WEATHER CLIMATE WATER
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Hello
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WORLD METEOROLOGICAL ORGANIZATION
AFRICAN CONFERENCE ON METEOROLOGY FOR AVIATION (ACMA -2018)

28 to 30 November 2018

Dakar, Senegal

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WORLD AREA FORECAST SYSTEM (WAFS) 10 YEAR PLAN

On behalf of WAFC London and WAFC Washington

Jonathan Dutton, UK Met Office

28 to 30 November 2018

Dakar, Senegal

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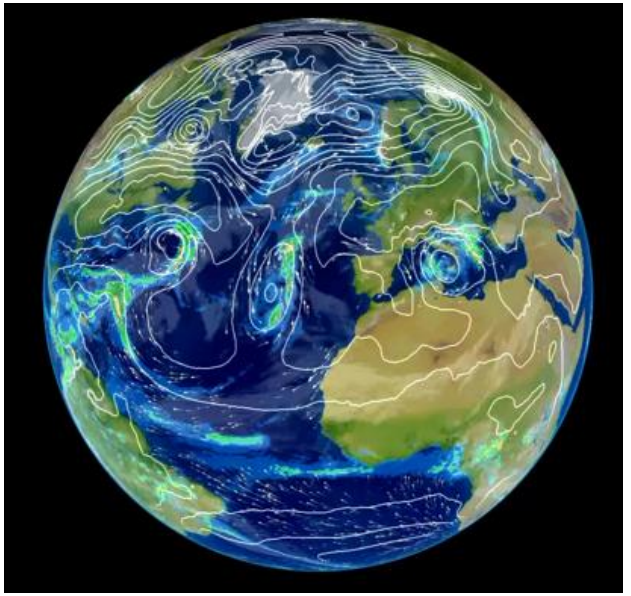
WAFS 10 year plan

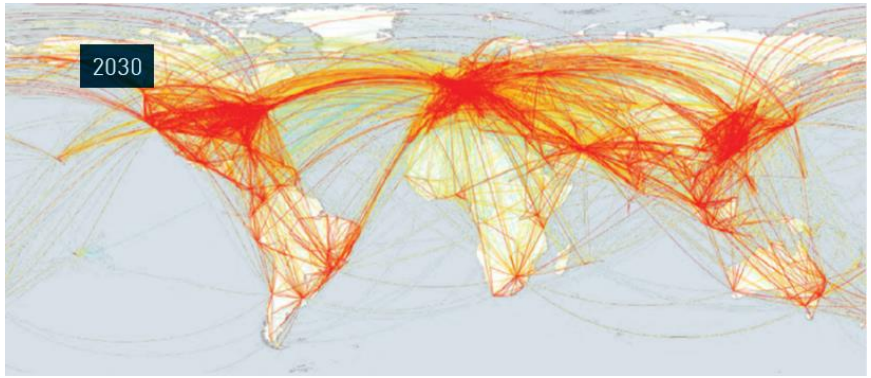
Proposed developments to World Area Forecast System (WAFS):

- Weather Science improvements
- WAFS data resolution developments
- WAFS Significant Weather (SIGWX) developments
- Technology changes



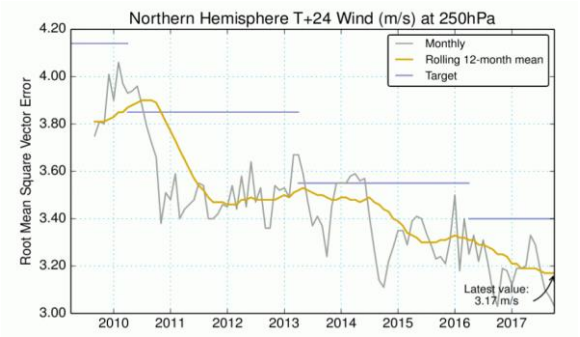
Drivers for change …

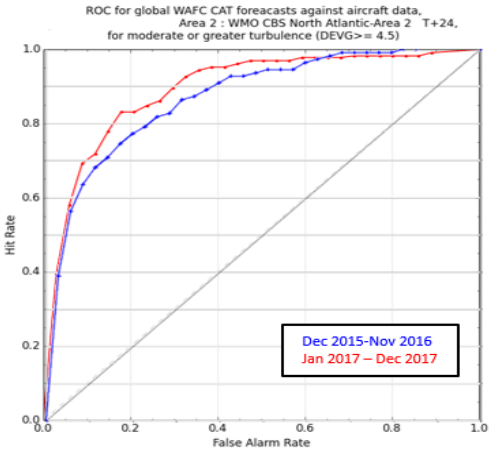
- Industry drivers
  - Air Traffic growth
  - GANP and ASBU framework
  - Capacity, Efficiency, Safety, Environment
  - Performance-based navigation (CDO, CCO, TBO etc.)



- Met developments
  - Accuracy
  - Science and computing

Winds at FL340 error



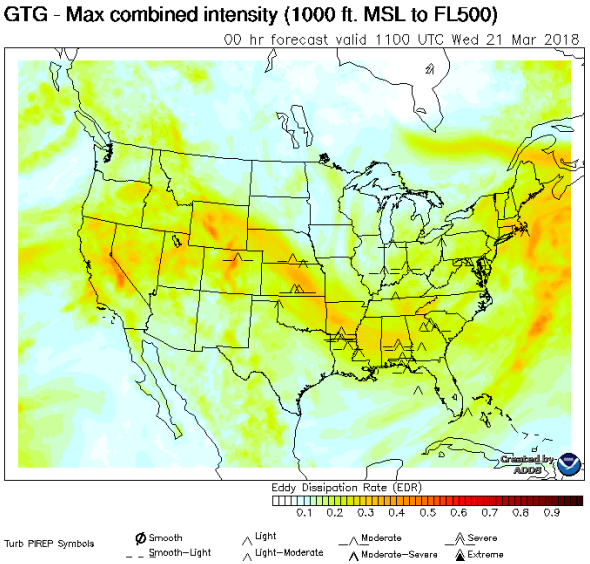


Advances in Meteorological Science

- Upgrades to the hazard algorithms

  Turbulence

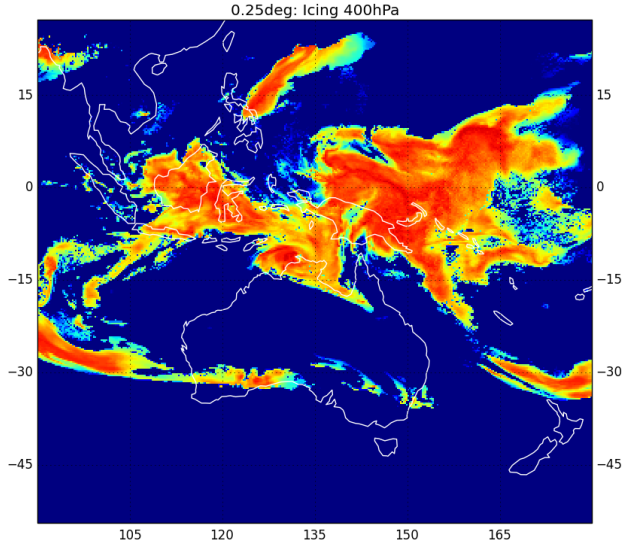
- NOW: Turbulence Potential
- November 2020: Turbulence Severity, units of EDR



- Upgrades to the hazard algorithms

  Icing

- NOW: Icing Potential
- November 2020: Icing Severity

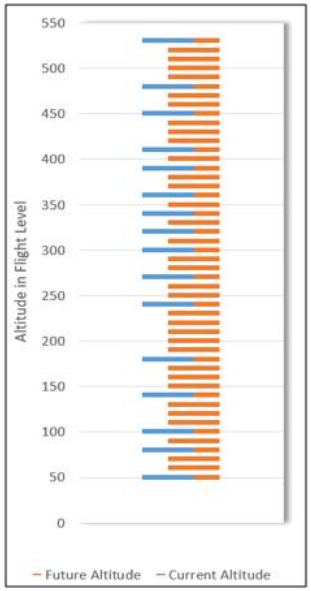


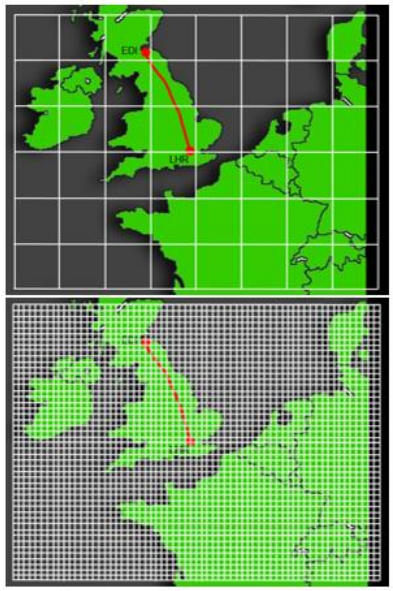
Improvements in the WAFS data sets: increased spatial resolution (detail)

Wind, temperature, turbulence, icing, CB cloud extent, humidity

Horizontal Resolution

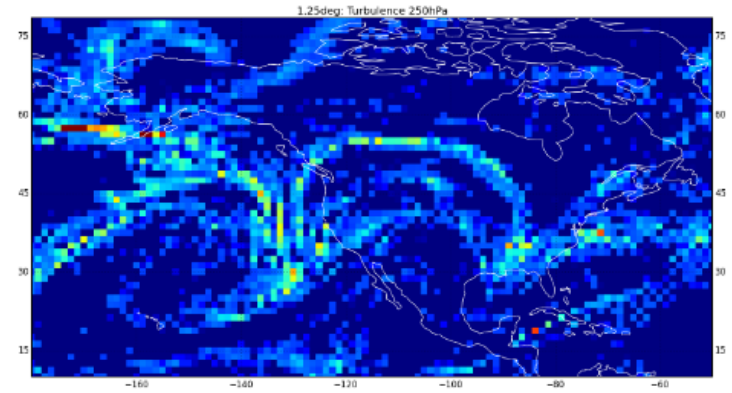
- WAFS current resolution 1.25 deg
- Proposed resolution of 0.25 deg
  - a good compromise between resolving features and limiting file size
- What does it mean:
  - 1.25 degree equates to approx. 9 minutes flying time
  - 0.25 degree equates to about 1.75 minutes flying time

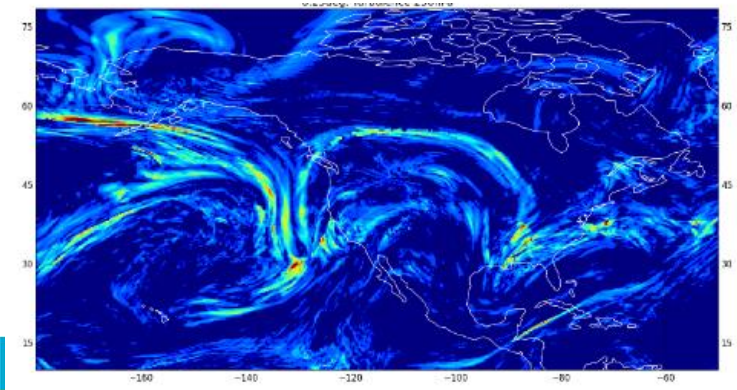


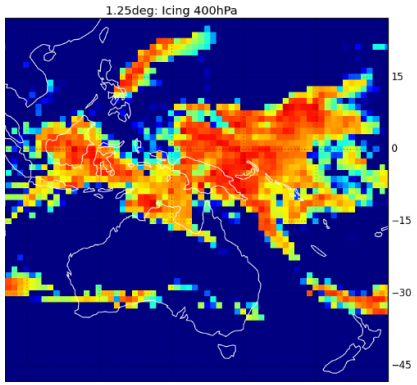


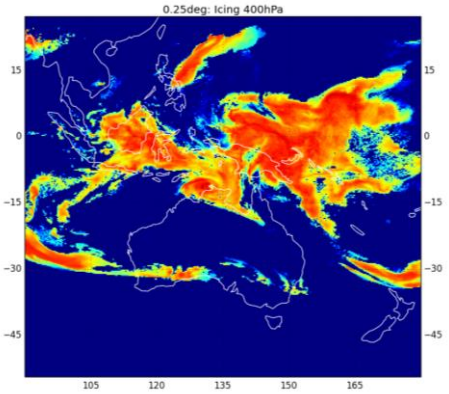
* Turbulence up to FL450, Icing up to FL300, Humidity up to FL180

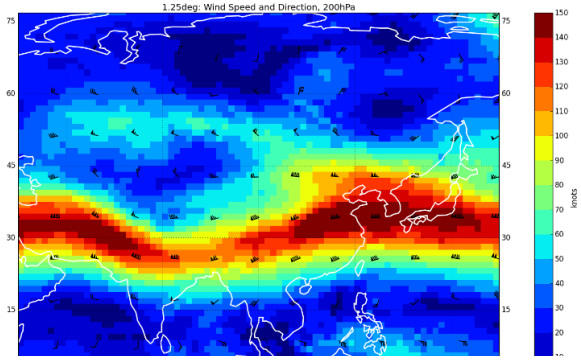
Resolution increase to 0.25 deg°

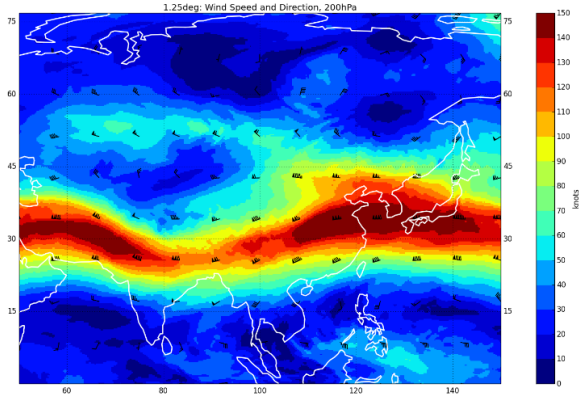












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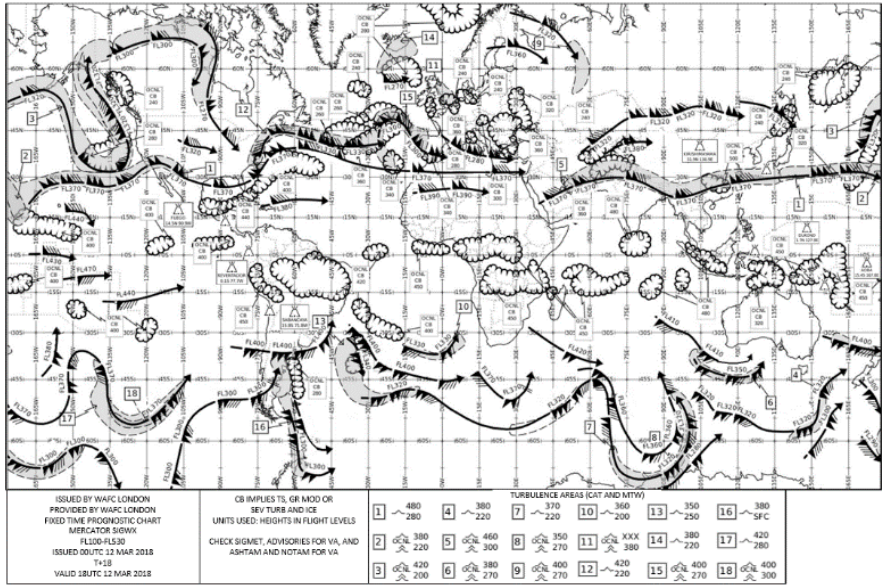
Improvements in the WAFS data sets: increased temporal resolution

- WAFS current data steps: 3 hourly between T+6 and T+36
- Proposed data steps: Hourly from T+6 to T+18, 3 hourly until T+48, then 6 hourly until T+120

NOW:	T+6	T+9	T+12	T+15	T+18	T+21	T+24	T+27	T+30	T+33	T+36	

NOV 2022:	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15	T+16	T+17
	T+18	T+21	T+24	T+27	T+30	T+33	T+36	T+39	T+42	T+45	T+48	
	T+54	T+60	T+66	T+72	T+78	T+84	T+90	T+96	T+102	T+108	T+114	T+120

Next-generation SIGWX forecasts:



NOW:	T+24			
NOV 2022:	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	T+45	T+48	

- Increased time-steps, available earlier and available also as objects
- WAFC London and Washington SIGWX forecasts will be harmonised
- SIGWX and WAFS gridded data sets will be consistent
- Improved accuracy, using upgraded science

Next-generation of SIGWX forecasts

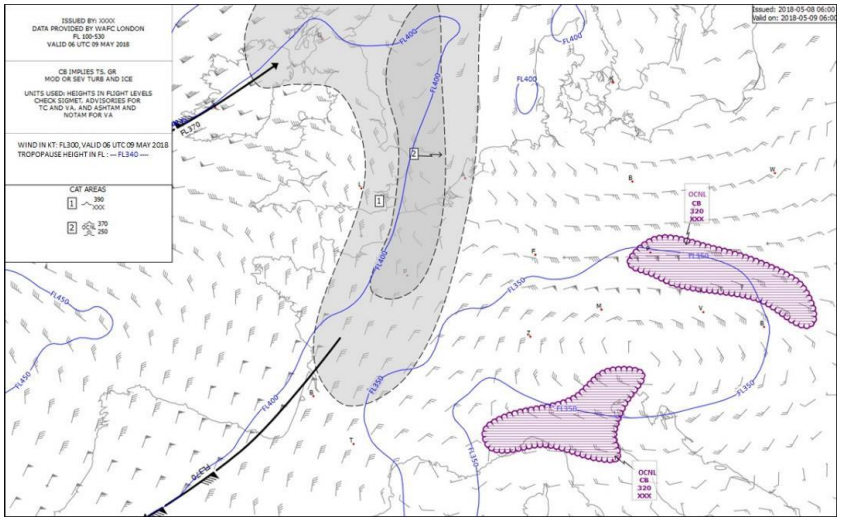
Some enabling and related changes:

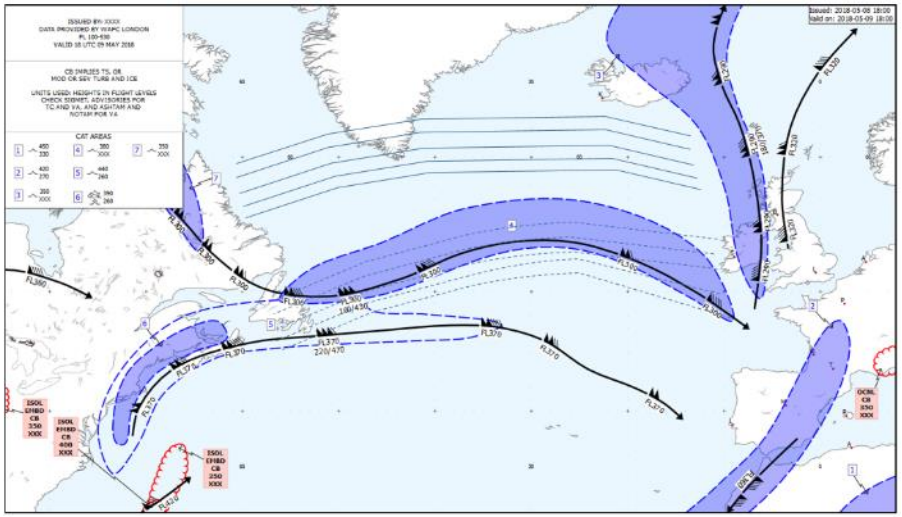
- Not possible to calculate:
  - Whether CB's are embedded or not
  - Areas of in cloud turbulence (the gridded data set is being retired in Nov 2020)
- Medium level SIGWX "objects" will be retired
- SIGWX "objects" will cover the entire range (FL100 to FL530)
- Icing "objects" will be determined for the whole globe
- The four medium level (png format) charts will be retired
- The 13 "high level" SIGWX chart areas will still be produced for T+24 until Nov 2028
- Three new large-area charts will be produced for each time-step between T+6 and T+48.
- SIGWX forecasts in IWXXM format from Nov 2022.
- BUFR format T+24 SIGWX forecasts retired Nov 2024.

Next-generation of SIGWX forecasts: availability of IWXXM objects

Enabling the user-preferred use or visualisation within downstream systems:

For example: SIGWX combined with WAFC gridded data sets - SIGWX combined with WAFC gridded data sets

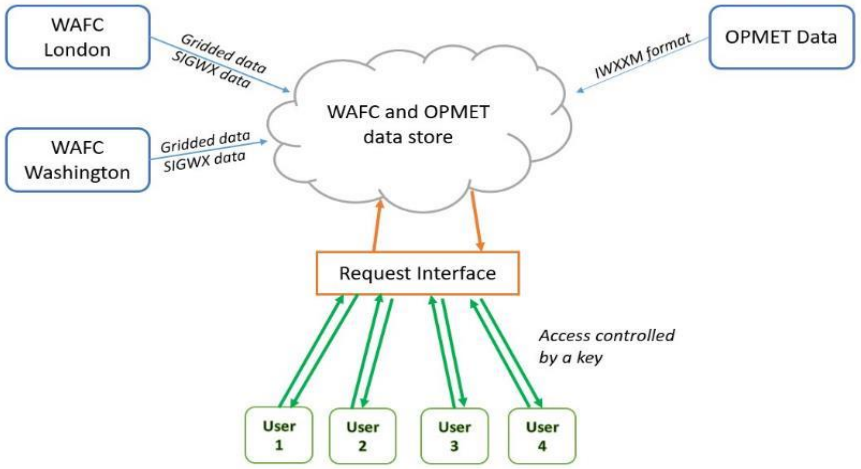


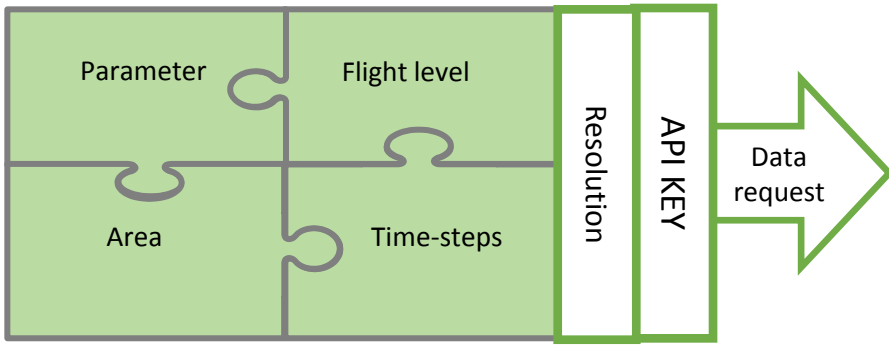


For example: SIGWX combined with NAT Tracks

Technology changes and dissemination of data

- Higher details in time and space means much more data (e.g. gridded data file more than 200x larger)
- Large data files via FTP becoming unviable
- Moving towards a data-centric approach:
  - SWIM compliant services
  - Discrete/specific chunks of data
  - Flexible data requests: request/reply





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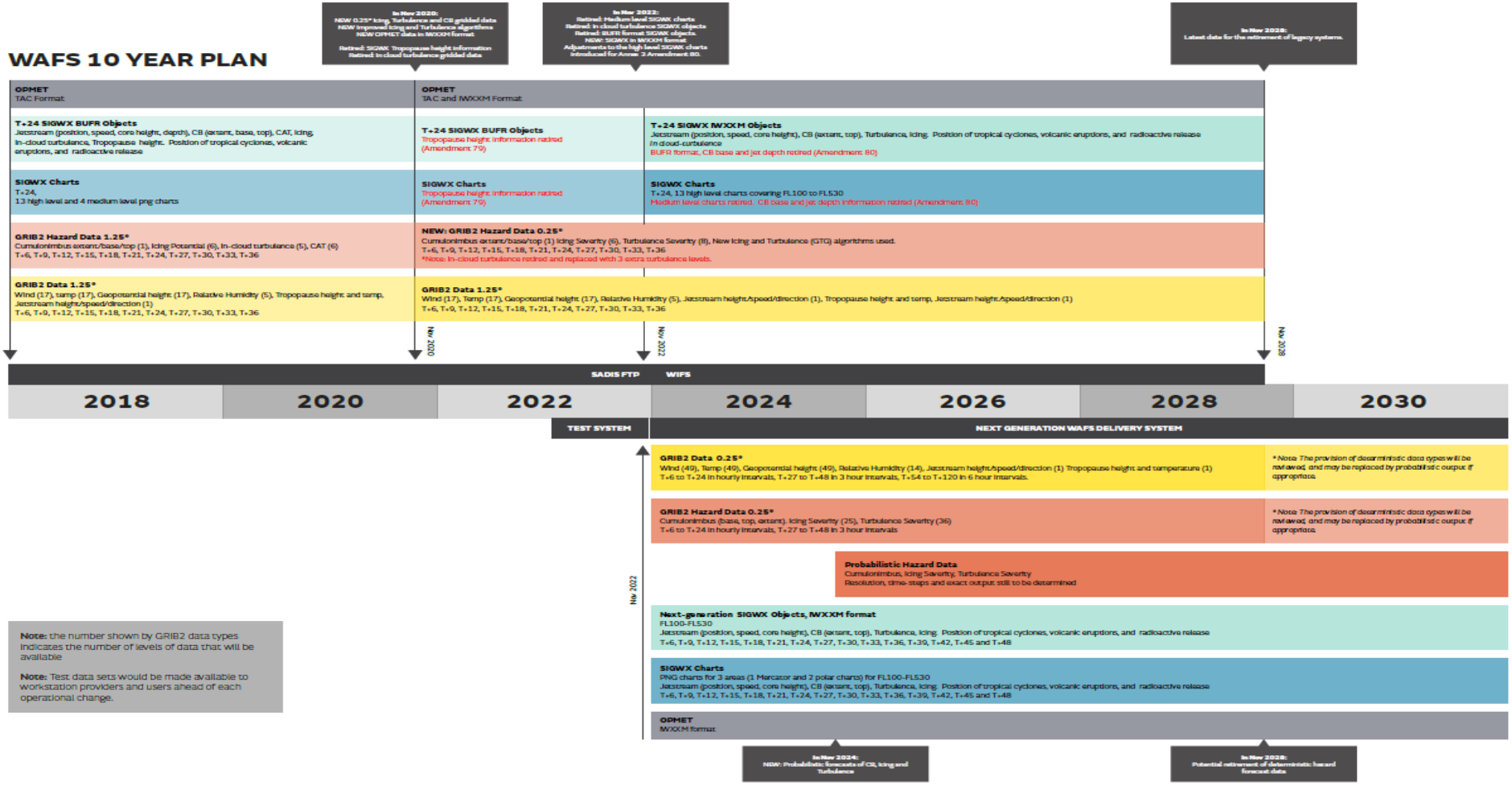
WAFS 10 YEAR PLAN



Note: the number shown by GRIB2 data types indicates the number of levels of data that will be available

Note: Test data sets would be made available to workstation providers and users ahead of each operational change.

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Thank you
Merci

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