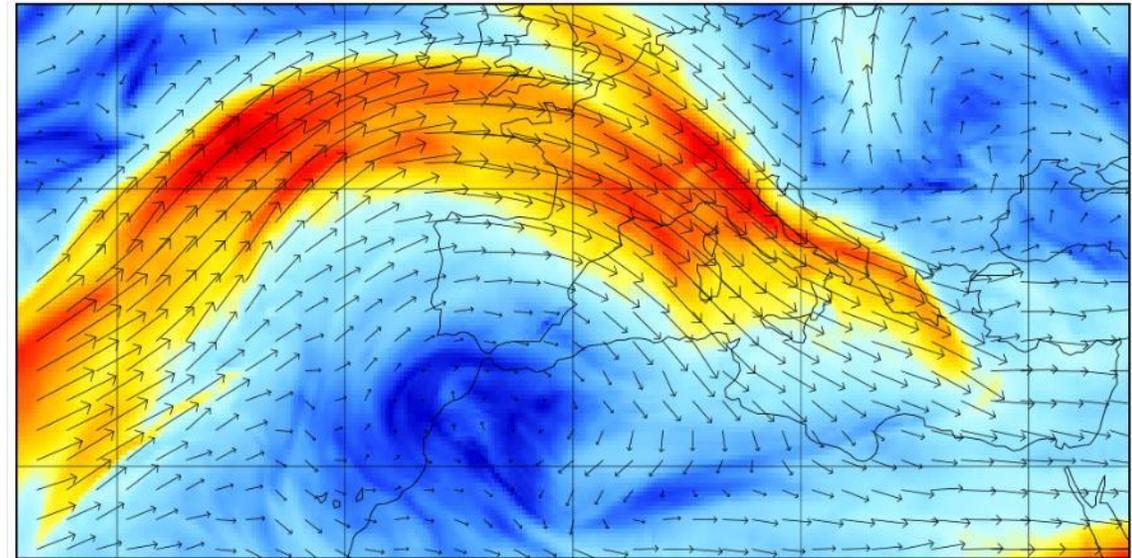
Current 1.25 degree resolution

wind vector @ FL300 (300hPa)



New 0.25 degree resolution

wind vector @ FL300 (300.9hPa)



WAFS GRIDDED DATA

Flight Level	ICAO Standard Atmosphere pressure level (hPa)	Geopotential Altitude	Wind	Temperature	Turbulence Severity	Icing Severity	Humidity
FL050	843.1	X	X	X		X	X
FL060	812.0	X	X	X		X	X
FL070	781.9	X	X	X		X	X
FL080	752.6	X	X	X		X	X
FL090	724.3	X	X	X		X	X
FL100	696.8	X	X	X	X	X	X
FL110	670.2	X	X	X	X	X	X
FL120	644.4	X	X	X	X	X	X
FL130	619.4	X	X	X	X	X	X
FL140	595.2	X	X	X	X	X	X
FL150	571.8	X	X	X	X	X	X
FL160	549.2	X	X	X	X	X	X
FL170	527.2	X	X	X	X	X	X
FL180	506.0	X	X	X	X	X	X
FL190	485.5	X	X	X	X	X	
FL200	465.6	X	X	X	X	X	
FL210	446.5	X	X	X	X	X	
FL220	427.9	X	X	X	X	X	
FL230	410.0	X	X	X	X	X	
FL240	392.7	X	X	X	X	X	
FL250	376.0	X	X	X	X	X	
FL260	359.9	X	X	X	X	X	
FL270	344.3	X	X	X	X	X	
FL280	329.3	X	X	X	X	X	
FL290	314.9	X	X	X	X	X	
FL300	300.9	X	X	X	X	X	
FL310	287.4	X	X	X	X		
FL320	274.5	X	X	X	X		
FL330	262.0	X	X	X	X		
FL340	250.0	X	X	X	X		
FL350	238.4	X	X	X	X		
FL360	227.3	X	X	X	X		
FL370	216.6	X	X	X	X		
FL380	206.5	X	X	X	X		

FL390	39000	X	196.8	X	X	X		
FL400	40000	X	187.5	X	X	X		
FL410	41000	X	178.7	X	X	X		
FL420	42000	X	170.4	X	X	X		
FL430	43000	X	162.4	X	X	X		
FL440	44000	X	154.7	X	X	X		
FL450	45000	X	147.5	X	X	X		
FL460	46000	X	140.6	X	X			
FL470	47000	X	134.0	X	X			
FL480	48000	X	127.7	X	X			
FL490	49000	X	121.7	X	X			
FL500	50000	X	116.0	X	X			
FL510	51000	X	110.5	X	X			
FL520	52000	X	105.3	X	X			
FL530	53000	X	100.4	X	X			
FL540	54000	X	95.7	X	X			
FL550	55000	X	91.2	X	X			
FL560	56000	X	87.0	X	X			
FL570	57000	X	82.8	X	X			
FL580	58000	X	79.0	X	X			
FL590	59000	X	75.2	X	X			
FL600	60000	X	71.7	X	X			

Data shown in blue is what is currently available.

Note: Data will be produced for exact pressure levels e.g. 392.7hPa for FL240 instead of the current 400hPa



WAFS GRIDDED DATA

<i>Upper-air grid point forecasts</i>	<i>1-hourly intervals</i>	<i>3-hourly intervals</i>	<i>6-hourly intervals</i>
Wind (56), temperature (56), geopotential altitude (56)	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24 hours*	27, 30, 33, 36, 39, 42, 45 and 48 hours*	54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114 and 120 hours* Note data from 72hours onward will only be produced for two of the four daily model runs.
Flight level and temperature of tropopause			
Direction, speed and flight level of maximum wind			
Humidity (14)			
Cumulonimbus extent, base and top	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24 hours*	27, 30, 33, 36, 39, 42, 45 and 48 hours*	Not provided
Icing (26)			
Turbulence (36)			

**after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based.*

The number in blue shows the number of vertical levels that will be available.

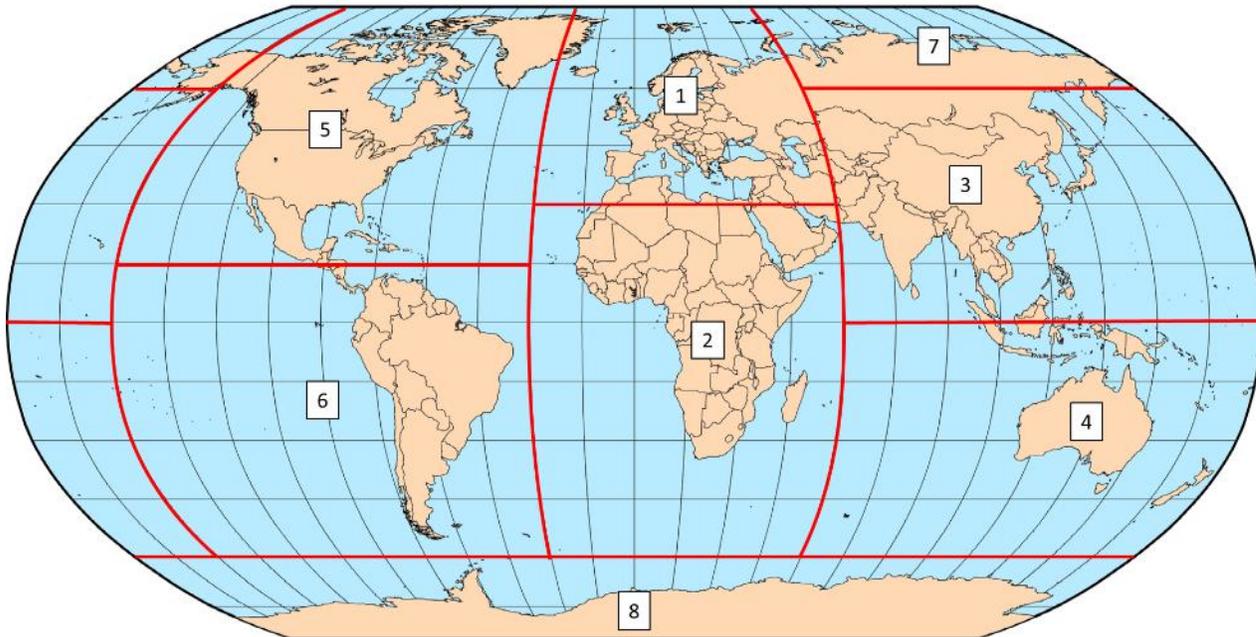


WAFS GRIDDED DATA

- The new data will all be provided at 0.25 degree resolution.
- The 1.25 degree wind, temperature, relative humidity, and tropopause and geopotential height data will still be provided for the levels and timesteps produced now (T+6 to T+36 at 3 hourly intervals)
- The way the data is distributed is also being updated.



- “Old way” SADIS FTP/WIFS – global data sets with limited choice of what users download.
- “New way” SADIS and WIFS API – users will be able to choose the specific data they are interested in.

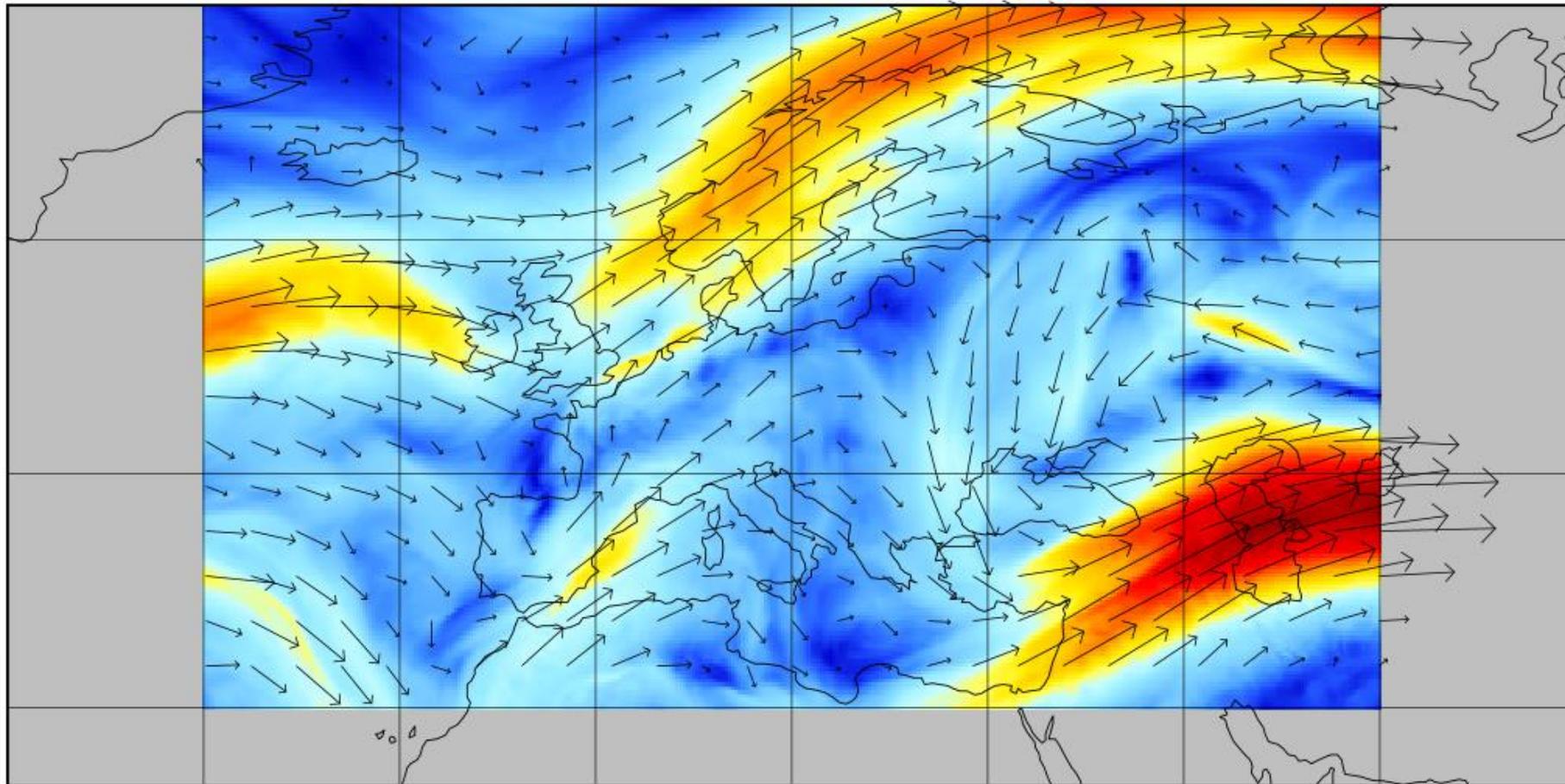


- Pre-set map areas will be available
- Users will be able to pick the timesteps of data that are needed. Initially they will get all vertical levels

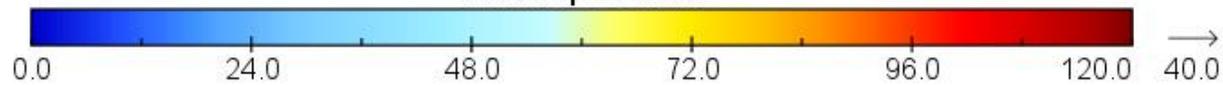


WAFC 0.25 Wind, FL340

Map tile Area 1



Wind speed KT





DATA DISTRIBUTION

- The next generation of SADIS, the SADIS API is in development to modernise the way that the WAFS data is provided.
- It uses the Open Geospatial Consortium (OGC) Environmental Data Retrieval API <https://ogcapi.ogc.org/edr/> framework. This is an industry standard protocol.
- Data is organised into a series of “collections”
- The SADIS API will adhere to the Eurocontrol SWIM yellow profile requirements <https://www.eurocontrol.int/concept/system-wide-information-management> and will be published in the SWIM registry <https://eur-registry.swim.aero/services>
- The WIFS API will be available for backup purposes and will adhere to very similar requirements. It will be published in the FAA SWIM registry <https://nsrr.faa.gov/>

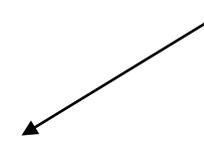


HOW WILL THE API WORK

Users make a request like this

https://xxxxx.api.metoffice.gov.uk/collections/egrr_wafs_windtempgeo_0p25/items/YUVDYA1015_017FLALL

Collection name



This is the ID for the data set:
Y = WAFS GRIB
UV = u and v wind
D = Deterministic
Y = 0.25 horizontal resolution
A1 = tile area 1
015-017 = forecast timesteps
FLALL = all flight levels.

- Access is controlled with authentication tokens

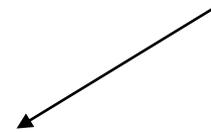


HOW WILL THE API WORK

Users make a request like this

https://xxxxx.api.metoffice.gov.uk/collections/egrr_wafs_windtempgeo_0p25/items/YUVDYA1015_017FLALL

Collection name



EGRR_	EGRR_	KWBC_	KWBC_
WAFS_windtempgeo_0p25	WAFS_windtempgeo_1p25	WAFS_windtempgeo_0p25	WAFS_windtempgeo_1p25
WAFS_humidity_0p25	WAFS_humidity_1p25	WAFS_humidity_0p25	WAFS_humidity_1p25
WAFS_tropjet_0p25	WAFS_tropjet_1p25	WAFS_tropjet_0p25	WAFS_tropjet_1p25
WAFSHZDS_blended_ice_0p25		WAFSHZDS_blended_ice_0p25	
WAFSHZDS_blended_turb_0p25		WAFSHZDS_blended_turb_0p25	
WAFSHZDS_blended_cb_0p25		WAFSHZDS_blended_cb_0p25	

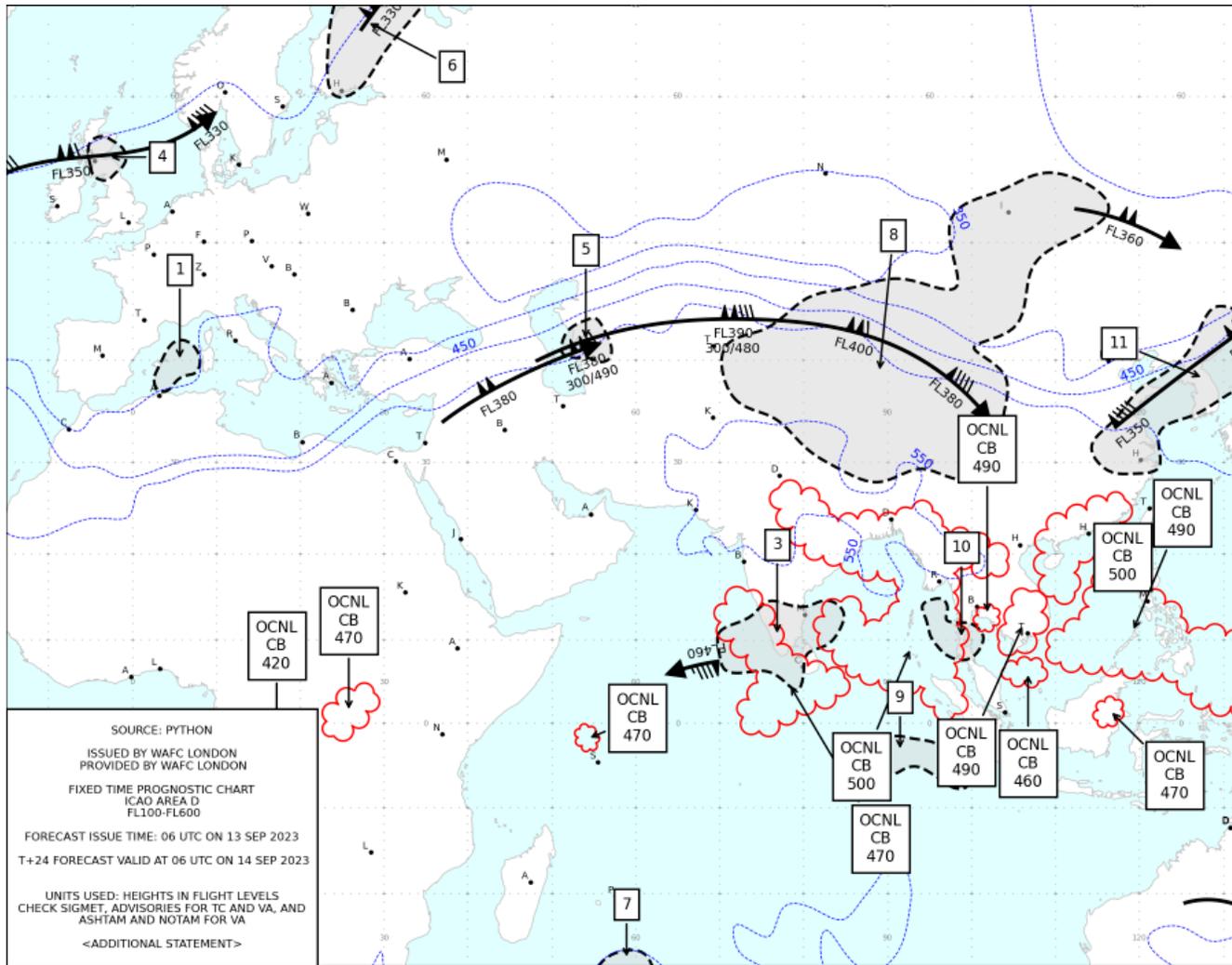


WAFS SIGWX FORECASTS ARE ALSO CHANGING....

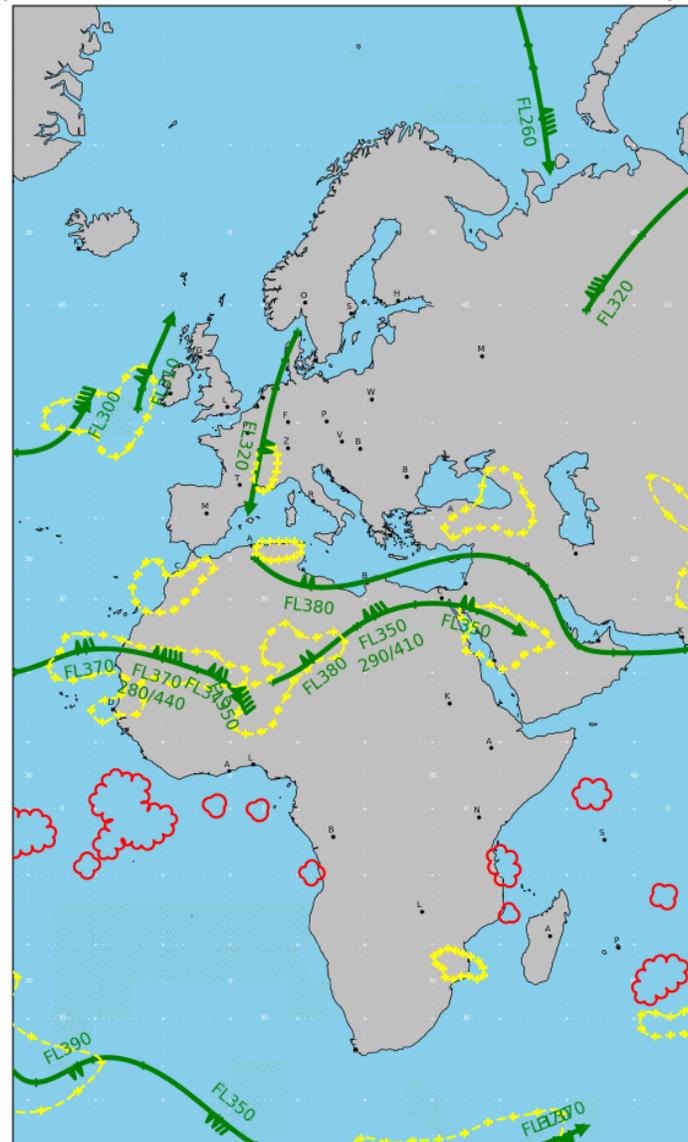
- SIGWX forecasts will no longer just be produced for T+24.
- New SIGWX forecasts will be provided for T+6 to T+48 at 3-hourly intervals
- The new SIGWX forecast will go from FL100 to FL600 (i.e. SWH and SWM merged)



METEOROLOGY PANEL



SigWx objects - WAFC: EGRR - Area: C - 2023-04-05 00Z T+06 forecast - Python objects





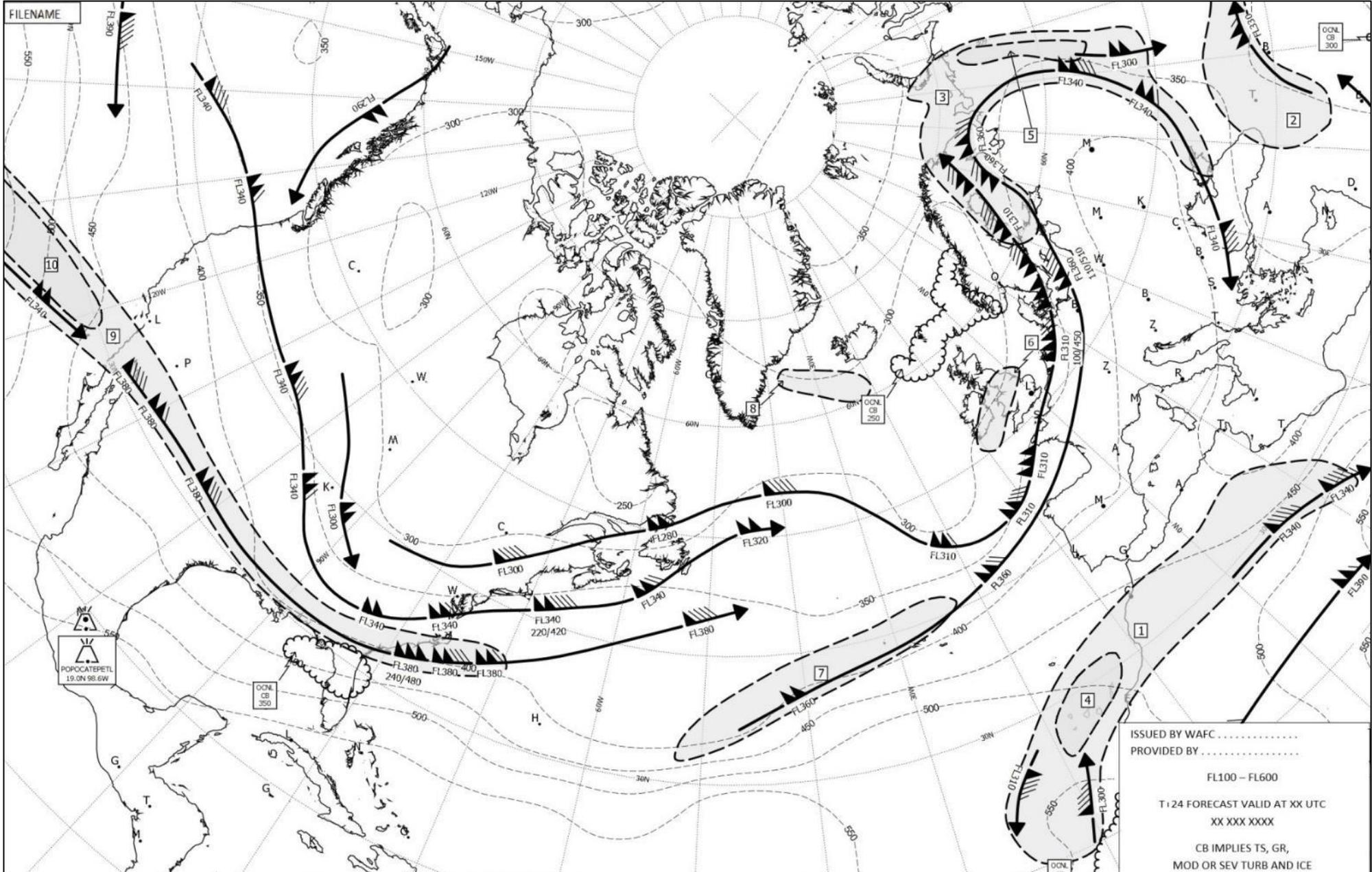
WAFS SIGWX FORECASTS

The content of SIGWX forecasts will change a little:

- Tropopause height as contours
- Icing areas provided for the entire globe
- Turbulence areas will use the new Turbulence Severity field (so CAT + orographic)
- Only areas of OCNL or FRQ CB will be forecast
- Tropical cyclone positions only available until T+24

“Paper copy” (.png) charts will only be provided for ICAO areas A, B, B1, C, D, E, F, G, H, I, J, K, L and M (i.e. the old SWH areas) at T+24, and until 2028 on SADIS FTP.

FILENAME



TURBULENCE AREAS NOT ASSOCIATED WITH CONVECTIVE CLOUD

1	380 XXX	2	380 XXX	3	390 XXX	4	O/NL CB 370 280	5	O/NL CB 340 XXX	6	300 XXX	7	390 290	8	310 XXX	9	450 XXX	10	O/NL CB 350 XXX
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ISSUED BY WADC

PROVIDED BY

FL100 – FL600

T+24 FORECAST VALID AT XX UTC
XX XXX XXXX

CB IMPLIES TS, GR,
MOD OR SEV TURB AND ICE

UNITS USED: HEIGHTS IN FLIGHT LEVELS

CHECK SIGMET, ADVISORIES FOR TC AND VA
AND ASHTAM AND NOTAM FOR VA



WAFS SIGWX FORECASTS

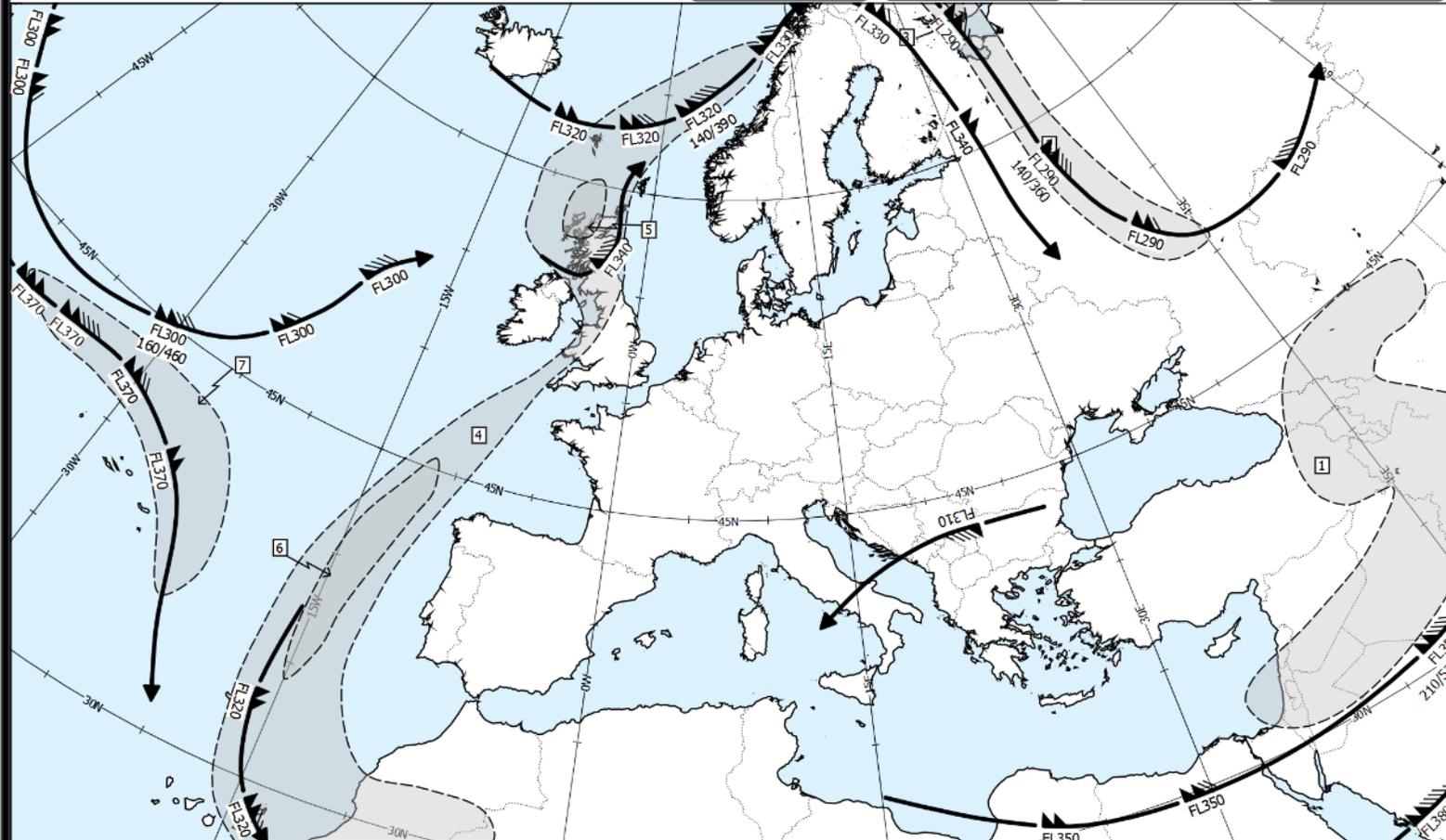
- Benefits of the new SIGWX forecasts
 - Better suited to the needs of the aviation industry particularly for short haul and ultra long haul flights.
 - The gridded and SIGWX data sets will be consistent with each other
 - Designed for digital use, where users will be able to control the content that is shown on the chart (toggling layers on and off, changing time-step, colour schemes)

WAFS SIGWX - FL100-FL600

CB IMPLIES TS, GR, MOD OR SEV TURB AND ICE
UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR TC AND VA AND ASHTAM AND NOTAM FOR VA

<< **T+12** >>
VT 18 UTC 15/02/2019

- Jetstream
- Tropopause
- Icing
- Overlays
- Turbulence
- CB
- VA/TC/N
- Flightpath



TURBULENCE

1	400 270	2	350 XXX	3	OCIL 300 XXX	4	380 XXX	5	OCIL 340 260	6	OCIL 340 260	7	450 290
---	------------	---	------------	---	--------------------	---	------------	---	--------------------	---	--------------------	---	------------

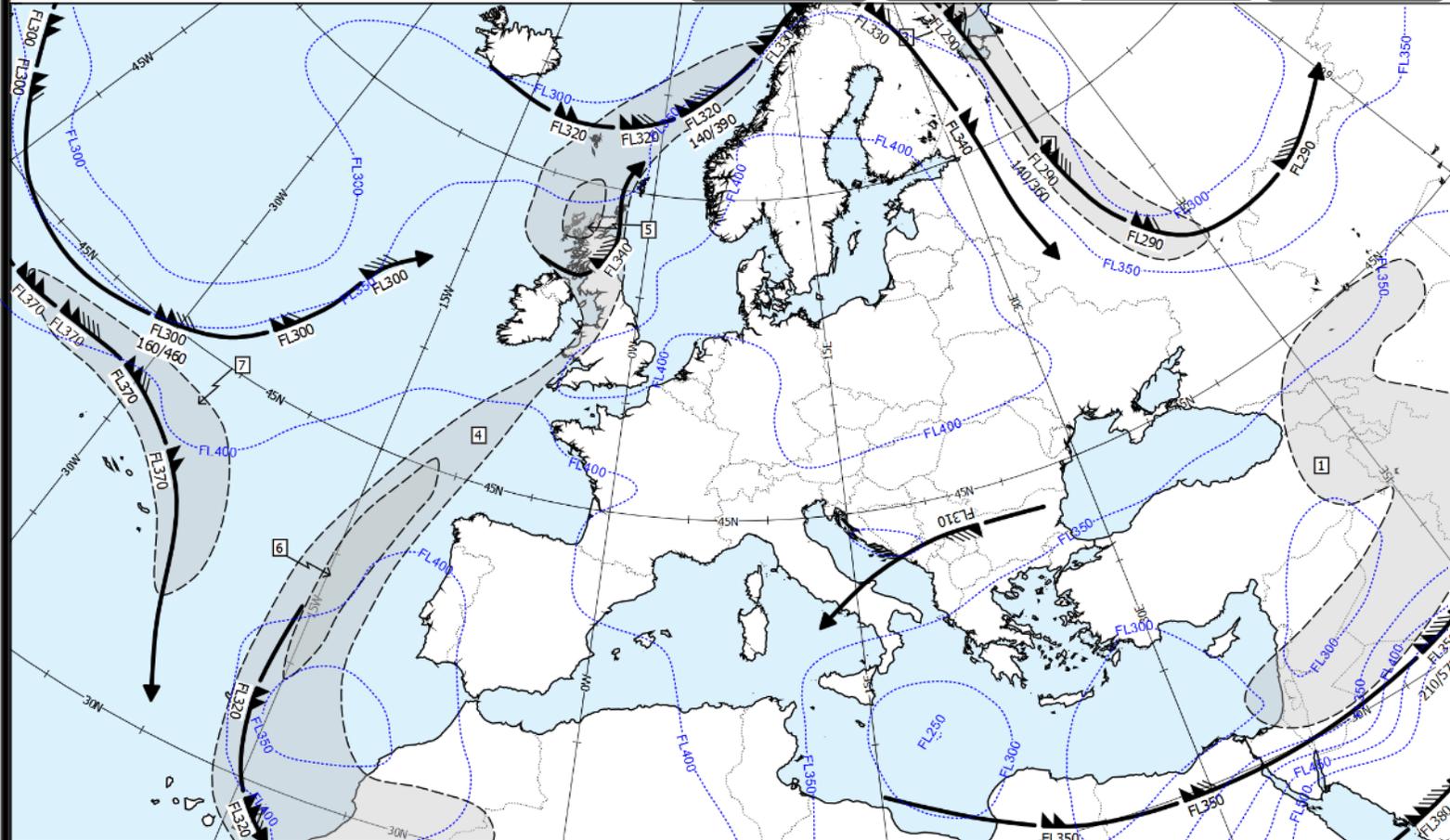
MODEL RUN TIME: 06UTC 15/02/2018
DATA PROVIDED BY WAFS LONDON

WAFS SIGWX - FL100-FL600

CB IMPLIES TS, GR, MOD OR SEV TURB AND ICE
UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR TC AND VA AND ASHTAM AND NOTAM FOR VA

<< **T+12** >>
VT 18 UTC 15/02/2019

- Jetstream
- Tropopause
- Icing
- Overlays
- Turbulence
- CB
- VA/TC/N
- Flightpath



TURBULENCE

1	400 270	2	350 XXX	3	OCIL 300 XXX	4	380 XXX	5	OCIL 340 260	6	OCIL 340 260	7	450 290
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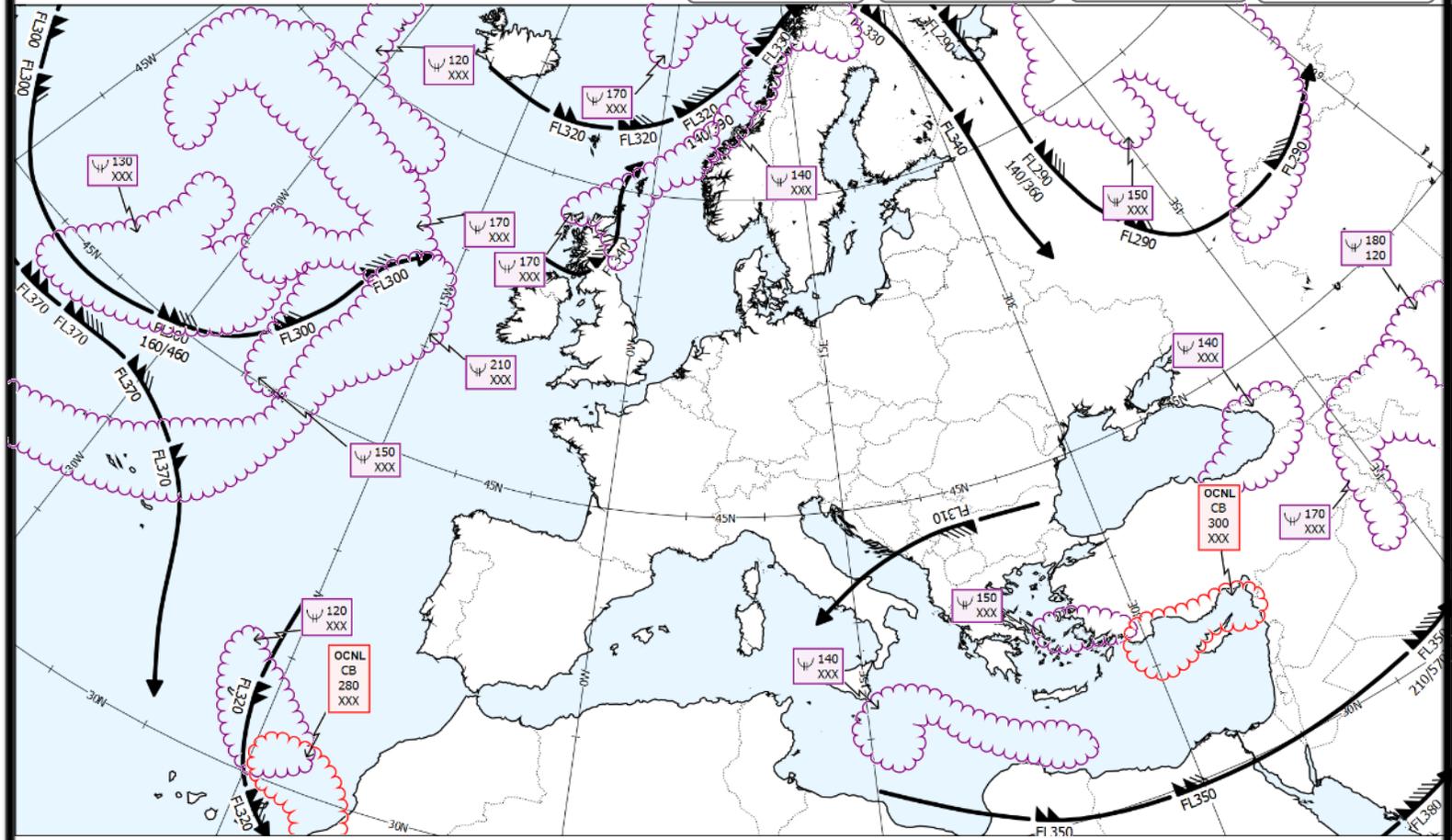
MODEL RUN TIME: 06UTC 15/02/2018
DATA PROVIDED BY WAFS LONDON

WAFS SIGWX - FL100-FL600

CB IMPLIES TS, GR, MOD OR SEV TURB AND ICE
UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR TC AND VA AND ASHTAM AND NOTAM FOR VA

<< **T+12** >>
VT 18 UTC 15/02/2019

- | | | | |
|------------|------------|---------|------------|
| Jetstream | Tropopause | Icing | Overlays |
| Turbulence | CB | VA/TC/N | Flightpath |



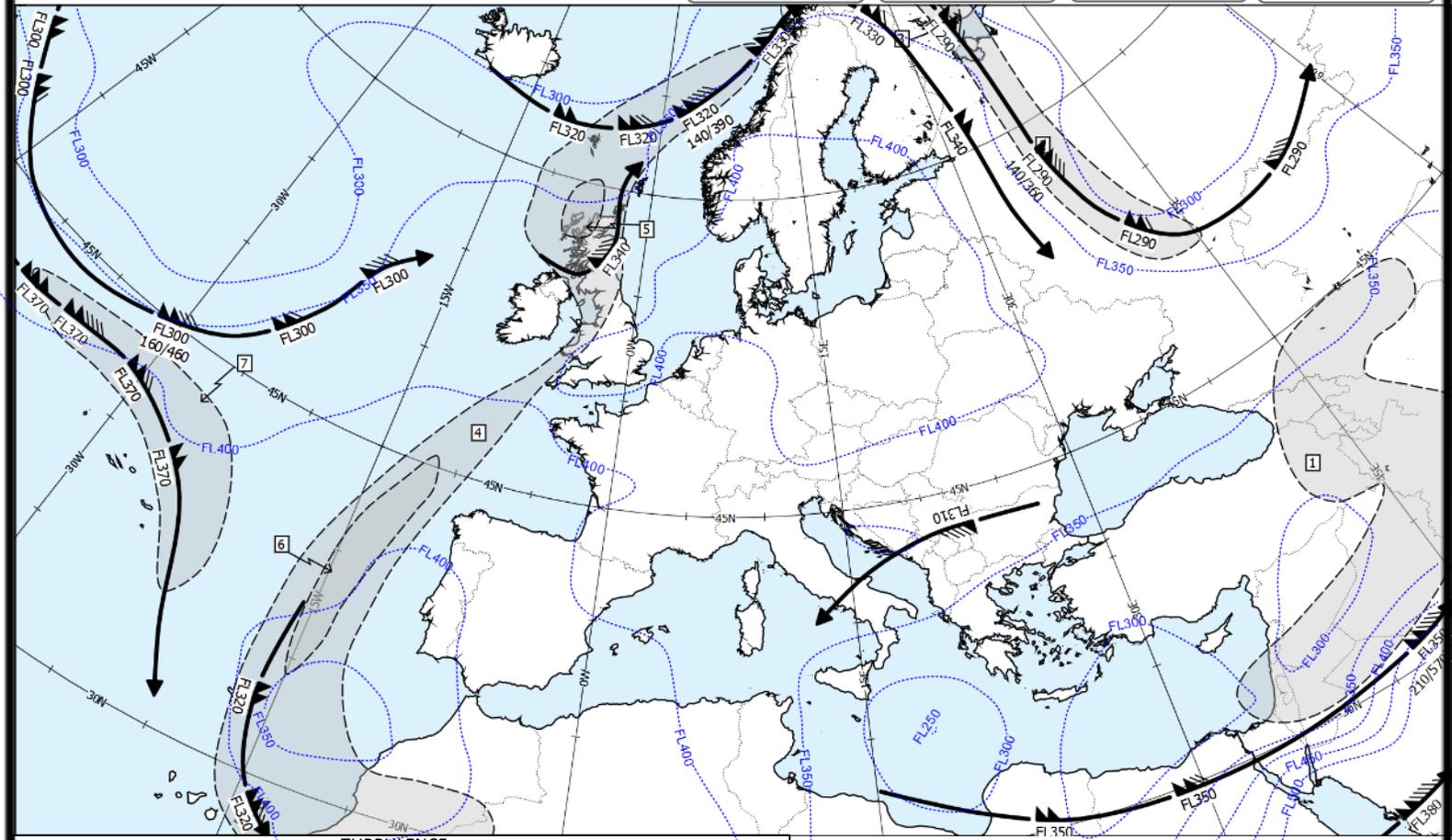
MODEL RUN TIME: 06UTC 15/02/2018
DATA PROVIDED BY WAFS LONDON

WAFS SIGWX - FL100-FL600

CB IMPLIES TS, GR, MOD OR SEV TURB AND ICE
UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR TC AND VA AND ASHTAM AND NOTAM FOR VA

<< **T+12** >>
VT 18 UTC 15/02/2019

- Jetstream
- Tropopause
- Icing
- Overlays
- Turbulence
- CB
- VA/TC/N
- Flightpath



TURBULENCE

1	400 270	2	350 XXX	3	OCIL 300 XXX	4	380 XXX	5	OCIL 340 260	6	OCIL 340 260	7	450 290
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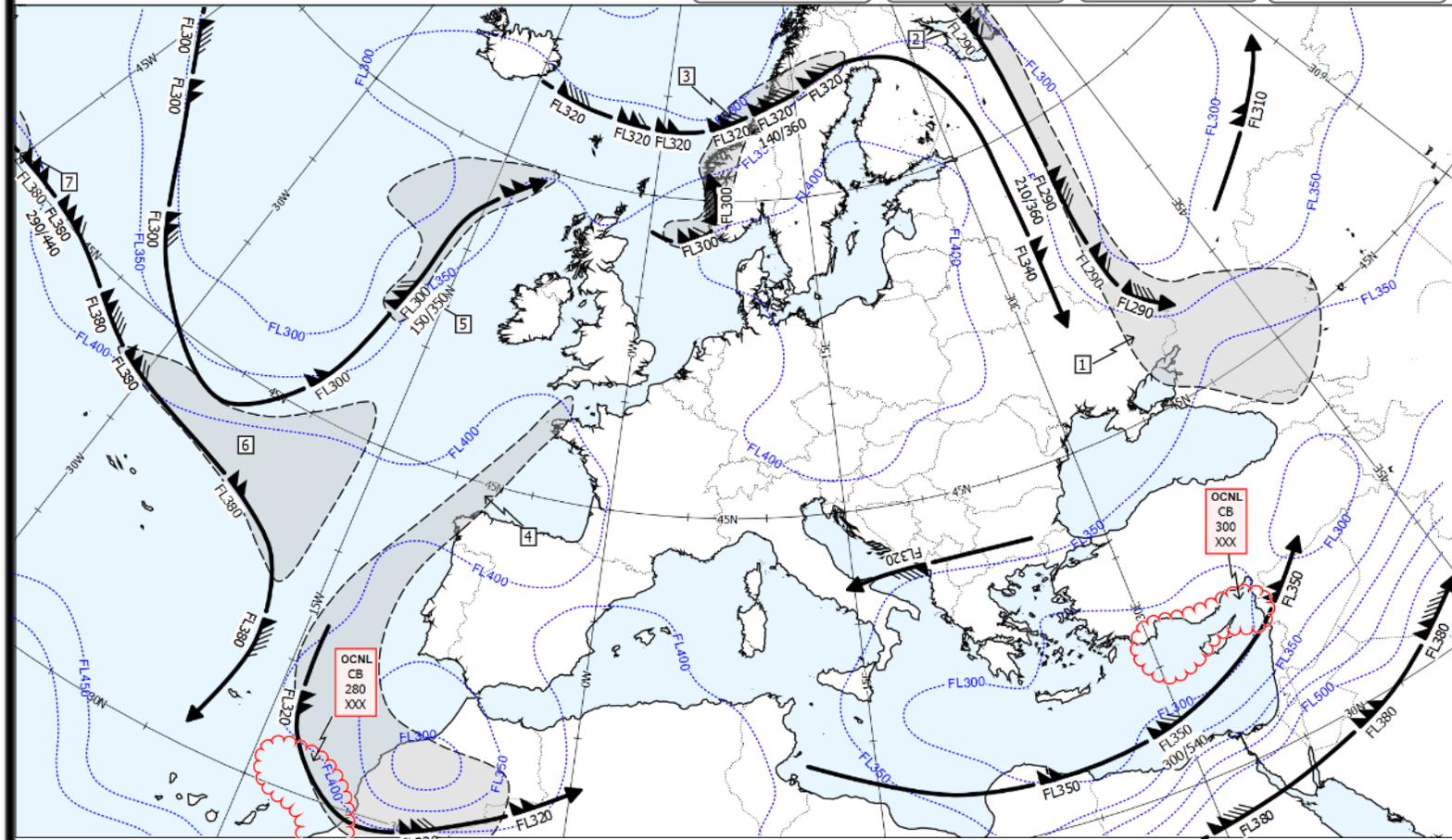
MODEL RUN TIME: 06UTC 15/02/2018
DATA PROVIDED BY WAFS LONDON

WAFS SIGWX - FL100-FL600

CB IMPLIES TS, GR, MOD OR SEV TURB AND ICE
 UNITS USED: HEIGHTS IN FLIGHT LEVELS
 CHECK SIGMET, ADVISORIES FOR TC AND VA AND ASHTAM AND NOTAM FOR VA

<< **T+18** >>
 VT 00 UTC 16/02/2019

- Jetstream
- Tropopause
- Icing
- Overlays
- Turbulence
- CB
- VA/TC/N
- Flightpath



TURBULENCE
 1 350 XXX 2 360 XXX 3 380 XXX 4 360 XXX 5 420 280 6 420 280

MODEL RUN TIME: 06UTC 15/02/2018
 DATA PROVIDED BY WAFS LONDON



WAFS SIGWX AND OPMET DATA

- The new SIGWX will be provided in IWXXM format using a new IWXXM schema that has been developed and approved by WMO <https://schemas.wmo.int/iwxxm/2023-1/WAFSSigWxFC.xsd>
- Example/test SIGWX forecasts in IWXXM format are available here: <https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-sigwx-test-data>
- The SWIM compliant SADIS and WIFS APIs for WAFS SIGWX forecasts is expected to become operational in July 2024.



VERY IMPORTANT

- Medium level SIGWX forecasts (BUFR and charts) will be retired in July 2024
- The T+24 BUFR SIGWX will be phased out in July 2026
- All remaining “paper copy” charts will be phased out in Nov 2028 when SADIS FTP and WIFS is retired.
- SIGWX flyer contains all the important information

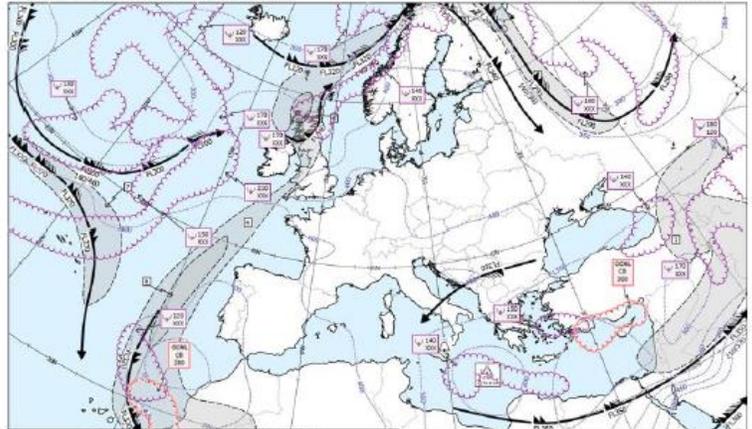
JULY 2024

Changes to WAFS SIGWX Forecasts

JULY 2024

In early July 2024 the WAFS SIGWX products will be changing as the World Area Forecast Centres introduce multi-timestep SIGWX forecasts that spans FL100 to FL600 for the first time. The following forecast time-steps will be produced: 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.

ISSUED BY WAFS LONDON, PROVIDED BY XXXX
FIXED TIME PROGNOSTIC CHART, SIGWX FL100-FL800
FORECAST ISSUE TIME: 12 UTC 15 FEB 2023 T+18
FORECAST VALID AT 06 UTC ON 16 FEB 2023



TURBULENCE NOT ASSOCIATED WITH CUMULONIMBUS
CB IMPLIES TS, GR, MOD OR SEV TURB AND ICE

UNITS USED: HEIGHTS IN FLIGHT LEVELS
CHECK SIGMET, ADVISORIES FOR TC AND VA, AND ASHTAM AND NOTAM FOR VA

IWXXM FORMAT

The new SIGWX forecasts will be provided in IWXXM format. Test data sets are updated regularly and available here: <https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-sigwx-test-data>

IWXXM schema information is available here: <https://schemas.wmo.int/iwxm/2023-1RC1/>

VISUALISING THE NEW SIGWX DATA

Users should set up their systems to visualise the IWXXM data, and allow individual layers to be toggled on and off. Existing SIGWX display conventions mostly still apply.

Suggested visualisation colour scheme:

- Jet Stream – black
- Tropopause contours (NEW) – blue dashed line
- Turbulence areas – black dashed outer line, shaded grey
- Cumulonimbus areas – red scalloped line (no CB base info)
- Icing areas – purple scallops
- Volcano and tropical cyclone markers – black or red.

A set of three charts will be provided to enable users to check their systems are visualising the SIGWX data properly. These are not to be used for flight briefing documents. Flight briefing documents need to be created from the IWXXM data sets according to local user requirements.



OPMET DATA ON SADIS

- SADIS and WIFS also provide OPMET products (METAR/TAF/SIGMET etc) and these will also be made available via the new SADIS and WIFS APIs. Data will be available in both TAC and IWXXM formats where available.
- Data is organised into collections:

Id	tac_opmet_reports	iwxxm_opmet_reports	tac_advisory_reports	iwxxm_advisory_reports	graphical_reports	Notices
output format	TAC	IWXXM	TAC	IWXXM	PNG	TAC
parameter names	TAF, METAR, SPECI, SIGMET (all types), AIRMET, GAMET, AIREP	TAF, METAR, SPECI, SIGMET (all types), AIRMET	SWA, VAA, TCA, NEM, NOTAM-ASHTAM	SWA, VAA, TCA	VAG, TCG	Relevant “NO” messages.



OPMET DATA ON SADIS

- The “tac_opmet_reports” and “iwxxm_opmet_reports” will be available globally and for six pre-set geographical regions: EUR-NAT, NAM-CAR, SAM, AFI, MID and ASI-PAC
- Data will be published at 5 minute intervals, and 36 hours worth of data will be held on the system in case users need to recover lost data:

Users will make a request like this:

https://gateway.api.management.metoffice.cloud/ads-sadis-opmet/1/collections/iwxxm_advisory_reports/locations/GLOBAL?datetime=PT5M--2007-12-14T15:30

Collection name

5 minute period data is required for



TIMELINES

November 2023

- WAFS gridded data upgrade
- SADIS and WIFS API's and gridded data become operational

February 2024

- SADIS and WIFS API's for OPMET data becomes operational

July 2024

- Introduction of multi timestep WAFS SIGWX forecasts in IWXXM format.
- SADIS and WIFS API's for SIGWX data

July 2026

- Retirement of BUFR format SIGWX

November 2027

- Introduction of probabilistic WAFS forecasts (hazards), made available through the SADIS and WIFS API's

November 2028

- Retirement of SADIS FTP including the T+24 "paper copy" charts



METEOROLOGY PANEL



Additional information on the upcoming WAFS changes is available here:

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

Thank you for listening.

https://beta.aviationweather.gov/wifs/data/IWXXM_TEST/

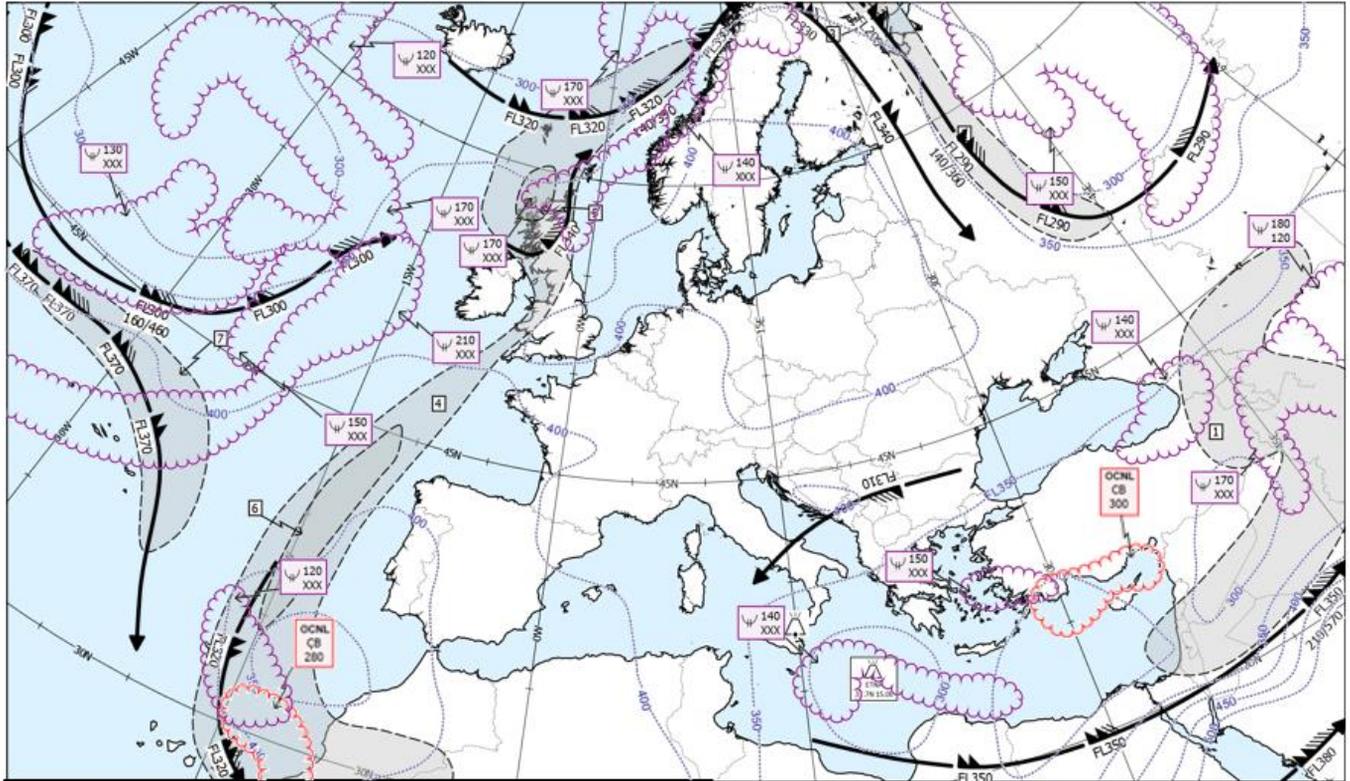
In early July 2024 the WAFS SIGWX products will be changing as the World Area Forecast Centres introduce multi-timestep SIGWX forecasts that spans FL100 to FL600 for the first time.

The following forecast time-steps will be produced:

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.

ISSUED BY WAFS LONDON, PROVIDED BY XXXX
FIXED TIME PROGNOSTIC CHART. SIGWX FL100-FL600

FORECAST ISSUE TIME: 12UTC 15 FEB 2023 T+18
FORECAST VALID AT 06UTC ON 16 FEB 2023



TURBULENCE NOT ASSOCIATED WITH CUMULONIMBUS



CB IMPLIES TS, GR, MOD OR SEV TURB AND ICE

UNITS USED: HEIGHTS IN FLIGHT LEVELS

CHECK SIGMET, ADVISORIES FOR TC AND VA, AND ASHTAM AND NOTAM FOR VA

IWXXM FORMAT

The new SIGWX forecasts will be provided in IWXXM format.

Test data sets are updated regularly and available here: <https://www.metoffice.gov.uk/services/transport/aviation/regulated/wafs-sigwx-test-data>

IWXXM schema information is available here: <https://schemas.wmo.int/iwxm/2023-1RC1/>

VISUALISING THE NEW SIGWX DATA

Users should set up their systems to visualise the IWXXM data, and allow individual layers to be toggled on and off. Existing SIGWX display conventions mostly still apply.

Suggested visualisation colour scheme:

- Jet Stream – black
- Tropopause contours (NEW) – blue dashed line
- Turbulence areas – black dashed outer line, shaded grey
- Cumulonimbus areas – red scalloped line (no CB base info)
- Icing areas – purple scallops
- Volcano and tropical cyclone markers – black or red.

A set of three charts will be provided to enable users to check their systems are visualising the SIGWX data properly. These are not to be used for flight briefing documents. **Flight briefing documents need to be created from the IWXXM data sets according to local user requirements.**



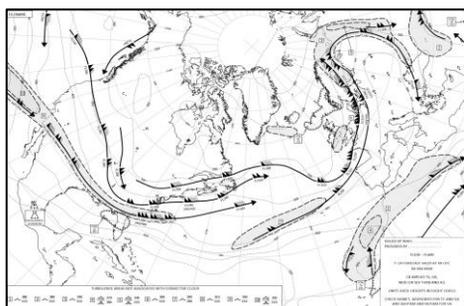
IMPORTANT: The following medium level SIGWX forecast data sets will be retired in July 2024

Charts

PGNE14 KKCI (NAT)
PGZE14 EGRR (ASIA SOUTH)
PGDE14 EGRR (EURO)
PGCE14 (MEA)

SWM BUFR

JUJE00 EGRR/KKCI
JUME00 EGRR/KKCI
JUNE00 EGRR/KKCI
JUOE00 EGRR/KKCI
JUTE00 EGRR/KKCI



If you have questions please e-mail your service provider:
wifs.admin@noaa.gov or
SADISManager@metoffice.gov.uk

HOW TO GET THE NEW SIGWX DATA

By the end of 2023 the WAFC's intend to invite SADIS and WIFS users to try out the SIGWX element of the SADIS API or the WIFS API. This beta service will be available until the go live data in July 2024.

Both WAFC's are working together to provide a consistent API offering. It will use the framework of the Open Geospatial Consortium (OGC) Environmental Data Retrieval API
<https://ogcapi.ogc.org/edr/>
and will be SWIM compliant.

Data available on SADIS FTP and WIFS after July 2024

T+24 (SWH) BUFR Data

JUBE99, JUCE00, JUVE00, JUWE96, JUFE00, JUTE97 EGRR and KKCI files.

Note: data will be labelled as SWH but will encompass FL100 to FL600. The JUTE97 tropopause file will not contain data as BUFR cannot handle tropopause contour data.

T+24 png format charts

PGEE05 KKCI (Area A), PGSE05 EGRR (Area B), PGIE05 KKCI (Area B1), PGRE05 EGRR (Area C), PGZE05 EGRR (Area D), PGGE05 EGRR (Area E), PGGE05 KKCI (Area F), PGCE05 EGRR (Area G), PGAE05 EGRR (Area H), PGAE05 KKCI (Area H), PGBE05 KKCI (Area I), PGJE05 KKCI (Area J), PGKE05 EGRR (Area K), PGDE29 KKCI (Area M)

There will be some changes to the appearance of the png charts:

- They will be valid for FL100 to FL600
- CB bases will not be shown
- tropopause spot heights will become contours
- turbulence areas will look a little different and will include orographic turbulence as well as CAT.

IMPORTANT: The BUFR data sets will be retired in July 2026, and the png format charts will be retired in 2028.

WHAT DO YOU NEED TO DO

1. Make sure that your software provider is aware of the upcoming changes and make sure that their software will be able to visualise the IWXXM data.
2. Try to visualise the test IWXXM data sets that have been provided.
3. Make the relevant teams in your organisation aware of the need to download data from the SADIS API or WIFS API systems.
4. Look out for the announcements by WAFC London and WAFC Washington inviting you to try out the new SADIS API or WIFS API beta systems in late 2023 or early 2024

Note: The SADIS API and WIFS API that delivers WAFS gridded data sets will use the same API technology and will be available for operational use from November 2024.