METEOROLOGY PANEL

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

Presented by Karen Shorey – SADIS and WAFS manager, UK Met Office.

WAFS CHANGES COMING IN NOVEMBER 2023….

- 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

- Changes will be implemented with Amendment 81 to ICAO Annex 3. November 2023.
- The proposed changes to Annex 3 were agreed at the ICAO Met Panel Meeting in June 2021, and are now being taken to the ICAO Air Navigation Commission for approval/consultation.

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.

WAFS GRIDDED DATA

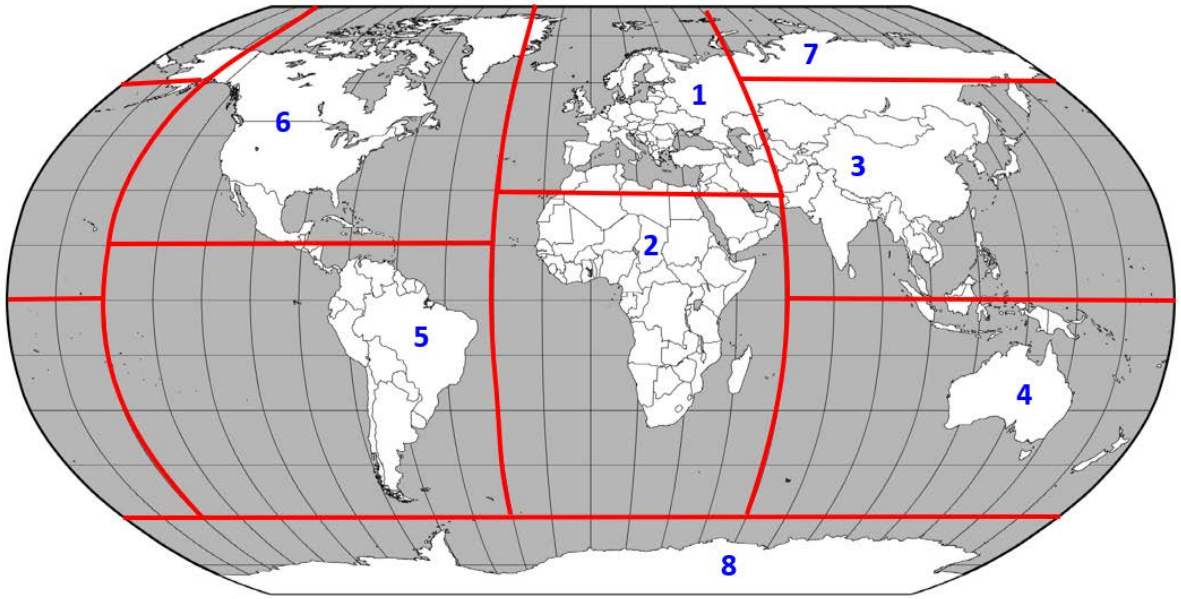
Upper-air grid point forecasts	*1-hourly intervals*	*3-hourly intervals*	*6-hourly intervals*
Wind, temperature, geopotential altitude	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23 and 24 hours*	27, 30, 33, 36, 39, 42, 45 and 48 hours*	54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114 and 120 hours*
Flight level and temperature of tropopause			
Direction, speed and flight level of maximum wind			
Humidity			
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			
Turbulence			

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

WAFS GRIDDED DATA

- The new data will all be provided at 0.25 degree resolution.
- We will also keep providing 1.25 degree wind, temperature, relative humidity, and geopotential height data for the levels and timesteps we produce now (T+6 to T+36 at 3 hourly intervals)
- We are also upgrading the way we distribute the data.

- "Old way" – global data sets with limited choice of what you download.
- "New way" – you will be able the specific data you are interested in.

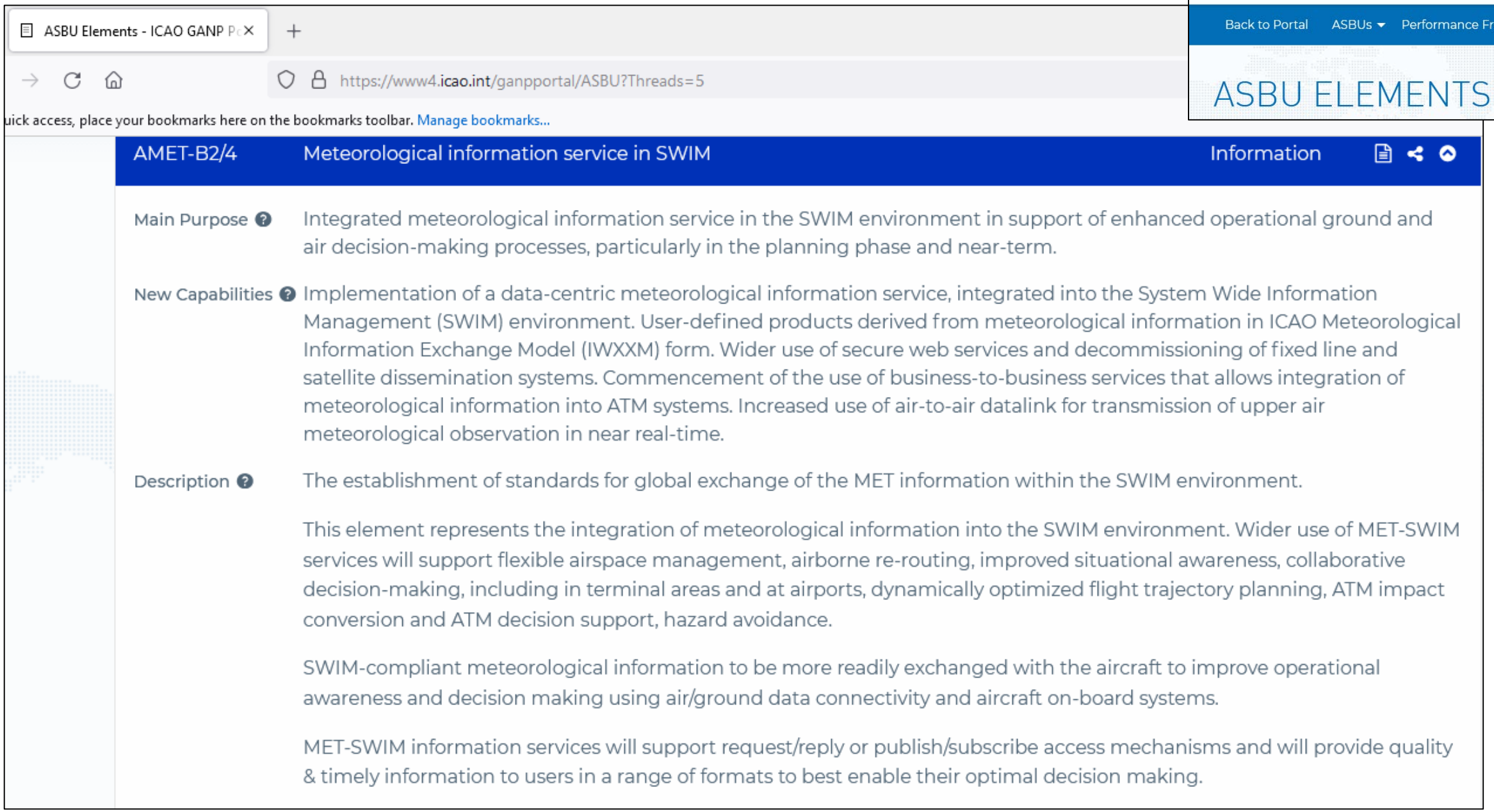


- Pre-set map areas will be available
- Ability to define your own map area (e.g to cover your FIR or a specific region of interest)
- Ability to pick the timesteps and levels of data that you want.

HOW ARE WE GOING TO DO THIS ….

- Next generation of SADIS “SADIS API” is currently in development to modernise the way that the WAFS data is provided.

- We will use API’s (Application Programmer Interface) which will allow the SADIS API to talk to your system. It will use industry standard protocols and be SWIM compliant. For example: https://ogcapi.ogc.org/edr/


ASBU Elements - ICAO GANP
https://www4.icao.int/ganpportal/ASBU?Threads=5
uick access, place your bookmarks here on the bookmarks toolbar. Manage bookmarks...
ICAO GANP PORTAL
Back to Portal
ASBUs
Performance Framework
ASBU ELEMENTS
AMET-B2/4
Meteorological information service in SWIM
Information
Main Purpose
Integrated meteorological information service in the SWIM environment in support of enhanced operational ground and air decision-making processes, particularly in the planning phase and near-term.
New Capabilities
Implementation of a data-centric meteorological information service, integrated into the System Wide Information Management (SWIM) environment. User-defined products derived from meteorological information in ICAO Meteorological Information Exchange Model (IWXXM) form. Wider use of secure web services and decommissioning of fixed line and satellite dissemination systems. Commencement of the use of business-to-business services that allows integration of meteorological information into ATM systems. Increased use of air-to-air datalink for transmission of upper air meteorological observation in near real-time.
Description
The establishment of standards for global exchange of the MET information within the SWIM environment.
This element represents the integration of meteorological information into the SWIM environment. Wider use of MET-SWIM services will support flexible airspace management, airborne re-routing, improved situational awareness, collaborative decision-making, including in terminal areas and at airports, dynamically optimized flight trajectory planning, ATM impact conversion and ATM decision support, hazard avoidance.
SWIM-compliant meteorological information to be more readily exchanged with the aircraft to improve operational awareness and decision making using air/ground data connectivity and aircraft on-board systems.
MET-SWIM information services will support request/reply or publish/subscribe access mechanisms and will provide quality & timely information to users in a range of formats to best enable their optimal decision making.

HOW ARE WE GOING TO DO THIS ….

- We will use API's (Application Programmer Interface) which will allow the SADIS API to talk to your system. It will use industry standard protocols and be SWIM compliant.
  1) REST – user makes a specific request to the SADIS API and gets a response back telling them where to pick up the data "package" from
  2) Streaming (AMQP) – constant flow of published data that can be picked up. Users subscribe to the streams of data that interest them.

- We will adhere to the https://www.eurocontrol.int/concept/system-wide-information-management "Yellow Profile" requirements for the SADIS API.

WAFS SIGWX FORECASTS ARE ALSO CHANGING….

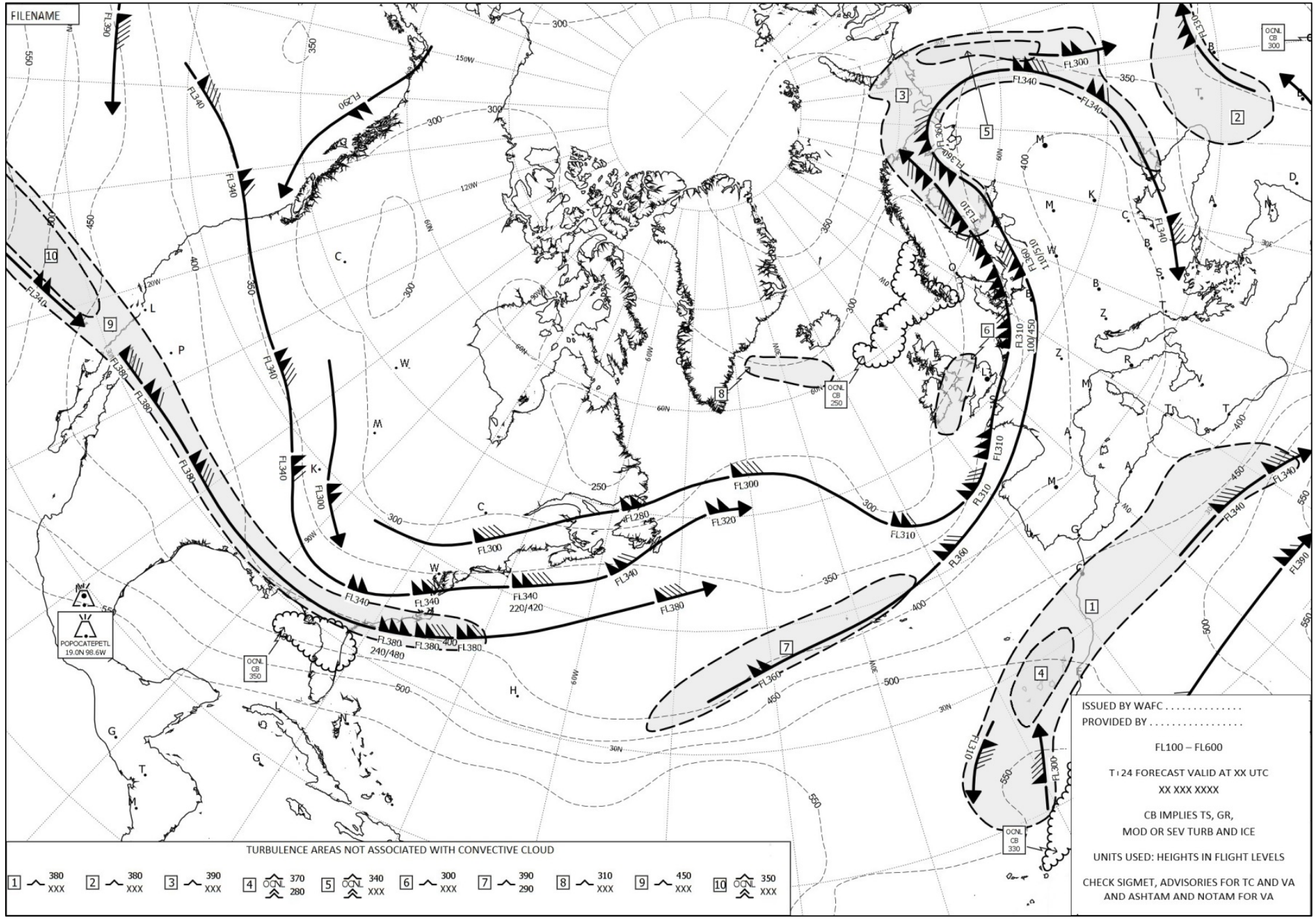
- SIGWX forecasts will no longer just be produced for T+24.
- New SIGWX will be provided for T+6 to T+48 at 3-hourly intervals
- The new SIGWX forecast will go from FL100 to FL600 (i.e. SWH and SWM merged)

- Introduction of a new IWXXM format https://schemas.wmo.int/iwxxm/2021-2RC1/WAFSSigWxFC.xsd.
  - Undergoing final approvals process by WMO
  - Example/test SIGWX forecasts in IWXXM format will be provided in Nov 2021.

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 MOD 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.


FILENAME
POPOCATEPETL
19.0N 98.6W
ISSUED BY WAFC . . . . . .
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
TURBULENCE AREAS NOT ASSOCIATED WITH CONVECTIVE CLOUD
1 380 XXX
2 380 XXX
3 390 XXX
4 OCNL 370 280
5 OCNL 340 XXX
6 300 XXX
7 390 290
8 310 XXX
9 450 XXX
10 OCNL 350 XXX

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)

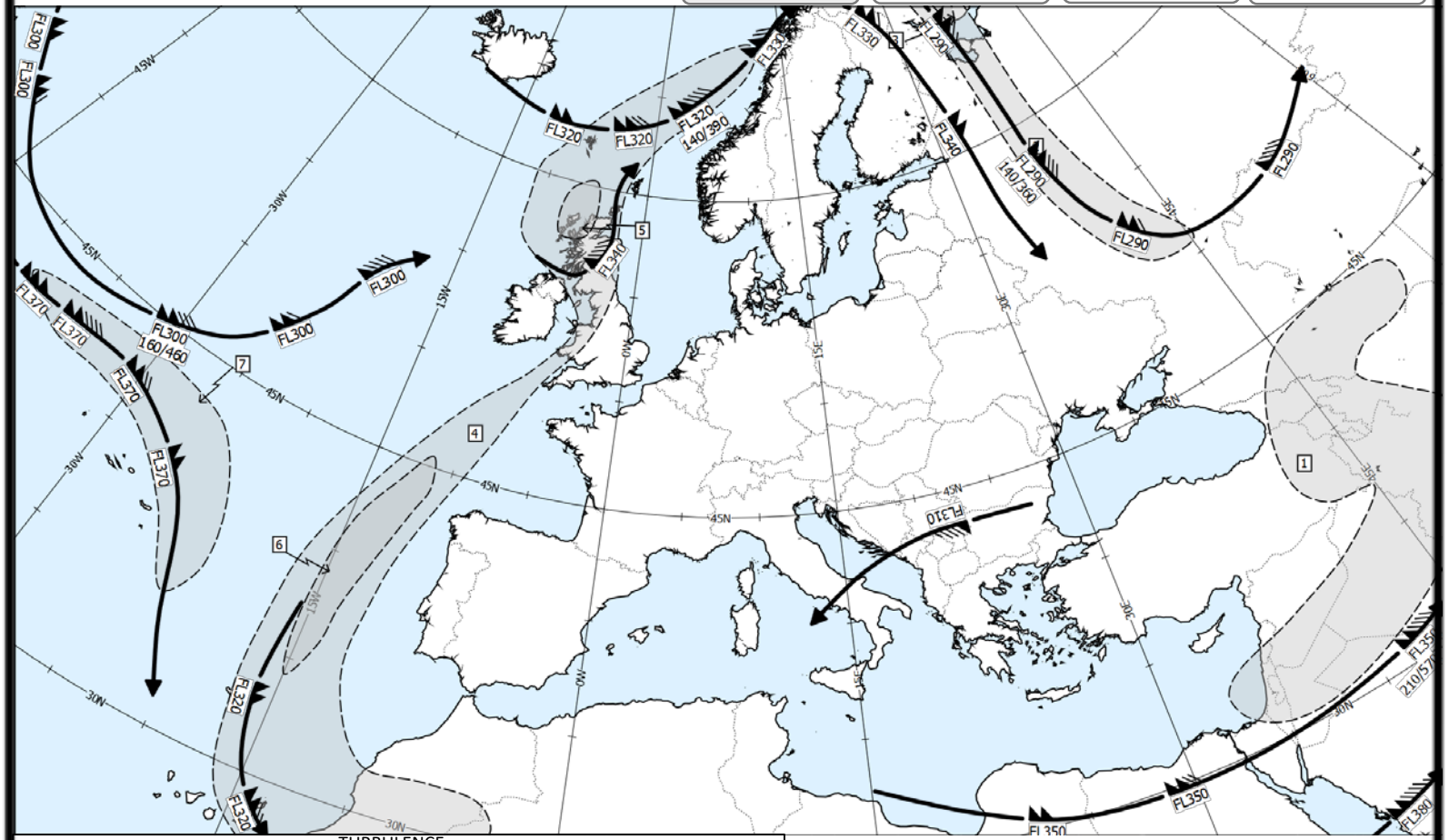
Important note: SIGWX in BUFR format will be phased out in Nov 2025, and all "paper copy" SIGWX charts will be phased out by Nov 2028.

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 OCNL 300/XXX | 4 380/XXX | 5 OCNL 340/260 | 6 OCNL 340/260 | 7 450/290

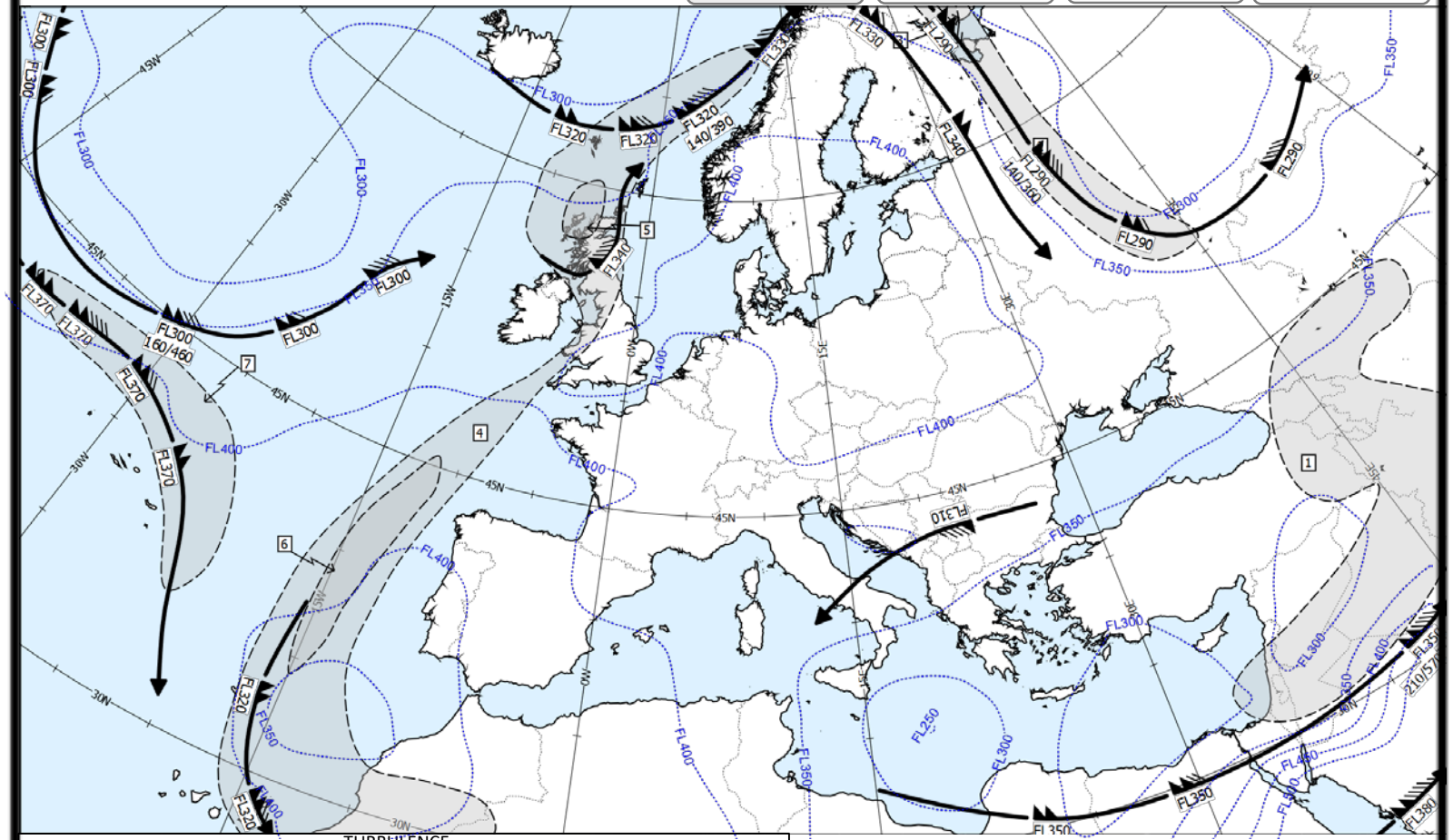
MODEL RUN TIME: 06UTC 15/02/2018
DATA PROVIDED BY WAFC LONDON

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 OCNL 300 XXX | 4 380 XXX | 5 OCNL 340 260 | 6 OCNL 340 260 | 7 450 290

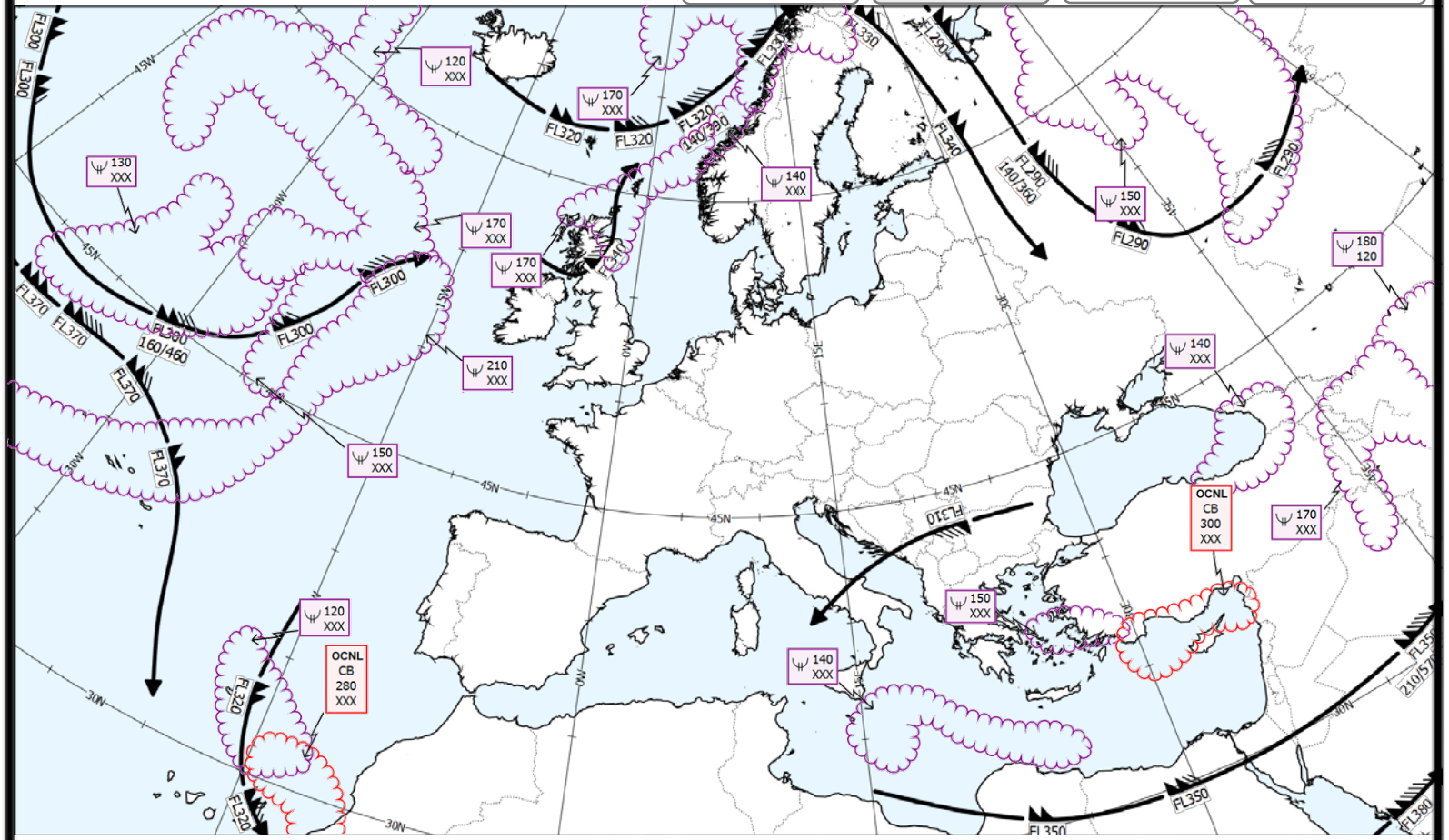
MODEL RUN TIME: 06UTC 15/02/2018
DATA PROVIDED BY WAFC LONDON

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

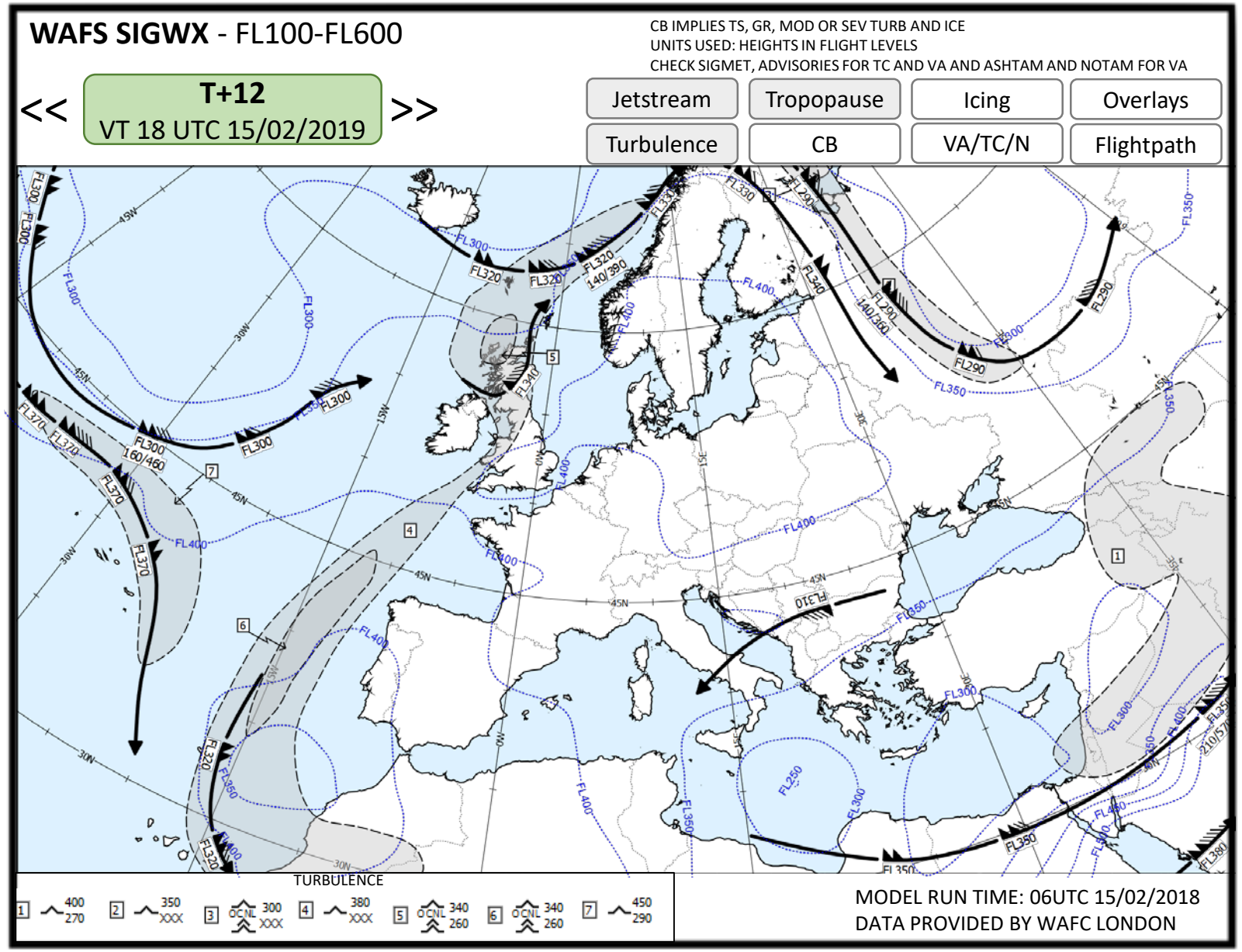
<< **T+12** VT 18 UTC 15/02/2019 >>

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



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

Change Timestep

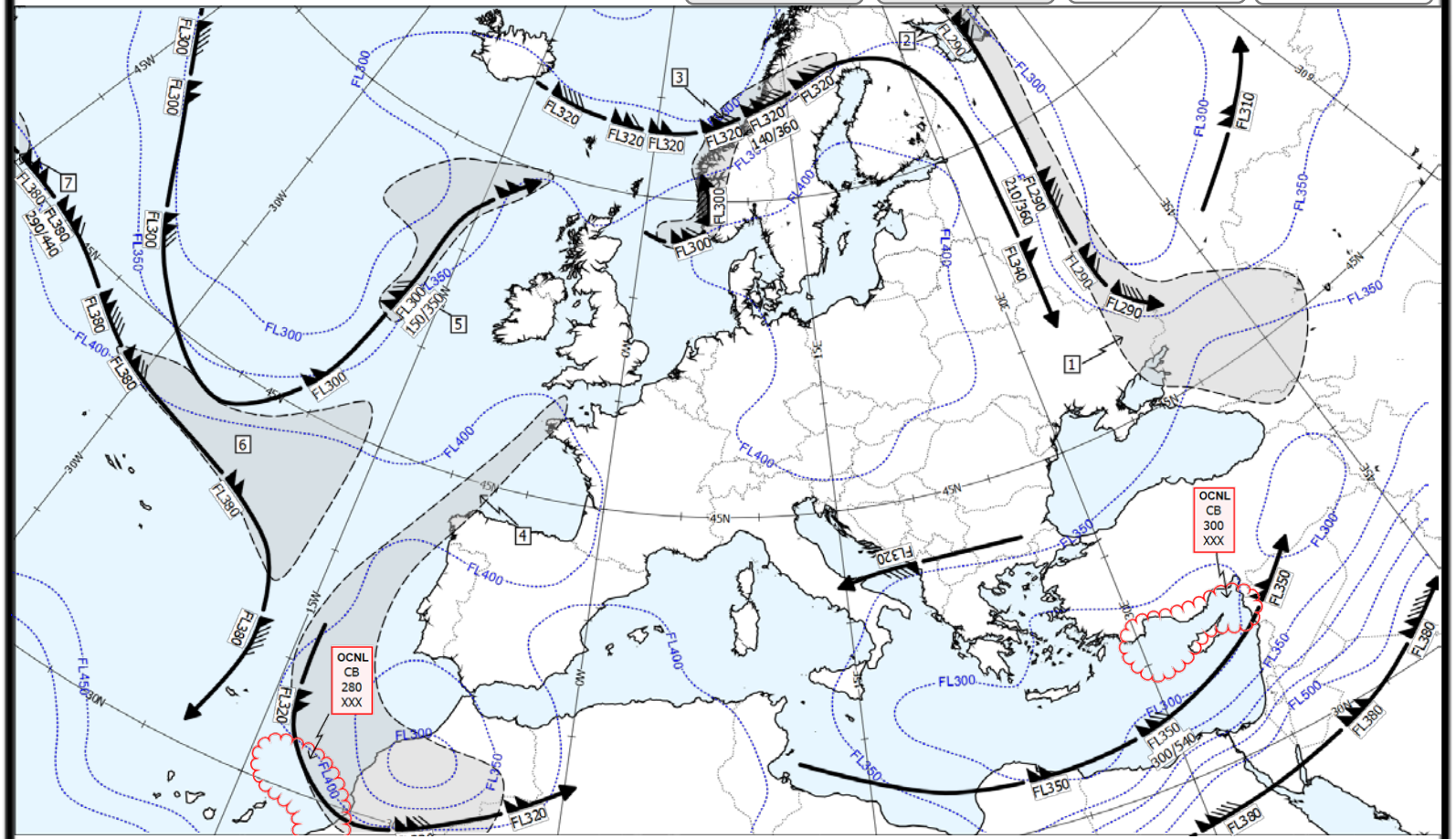


WAFS SIGWX - FL100-FL600

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 WAFC LONDON

WAFS CHANGES COMING IN NOVEMBER 2023….

- WAFS SIGWX and OPMET products (METAR/TAF/SIGMET etc) will also be available via the SADIS API. It will be possible to sub-set the OPMET data using the ICAO Identifiers.

- A set of simple API services will be provided to enable migration to the new SADIS API (so you can get what you get now as a starting point)
- With time, your systems can be upgraded to use the advanced sub-setting capability the API will offer so that you can effectively access the new data sets.

MORE INFORMATION

- 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.

- Please e-mail me on SADISmanager@metoffice.gov.uk if you have any questions.