WGNE Table 2025

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Ready: ECMWF, DWD, NCEP, CMC, JMA, CMA, India (IMD, IITM, MoES & NCMRWF MoES)

In Process: Met Office, KMA, CPTEC/INPE, BoM

In-active: HMC (Russia), Navy/FNMOC/NRL

WGNE List of Operational Global Numerical Weather Prediction Systems

Forecast Centre (Country)	Computer [Peak performance] in TFlop/s	High resolution Model (FC Range in days)	Ensemble Model (FC Range in days)	Type of Data Assimilation
ECMWF (Europe)	Atos Bull Sequana XH2000, 1920 nodes x 4 [30 PFlops]	TCo1279 L137 (~9km) (15)	51 x TCo1279 L137; (15) 101 x TCo319L137 (46)	OOPS Hybrid 4D-Var 12h (TCo1279; TL511); EDA M50 (TCo639)
Met Office (UK)	Cray XC40 3040+3040+6720 nodes [15.5PFlops]	~10 km L70 (7)	~20km L70; 18M (36M lagged products) (7)	Hybrid 4D-Var (~40km)
Météo France (France)	ATOS BULL Sequana XH2000, AMD Epyc Rome, 2290 nodes x 2, 128 cores/node, [2 x ~10.3Pflops]	T_L1798(C2.2) L105 (4)	T_L1798(C2.2) L105; M35 (4)	4D-Var 6h (TL499) ; EDA M50 (TL499)
DWD (Germany)	NEC SX Aurora; 338+440 nodes with 8 Tsubasa 10AE vector engines (VEs) per node, 8 cores per VE (total 21632+28160 cores), plus 52+68Tsubasa 30 nodes with 16 cores per VE (6656+8704 cores) 8940+10930 TF	13 km L120 (6.5 km L74 for Europe) (7.5/5)	26 km L120 (13 km L74 for Europe); M40 (7.5/5)	Hybrid 3D-Var 13 km EnKFM40 (26 / 13 km)
HMC (Russia)	Cray XC40-LC, 976 nodes x36 cores [1293 Tflops] T-Platforms V6000 129 nodes x 40 cores [800 TFlops]	0.1°x0.08° L104 (10) since October	SLAV0.72x0.9L96(~75km) M41 (10)	3D-Var
NCEP (USA)	CRAY EX (400128 x 2 cores) (14,400 x2 TFs peak)	13-km FV3-based, C768 L127 16	25km FV3-based, C384L64(16) 00Z cycle extended to 35 days	Hybrid 4DEnVAR EnKFM80 25 km
Navy/FNMOC/NRL (USA)	15% of Cray EX 13.6 petaFLOPS	T681L60 (19 km) 7,5	T359L60 M20 (16)	Hybrid 4D-VAR (T681L60/T119L60)
CMC (Canada)	2 x 1498 nodes of 2 X Intel Ice Lake 40Cores CPUs , 512GB RAM, 239K cores, peak 10.9 PFlops each (x2)	0.14°x0.14° L84 (10)	0.225°x0.225° L84; M21 (16-32)	Det: Hybrid 4D-EnVar (0.225°) EPS: LETKF M256 (0.225°x0.225°)
CPTEC/INPE (Brazil)	HPE Cray XD2000 30.786 cores AMD EPYC Turin 5th Gen CRAY XC50 4160 cores (193) [313.5]	T666 L64 (11)	T126 L28 M15 (15)	3D-Var (TQ0299L064)(45km)
JMA (Japan)	Fujitsu PRIMERGY CX2550 M7, 2*484 nodes [2x3,295] Fujitsu PRIMEHPC FX1000, 2*4224 nodes [2x14,273]	TQ959 L128 (11)	TQ479 L128; M51(-18) TQ319 L128; M25(18-34)	Hybrid 4D-Var (TL319) M100
CMA (China)	Sugon, 2*130000 cores 46PFlops	0.125°L87 (10)	0.25°L87 (15)	4D-Var (GRAPES 0.125°)
KMA (Korea)	LENOVO SD650; 2 x 306,432 cores [2X 25.5 PFlops]	~8kmL91 (12)	~24km L91 (12)	Hybrid 4DEnVar (~32km)
IMD / IITM / MoES (India)	AMD Milan 7643, (3021 nodes, 26 A100 GPU) [11.77 PFlops], 48 cores/node	TCo1534, L64 (10)	T1534, L64 (~ 12.5 km) (10)	Hybrid 4DEnVAR EnKF M80, ~25 km
BoM (Australia)	Oracle Blade 6000, 576 nodes (12 cores per node) [?]	40km, L70 (10)	No global EPS	4D-VAR (80km)
NCMRWF / MoES (India)	AMD Milan (2115 nodes, 48 cores/node) [8.24 PFlops]	12km, L70 10	12km,L70 10	Hybrid 4DVAR (40km)

WGNE List of Operational Global Numerical Weather Prediction Systems

Computers: (no GPU)

- 5x CRAY XC-40/50, EX, XD
- 2x NEC/Fujitsu
- 2x AMD Milan
- 3x Intel (Bull, Oracle)
- 1x Sugon

Performance (PF):

0.3, 0.8, 8, 14, 15, **20, 20**, 22, 28, 30, 30, 46 (CMA)

global resolution:

8, 8, 9, 10, 10, 12, **12, 13**, 13, 13, 14, 18, 19, 40

ensemble resolution:

9, 12, 13, 20, 23, **24, 24**, 24, 26, 27, 30, 60, 75

What will be the **next computer**? GPU?

Timing of the global forecasts

Forecast Centre (Country)	global deterministic model number of processors wall clock time for a 5 dynamics alone physics alone allocation time per day	global ensemble prediction system number of processors wall clock time for a 5 dynamics alone physics alone allocation time per day	global analysis number of processors wall clock time for 1 day	regional deterministic model (coarse) number of processors wall clock time for a 2 day dynamics alone physics alone allocation time per day	regional ensemble prediction system (coarse) number of processors wall clock time for a 2 day dynamics alone physics alone allocation time per day	regional analysis (coarse) number of processors wall clock time for 1 day	regional deterministic model (fine) number of processors wall clock time for a 1 day dynamics alone physics alone allocation time per day	regional ensemble prediction system(fine) number of processors wall clock time for a 1 dynamics alone physics alone allocation time per day	regional analysis (fine) number of processors wall clock time for 1 day
ECMWF (Europe)	16384 cores 18 min 6 min 9 min (incl wave+ocean+ice) 2 x 36 min (2 x 10d forecast)	51 x 6400 cores ; 101 x 512 cores 22 min ; 9min 8 min 12 min (incl wave+ocean+ice) 2 x 51 x 65 min (2 x 15d forecast)	16384 cores 2 x 43 min (12hr cycling)						
Met Office (UK)	14904 cores (14760 atmos) 38 min 2 x 56 min (2 x 7d forecast)	18 x 1512 cores (1368 atmos) 61 min	4608 cores 4 x 27 min (6hr cycling)				3996 cores 13 mins	18 x 1512 cores 11 min	2720 cores 24 x 10 min (hourly cycling)
Météo France (France)	4992 cores 72 min 36 min 36 min 4 x 60 min (4 x 102h forecast)	35 x 2688 cores 82 min 41 min 41 min 4 x 35 x 70 min (4x35x102h)	2304 cores 4 x 40 min (6hr cycling)				4480 cores 30 min 18 min 12 min 8 x 60 min	16 x 3584 cores 38 min 25 min 13 min 4 x 16 x 76 min	768 cores 24 x 5 min (hourly cycling)
DWD (Germany)	384 cores 33.0 min Dy 19 min Ph 13 min 200 min	40 * 64 cores 24 min Dy 14 min Ph 10 min 140 min	40 M * 64 cores + 1 * 384 cores + 832 cores (EnKF) 20 min 160 min (EnKF)	*** 13 min Dy 7.8 min ph 5 min	***	-	112 cores 11 min Dy 7.5 min ph 3.5 min 100 min	20 * 112 cores 11 min 7.5 min 3.5 min 100 min	1 DET + 40 member * 96 cores 30 min (model) 60 min (EnKF)
HMC (Russia)	2592 cores 80 min Dyn: 25 min Phy 45 min (the rest is I/O) 90 min, 180 min	41*32 cores 20 min 1x50min; 3x14min	64 cores 4x45 min	COSMO-Ru6 2880 cores 26 min dy 16 min; ph 10 min 214.5 min	N/A	N/A	COSMO-Ru1 144 cores 25 min dy 15 min; ph 10 min 100 min	N/A	N/A
NCEP (USA)	14,336 cores 105 min for 16-d fcst; dy 70%; ph 30%; 4 cyc per day, 4x105=420 min total wall clock time	31 x 384 cores 165 min for day 1-16; (152 min for day 16-35) 165 min 4xdays = 660min (152min only one cycle)	GFS 7040 cores 27 min/cyc GDAS 6656 cores 37 min/cyc ENKF 80x512 cores, 16 min/cyc	264 cores allocated to the 12 km NAM parent domain 61 min for 60-h forecast (dynamics 64%, physics 36%) 61 min 4x/day = 244min	2272 60 min 60 min 4x/day = 240 min	144 cores 5.5 min	2583 cores allocated to the 5 NAM nests in the forecast job 61 min 61 min 4x/day = 244 min (runs concurrently with coarse regional model)	720 15 min 30 min 2x/day = 60 min	992 (sum for 5 nests) 23 min sum for all 5 nests (all run concurrently, longest is 8.5 min)
Navy/FNMOC/NRL (USA)	864 40 min estimated fractions dynamics 55%, physics 45%	192 30 min estimate fractions dynamics 55%, physics 45%	120 25 min				up to 240 cores up to 30 min		up to 240 cores up to 15 min
CMC (Canada)	6264 cores 26 min (00/12 = 52 min / day)	(21*360) 7560 cores 8 min **(00/12 = 16 min / day)**	2160 cores (Var) 4 cycles x 32 min (including trial) (00/06/12/18 = 128 min / day)	1560 cores 12 min **(00/06/12/18 = 48 min / day)**	(21*800) 16800 cores 12 min **(00/06/12/18 = 48 min / day)**	2160 cores (Var) 4 cycles x 31 min (including trial) (00/06/12/18 = 124 min / day)	5624 cores 28 min (00/06/12/18 = 112 min / day)	No ensemble	1080 cores (Var) 4 cycles x 42 min (including trial) (00/06/12/18 = 168 min / day)
CPTEC/INPE (Brazil)	1680 54min 9.4 min 7 min		72 2h			N/A	-	multi-model: 540; 1040; 1040 8 min; 16 min; 17 min	-
JMA (Japan)	5460 cores 16 min ?min ?min	448 cores (per member) 18 min ?min ?min	5264 cores 4x25 min (6hr cycling) N/A* N/A*	2128 cores 23 min dy 75% ph 25%	784cores (per member) 41min dy 75% ph 25%	4480cores 56min ([7min]*8, 3hr cycling) ?min ?min	10368 cores*** 25 min dy 65% ph 35%		11520 cores*** 156 min ([3x100sec + 90sec]*24, N/A** N/A**
CMA (China)	8192cores 60min for 10d forecast		512cores 110min	256cores 33min		32cores 10min			
KMA (Korea)	20520(270*76) cores 30 min 2x70min(12d forecast) (KIM)	1824(24*76) cores (per member) 2x80min(12d forecast) (KIM)	20520(270*76) cores 13min*8 (KIM)	4560(60*76)cores 20min 4x20min(3d forecast) (KIM)	988(13*76)cores (per member) 45min 2x45min(3d forecast) (KIM)	24(1*24)cores 6min*8 (KIM)			72cores 3min*8 (KIM)
IMD (India)	2016 cores 28 min 13 min 15 min	21 * 828 cores 40 min 18 min 22 min	4680 cores 4 x 42min (6 hr cycle)						
BoM (Australia)	1152 cores 20 min 2 min		432 cores 41 min	1440 cores 40 min		648 cores 45 min	168 cores 6 (min) / 14 (max) minutes *		n/a n/a

Plans Global Deterministic

Forecast Centre (Country)	2025	2026	2027
ECMWF (Europe)	Coupled O-A 0.25/L75 TCo1279 L137 (~9km)	TBD	TBD
Met Office (UK)	Coupled O-A oc=0.25L75, atm=10km L70 7 days (expect to retire deterministic model towards end of 2025)	Coupled O-A oc=0.25L75, atm=10km L70 7 days (expect to retire deterministic model towards end of 2025)	Coupled O-A oc=0.25L75, atm=10km L70 10 days (expect to retire deterministic model towards end of 2025)
Météo France (France)	~T_L1798c2.2 L105 (from 5km on W Europe to 24km)	~T_L1798c2.2 L105 (from 5km on W Europe to 24km)	~T_L1798c2.2 L105 (from 5km on W Europe to 24km)
DWD (Germany)	13 km L120 (6.5 km L74 for Europe)	13 km L120 (6.5 km L74 for Europe)	13 km L120 (6.5 km L74 for Europe)
HMC (Russia)	0.1°x0.08° L104	0.1°x0.08° L126	0.1°x0.08° L126
NCEP (USA)	Coupled O-A atmos C1152L127 (9 km); Ocean 0.25-deg	Coupled O-A atmos C1152L127 (9 km); Ocean 0.25-deg	Coupled O-A atmos C1152L127 (9 km); Ocean 0.25-deg
Navy/FNMOC/NRL (USA)	T681L134	9-km NEPTUNE	9-km NEPTUNE
CMC (Canada)	0.14o L84	0.14o L84	0.14o L84
CPTEC/INPE (Brazil)	TBD	TBD	TBD
JMA (Japan)	TQ959L128	TQ959L128	TQ959L128
CMA (China)	12.5km L87	12.5km L87	12.5km L87
KMA (Korea)	8km L91 12days (KIM)	8km L91 12days (KIM)	8km L91 12days (KIM)
IMD / IITM (India)	TCo1534 L64 (6.5 km)	TBD	Coupled O-A
BoM (Australia)			

Plans Global Ensemble

Forecast Centre (Country)	2025	2026	2027
ECMWF (Europe)	51 x TCo1279 L137 to D+15 ; 100 x TCo319 L137 to D+46 coupled O-A 0.25° 2x/day	TBD, poss ML/AI in addition	TBD, poss ML/AI in addition
Met Office (UK)	Coupled O-A Oc=0.25L75. atm=20km L70 8d; 18M (6hr cycle) 36M lagged products.	Coupled O-A Oc=0.25L75. atm=20km L70 8d; 18M (6hr cycle) 36M lagged products.	Coupled O-A Oc=0.25L75. atm=10km L70 10d; 18M (6hr cycle) 36M lagged products.
Météo France (France)	~T_L1798c2.2 L105 (from 5km on W Europe to 24km) ; M35; 4 days, 4x/day	~T_L1798c2.2 L105 (from 5km on W Europe to 24km) ; M35; 4 days, 4x/day	~T_L1798c2.2 L105 (from 5km on W Europe to 24km) ; M35; 4 days, 4x/day
DWD (Germany)	26 km (13 km for Europe) L120; M40 FC range 7.5 days (5 days for nest),	26 km (13 km for Europe) L120; M40 FC range 7.5 days (5 days for nest),	26 km (13 km for Europe) L120; M40 FC range 7.5 days (5 days for nest),
HMC (Russia)	SLAV 20 km L51, M36, 14days, 2x/day	SLAV 20 km L104, M36, 14days, 2x/day	SLAV 20 km L104, M36, 14days, 2x/day
NCEP (USA)	Coupled O-A: C384 L127/0.25Deg, M 31 to D+16 3x/day to D+45 1x/day	Coupled O-A: C384 L127/0.25Deg, M 31 to D+16 3x/day to D+45 1x/day	Coupled O-A: C384 L127/0.25Deg, M 31 to D+16 3x/day to D+45 1x/day
Navy/FNMOC/NRL (USA)	T359L60, M20, 16 days, 2x/day	T359L60, M20, 16 days, 2x/day	T359L60, M20, 16 days, 2x/day
CMC (Canada)	0.225o L84; 20 members; 16d; 2/day	0.225o L84; 20 members; 16d; 2/day	0.135o L84; 20 members; 16d; 2/day
CPTEC/INPE (Brazil)	TBD	TBD	TBD
JMA (Japan)	L128M51 D+5.5 12UTC init.: TQ479L128M5	06,18UTC init.: TQ479L128M51 D+5.5 1	TBD
CMA (China)	12.5kmL87	12.5kmL87	12.5kmL87
KMA (Korea)	24km L91 M51 (KIM)(12d, 2 x/day)	24km L91 M51 (KIM)(12d, 2 x/day)	24km L91 M51 (KIM)(12d, 2 x/day)
IMD / IITM (India)	T1534, L64 , 21M, 10d, 2x/day	TBD	TBD
BoM (Australia)			

Plans Global Data Assimilation

Forecast Centre (Country)	2025	2026	2027
ECMWF (Europe)	OOPS/TCo1279 Hybrid-4DVar, weak-constraint, continuous DA (EDA 50m TCo1279 / TL511 ; L137)	OOPS/TCo1279 Hybrid-4DVar, weak-constraint, continuous DA (EDA 50m TCo1279 / TL511 ; L137)	OOPS/TCo1279 Hybrid-4DVar, weak-constraint, continuous DA (EDA 50m TCo1279 / TL511 ; L137)
Met Office (UK)	Hybrid 4D-Var (~40km. L70) M44 (plus lag/shift) EN-4D-ENVar. Ocean/ice: 3D-VAR with FGAT	Hybrid 4D-Var (~40km. L70) M44 (plus lag/shift) EN-4D-ENVar. Ocean/ice: 3D-VAR with FGAT	Hybrid 4D-Var (~40km. L70) M44 (plus lag/shift) EN-4D-ENVar. Ocean/ice: 3D-VAR with FGAT
Météo France (France)	Hybrid 4Dvar 6h EDA 50m, TL499C1L105	Hybrid 4Dvar 6h EDA 50m, TL499C1L105	Hybrid 4Dvar 6h EDA 50m, TL499C1L105
DWD (Germany)	Hybrid 3D-Var 13 km EnKFM40 (26 / 13 km) L120	Hybrid 3D-Var 13 km EnKFM40 (26 / 13 km) L120	Hybrid 3D-Var 13 km EnKFM40 (26 / 13 km) L120
HMC (Russia)	3DVar 0.25°x0.25° L40	3DVar 0.25°x0.25° L40	3DVar 0.25°x0.25° L40
NCEP (USA)	Hybrid 4D EnVar, 25 km, L127 M80LETKF	Weakly coupled - ATM: Hybrid 4DEnVar (25 km/L127), M80LETKF; OCN/ICE: Hybrid 3DEnVar, (0.25 deg/L75), M80LETKF; SNOW: 2DVar (25km); AERO: 3DVar-FGAT (25km)	Weakly coupled - ATM: Hybrid 4DEnVar (25 km/L127), M80LETKF; OCN/ICE: Hybrid 3DEnVar, (0.25 deg/L75), M80LETKF; SNOW: 2DVar (25km); AERO: 3DVar-FGAT (25km)
Navy/FNMOC/NRL (USA)	Hybrid 4D-Var (T681L60/T119L60)	Hybrid 3D-var then Hybrid 4D-var for NEPTUNE	Hybrid 3D-var then Hybrid 4D-var for NEPTUNE
CMC (Canada)	Hybrid 4D EnVar (IAU); 0.225o; L84	Hybrid 4D EnVar (IAU); 0.225o; L84	Hybrid 4D EnVar (IAU); 0.135o; L84
CPTEC/INPE (Brazil)	TBD	TBD	TBD
JMA (Japan)	Hybrid-4DVar; TL319; L128 LETKF M100	Hybrid-4DVar; TL319; L128 LETKF M100	Hybrid-4DVar; TL319; L128 LETKF M100
CMA (China)	EN-4DVar	EN-4DVar	EN-4DVar
KMA (Korea)	Hybrid 4DEnVar (KIM) 24kmL91	Hybrid 4DEnVar (KIM) 24kmL91	Hybrid 4DEnVar (KIM) 24kmL91
IMD / IITM / NCMRWF (India)	Hybrid 4D EnVar, 25 km, L64 M80 EnKF	Hybrid 4D EnVar, 25 km, L64 M80 EnKF	Weakly Coupled ATM OCN LND
BoM (Australia)			

Plans Regional Deterministic

Forecast Centre (Country)	2025	2026	2027
ECMWF (Europe)			
Met Office (UK)	950x1025; 1.5km vrb L70. Expect to retire deterministic model beyond T+12 towards end of 2025	950x1025; 1.5km vrb L70. Expect to retire deterministic model beyond T+12 towards end of 2025	950x1025; 1.5km vrb L70. Expect to retire deterministic model beyond T+12 towards end of 2025
Météo France (France)	1536x1440; 1.3 km; L90	1536x1440; 1.3 km; L90	1536x1440; 1.3 km; L90
DWD (Germany)	zooming 6.5 km; L74 542040; 2.1 km, with two-way nests at 1 km (1066968 GP) and 500 m (2857428 GP)	zooming 6.5 km; L74 542040; 2.1 km, with two-way nests at 1 km (1066968 GP) and 500 m (2857428 GP)	zooming 6.5 km; L74 542040; 2.1 km, with two-way nests at 1 km (1066968 GP) and 500 m (2857428 GP)
HMC (Russia)	Global ICON-Ru13, L120:zooming 6.5 km,L74 (Northern extratropics: ≥ 29.50 N); ILAM-Ru2EE (EE -Eastern Europe): 2 959 068,2.0 km; Moscow, Sochi: 1.0 km; ILAM-Ru3Arc (Arctic): 1 417 484, 3.25 km	TBD	TBD
NCEP (USA)	935x835; 12 km; L60 1827x1467; 3 km; L60 1189x1249; 3 km; L60 373x561; 3 km; L60 401x325; 3 km; L60 333x333; 1.5 km; L60 953x834; 13 km; L50 1799x1059; 3 km; L50 1299x919; 3 km; L50	3641x2521; 3 km; L65 (RRFSv1)	3641x2521; 3 km; L65 (RRFSv1)
Navy/FNMOC/NRL (USA)	~100 relocatable areas. Nested, Variable size, inner nests: 9, 3, 1 km up to L80	~100 relocatable areas. Nested, Variable size, inner nests: 9, 3, 1 km up to L80	~100 relocatable areas. Nested, Variable size, inner nests: 9, 3, 1 km up to L80
CMC (Canada)	>2582x1332; 0.0225o; L81	>2582x1332; 0.0225o; L81	>2582x1332; 0.0225o; L84
CPTEC/INPE (Brazil)	TBD	TBD	TBD
JMA (Japan)	817x661; 5 km; L96 1581x1301, 2km, L76	817x661; 5 km; L96 3161x2601, 1km, L76	817x661; 5 km; L96 3161x2601, 1km, L76
CMA (China)	1km, L70	1km, L70	1km, L70
KMA (Korea)	TBD	TBD	TBD
IMD (India)			
BoM (Australia)			

Plans Regional Ensemble

Forecast Centre (Country)	2025	2026	2027
ECMWF (Europe)			
Met Office (UK)	2.2km vrb L90+; 3M/hr, 18M lagged products; 5 days	2.2km vrb L90+; 3M/hr, 18M lagged products; 5 days	2.2km vrb L90+; 3M/hr, 18M lagged products; 5 days
Météo France (France)	1.3kmL90; M24; 2 days, 4x/day	1.3kmL90; M24; 2 days, 4x/day	1.3kmL90; M24; 2 days, 4x/day
DWD (Germany)	2.1 km, L65; M20; 2 days x 8 + RUC M40 14 hours x 24	2.1 km, L65; M20; 2 days x 8 + RUC M40 14 hours x 24	2.1 km, L65; M20; 2 days x 8 + RUC M40 14 hours x 24
HMC (Russia)	2.2 km,L65; M15; 2days; 1x/day	TBD	TBD
NCEP (USA)	16km M26 3.5day 4x/day		3 km M9 18h 24x/day, 2.5day 4x/day
	3 km M10 2day 4x/day	3 km M9 18h 24x/day, 2.5day 4x/day	
Navy/FNMOC/NRL (USA)	Moving Tc: 4km 5 day M21 2-4x/day	Moving Tc: 4km 5 day M21 2-4x/day	Moving Tc: 4km 5 day M21 2-4x/day
CMC (Canada)	0.09o; M20; 3.5d; 4x/day	0.09o; M20; 3.5d; 4x/day	Removed (To be replaced with ~0.035o; M20; 4x/day)
CPTEC/INPE (Brazil)	TBD	TBD	TBD
JMA (Japan)	5 km; L96: M21 4 times/day; 39hr	5 km L96; M21; 39hr; 4 times/day 2 km L76; M21; 21hr; 4 times/day	5 km L96; M21; 39hr; 4 times/day 2 km L76; M21; 21hr; 4 times/day
CMA (China)	TBD	TBD	TBD
KMA (Korea)	TBD	TBD	TBD
IMD (India)			
BoM (Australia)			

Plans Global Data Assimilation

Forecast Centre (Country)	2025	2026	2027
ECMWF (Europe)			
Met Office (UK)	4D-Var; 4.5km; 1h cycle	4D-Var; 4.5km; 1h cycle	4D-Var; 4.5km; 1h cycle
Météo France (France)	3DEnVar 1.3 km, 1h cycle	4DEnVar 1.3 km, 1h cycle	4DEnVar 1.3 km, 1h cycle
DWD (Germany)	LETKF (M40 + M40 for RUC); 2.1 km	LETKF (M40 + M40 for RUC); 2.1 km	LETKF (M40 + M40 for RUC); 2.1 km
HMC (Russia)	TBD	TBD	TBD
NCEP (USA)	Hybrid 3DEnVar 12-13 km / 3 km for nests	Hybrid 3DEnVar; 1h cycle 3 km	Hybrid 3DEnVar; 1h cycle 3 km
Navy/FNMOC/NRL (USA)	3DVAR Typical: 27/9/3/1 km up to L60 Nested; highest resolution applications of <1 km	3DVAR Typical: 27/9/3/1 km up to L60 Nested; highest resolution applications of <1 km	3DVAR Typical: 27/9/3/1 km up to L60 Nested; highest resolution applications of <1 km
CMC (Canada)	Hybrid 4D-EnVar (IAU); 6h cycle 0.0225° (increments at 0.225o)	Hybrid 4D-EnVar (IAU); 6h cycle 0.0225° (increments at 0.225o)	Hybrid 4D-EnVar (IAU); 6h cycle 0.0225° (increments at 0.225o)
CPTEC/INPE (Brazil)	3DVAR TBD	3DVAR TBD	3DVAR TBD
JMA (Japan)	4D-Var, 15kmL48; 3h cycle(for coarse model) Hybrid 3D-Var, 5kmL48 three-hour analysis cycle repeats hourly assimilation (for fine model)	4D-Var, 15kmL48; 3h cycle(for coarse model) Hybrid 3D-Var, 5kmL48 three-hour analysis cycle repeats hourly assimilation (for fine model)	4D-Var, 15kmL48; 3h cycle(for coarse model) Hybrid 3D-Var, 5kmL48 three-hour analysis cycle repeats hourly assimilation (for fine model)
CMA (China)	hybrid en-3DVar	hybrid en-3DVar	hybrid en-3DVar
KMA (Korea)	TBD	TBD	TBD
IMD (India			
BoM (Australia)			

Plans Global Composition

Forecast Centre (Country)	2025	2026	2027
ECMWF (Europe)	TBD	TBD, CO2 emissions estimation	TBD, CO2 emissions estimation
Met Office (UK)	Interactive prognostic dust (climatologies of other aerosols): Global 10km L70 + 20km L70 EPS	Interactive prognostic dust (climatologies of other aerosols): Global 10km L70 + 20km L70 EPS	Interactive prognostic dust (climatologies of other aerosols): Global 10km L70 + 20km L70 EPS
Météo France (France)	Chemistry-transport model MOCAGE : tropo&stratospheric chemistry; aerosols (primary&secondary), 0.5° resolution, 60 vertical levels up to 0.1 hPa. Assimilation for aerosols (sat. AOD), for volcanic SO2 (sat. Total columns Tropomi) and for ozone and CO (sat. Infrared radiances IASI and CrIS). Alert system for volcanic ash	Chemistry-transport model MOCAGE : tropo&stratospheric chemistry; aerosols (primary&secondary), 0.5° resolution, 60 vertical levels up to 0.1 hPa. Assimilation for aerosols (sat. AOD and possibly sat. Infrared radiances), for volcanic SO2 (sat. Total columns) and for ozone and CO (sat. Infrared radiances IASI and CrIS, possibly IASI-NG). Alert system for volcanic ash	Chemistry-transport model MOCAGE : tropo&stratospheric chemistry; aerosols (primary&secondary), 0.5° resolution, 60 vertical levels up to 0.1 hPa. Assimilation for aerosols (sat. AOD and possibly sat. Infrared radiances), for volcanic SO2 (sat. Total columns Tropomi+S5) and for ozone and CO (sat. Infrared radiances IASI and CrIS, IASI-NG and possibly IRS). Alert system for volcanic ash. In addition, a version of NWP model ARPEGE with interactive prognostic dust will run in NRT (regular grid T499) with assimilation of sat. infrared radiances for dust
DWD (Germany)	26 km / 13 km L120/74 ICON-ART operational mineral dust forecasts DET + M10 EPS; alert system for volcanic ash and radionuclides	26 km / 13 km L120/74 ICON-ART operational mineral dust forecasts DET + M10 EPS; alert system for volcanic ash and radionuclides	26 km / 13 km L120/74 ICON-ART operational mineral dust forecasts DET + M10 EPS; alert system for volcanic ash and radionuclides
NCEP	GEFS-Aero inline Prognostic aerosols and stratospheric ozone at C384 L64 (25 km); update sulfate emissions; update dust land use type constants	Global Chemistry and Aerosol Forecast System (GCAFS) at C384L127 resolution (25km), with aerosol DA	Global Chemistry and Aerosol Forecast System (GCAFS) at C384L127 resolution (25km), with aerosol DA
(USA)	Parameterized stratospheric ozone at C768 L127 (13 km)	Parameterized stratospheric ozone at C768 L127 (13 km)	Parameterized stratospheric ozone at C768 L127 (13 km)
Navy/FNMOC/NRL (USA)	off-line Dust, Smoke, Pollution, Sea Salt, DA T681L134	off-line Dust, Smoke, Pollution, Sea Salt, DA run off 9-km NEPTUNE	off-line Dust, Smoke, Pollution, Sea Salt, DA run off 9-km NEPTUNE
CMC (Canada)	In-line stratospheric ozone in global deterministic system	In-line stratospheric ozone in global deterministic system	In-line stratospheric ozone in global deterministic system with potential extension to include tropospheric ozone
JMA	Stratospheric and tropospheric ozone with full O3 chemistry at TL159L64	TBD	TBD
(Japan)	Dust (,sea-salt, sulfate, BC, and OC) at TL479L40 2D-Var DA	TBD	TBD
IMD (India)	prognostic aerosols (climatologies): T1534 L64	TBD	TBD

Plans Regional Composition

Forecast Centre (Country)	2025	2026	2027
Met Office (UK)	12km L70 online chemistry and aerosol model (UM + UKCA). Once per day T+120h forecast.	12km L70 online chemistry and aerosol model (UM + UKCA). Once per day T+120h forecast.	12km L70 online chemistry and aerosol model (UM + UKCA). Once per day T+120h forecast.
Météo France (France)	MOCAGE ; Europe 0.1° ; full chemistry + primary&secondary aerosols. Tropo + Strato. Assimilation for aerosols (ground-based lidars + ceilometers) and for volcanic SO2 (sat. Total Columns Tropomi).	MOCAGE ; Europe 0.1° ; full chemistry + primary&secondary aerosols. Tropo + Strato. Assimilation for aerosols (ground-based lidars + ceilometers) and for volcanic SO2 (sat. Total Columns Tropomi).	MOCAGE ; Europe 0.1° ; full chemistry + primary&secondary aerosols. Tropo + Strato. Assimilation for aerosols (ground-based lidars + ceilometers), for volcanic SO2 (sat. Total Columns Tropomi and possible Sentinel-4) and for ozone and CO (IRS).
DWD (Germany)	26 km / 13 km L120/74 ICON-ART operational mineral dust forecasts DET + M10 EPS (global+nested); 6.5 km L74 pollen forecast	26 km / 13 km L120/74 ICON-ART operational mineral dust forecasts DET + M10 EPS (global+nested); 6.5 km L74 pollen forecast	26 km / 13 km L120/74 ICON-ART operational mineral dust forecasts DET + M10 EPS (global+nested); 6.5 km L74 pollen forecast
HMC (Russia)	COSMO-RuART to ILAM-RuART	TBD	TBD
NCEP	UFS-CMAQ (v7); full trop. gas and aerosols 9 km; North America; 4x per day; 72 hrs; O3/pm analog bias corrrected ; RAVE.v2 hourly fire smoke emissions	UFS-CMAQ (v8); updated CMAQ and meteorology phsyics; full trop. gas and aerosols, 9 km; North America; 4x per day; 72 hrs; ML-based O3/PM2.5 bias corrrection ; RAVE.v2 hourly fire smoke emissions	UFS-CMAQ (v8); updated CMAQ and meteorology phsyics; full trop. gas and aerosols, 9 km; North America; 4x per day; 72 hrs; ML-based O3/PM2.5 bias corrrection ; RAVE.v2 hourly fire smoke emissions
	HYSPLIT GEFS ensemble volcanic ash and RSMC radiological predictions on 1/4 degree grid; Transfer Coefficiants Matrix source term estimation	HYSPLIT GEFS ensemble volcanic ash and RSMC radiological predictions on 1/4 degree grid; Transfer Coefficiants Matrix source term estimation	HYSPLIT GEFS ensemble volcanic ash and RSMC radiological predictions on 1/4 degree grid; Transfer Coefficiants Matrix source term estimation
(USA)	HRRR-smoke 3 km CONUS/AK, 48 h forecasts 4x/day, 18 h forecast other hours	RRFS Smoke and Dust, 3km, North America	RRFS Smoke and Dust, 3km, North America
Navy/FNMOC/NRL (USA)	In-line Dust, Smoke, Pollution, Sea Salt 9/3/1 km; L80	In-line Dust, Smoke, Pollution, Sea Salt 9/3/1 km; L80	In-line Dust, Smoke, Pollution, Sea Salt 9/3/1 km; L80
CMC (Canada)	RAQDPS uses full atmospheric chemistry, including tropospheric ozone, trace gas and aerosol sources. (0.9o: L84)	RAQDPS uses full atmospheric chemistry, including tropospheric ozone, trace gas and aerosol sources. (0.9o: L84)	RAQDPS uses full atmospheric chemistry, including tropospheric ozone, trace gas and aerosol sources. (0.9o: L84)
JMA	(discontinued)		
(Japan)	ATM: Volcanic ash forecast	ATM: Volcanic ash forecast	ATM: Volcanic ash forecast

extra slides

Discussion points

- increased cost for GPU and CPU
- How will AI influence NWP configuration in the future