

Extended-range Forecasts

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- Current operational configuration
- Overview of the current web products
- Future extended-range forecast configuration

ECMWF extended-range prediction

- A 51-member ensemble is integrated for 46 days twice a week (Mondays and Thursdays at 00Z)
 - Atmospheric component: IFS with the latest operational cycle and with a TCo639L137 resolution up to day 15 and TCo319L137 after day 15.
 - Ocean-atmosphere coupling from day 0 to NEMO (about 1/4 degree) every hour.
-
- Atmosphere: Operational 4-D var analysis + SVs+ EDA perturbations
 - Ocean: 3D-Var analysis (NEMOVAR) + wind stress perturbations

Current configuration of the ECMWF extended-range forecasts and re-forecasts

Extended-range forecasts:

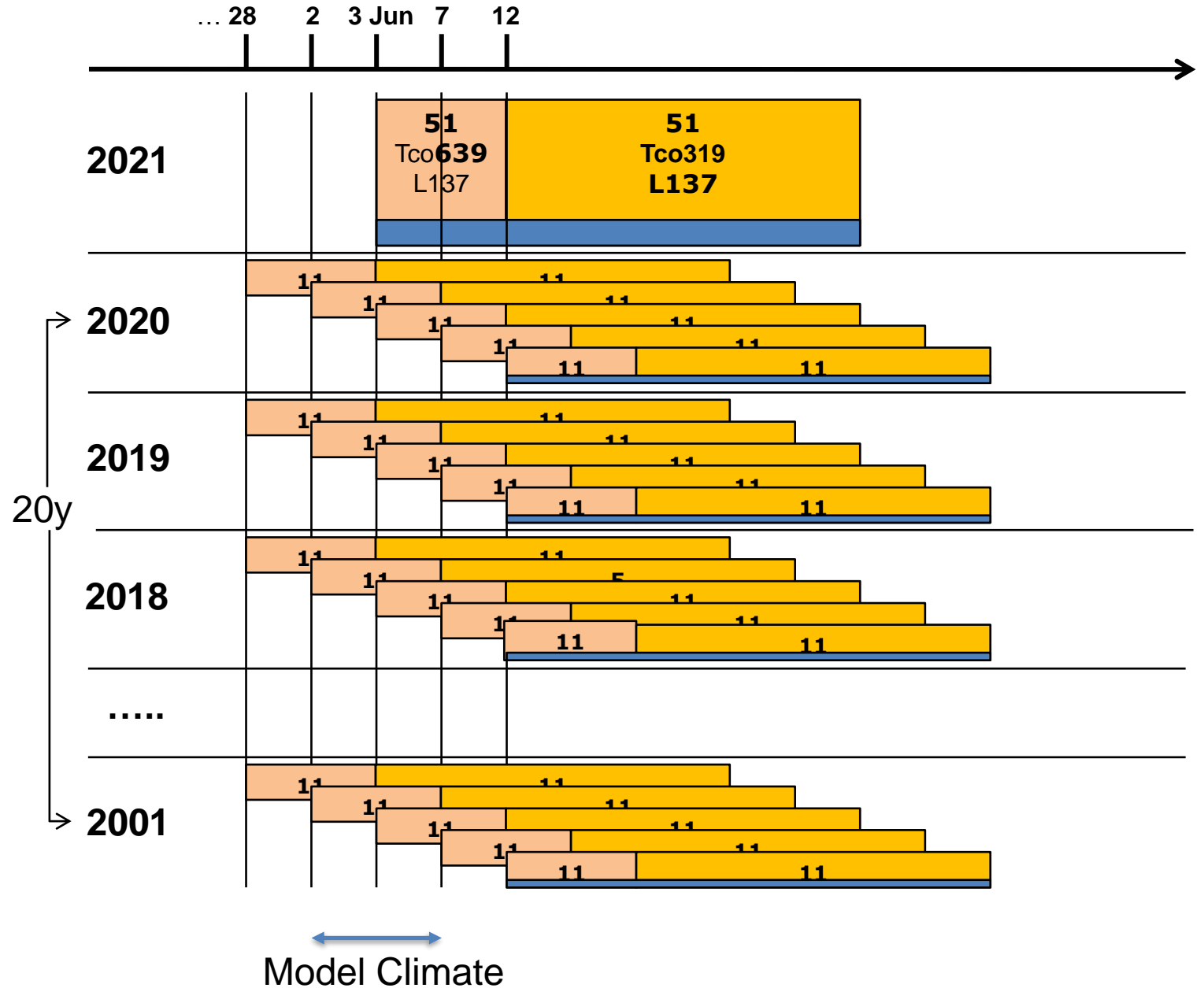
Twice a week (Mondays and Thursdays 00z), the 51-member ensemble forecasts are extended to 46 days.

The resolution between day 15 and 46 is Tco319L137

Reforecasts:

11-members starting the same day and month as the real-time forecasts over the past 20 years.

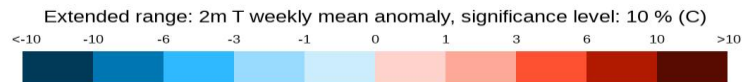
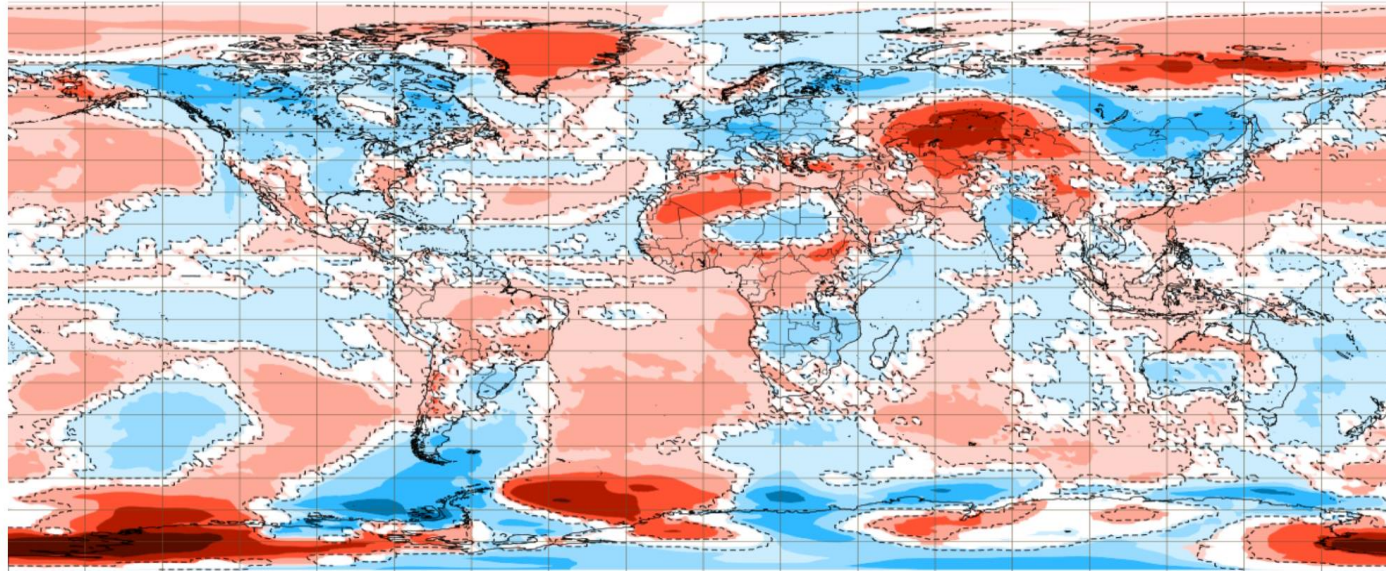
- Same resolution as real-time forecasts (Tco639/Tco319L137)
- Initialized from ERA5 and ORAS5



Extended-range forecast charts

2m temperature: Weekly mean anomalies

Base time: Mon 24 May 2021, Valid time: Mon 24 May 2021 - Mon 31 May 2021, - T+168 h, Area : Global



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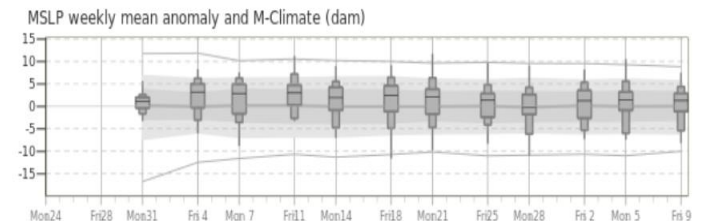
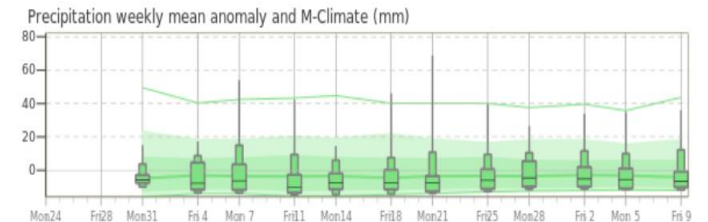
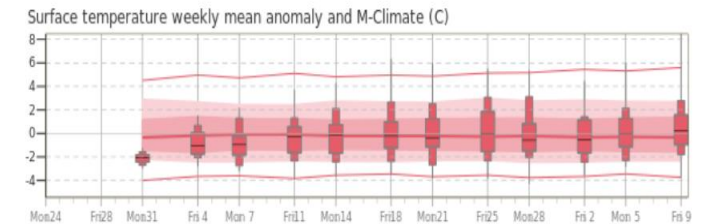
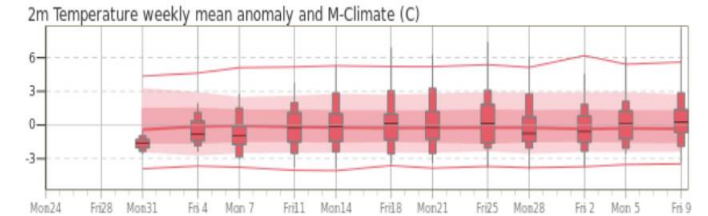


Anomalies (temperature, precipitation..)

Most of the products are based on **weekly means**

Meteograms

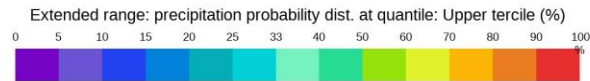
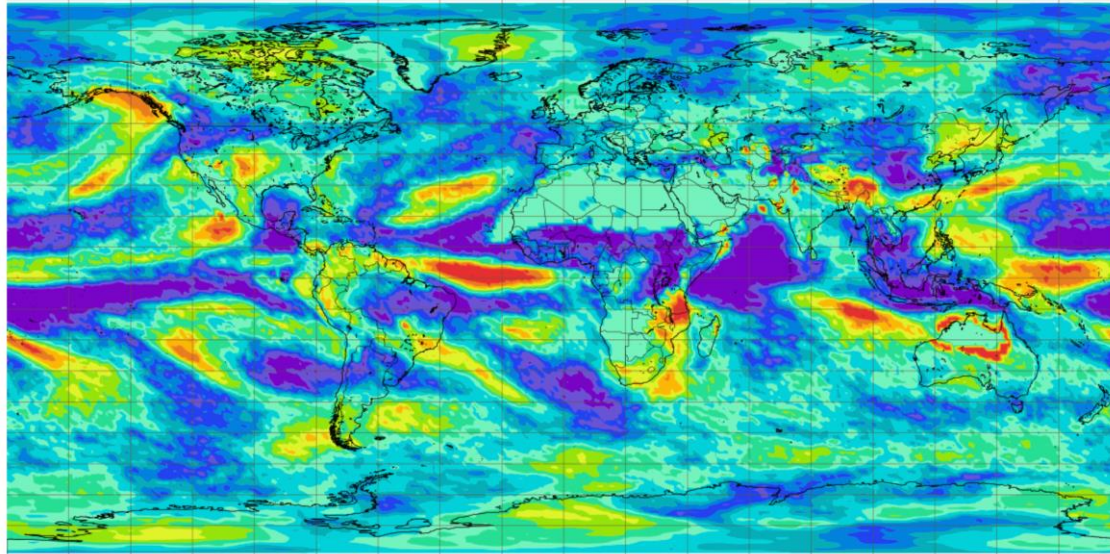
Extended range meteogram - weekly mean anomalies
Reading 51.29°N 1.27°W (ENS land point) 49 m
Monday 24 May 2021 00 UTC



Extended-range forecast charts

Precipitation: Probability distribution

Base time: Mon 24 May 2021, Valid time: Mon 31 May 2021 - Mon 07 Jun 2021, - T+336 h, Distribution group : Upper tercile, Area : Global

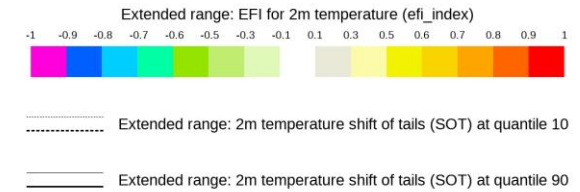
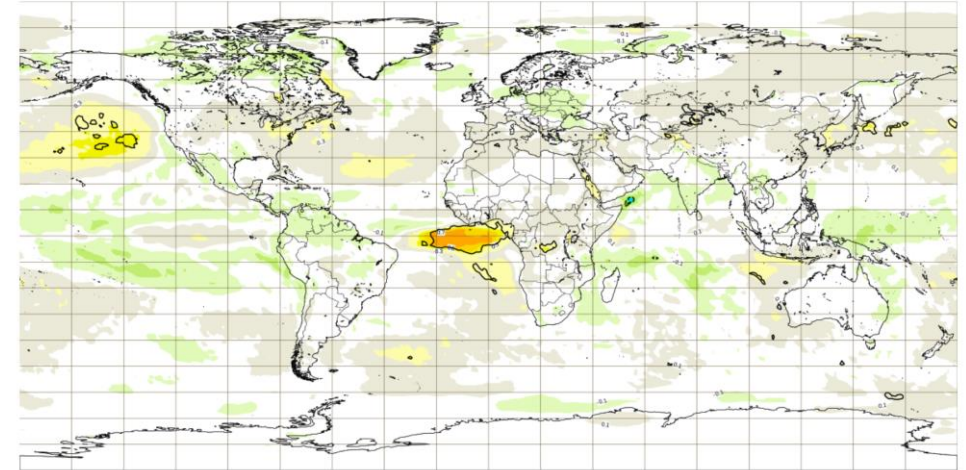


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EFI 2m temperature over Extended range

Base time: Mon 24 May 2021, Valid time: Mon 28 Jun 2021 - Mon 05 Jul 2021, - T+1008 h, Area : Global



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Probabilities (temperature, precipitation..)

Available for 2mtm and precip

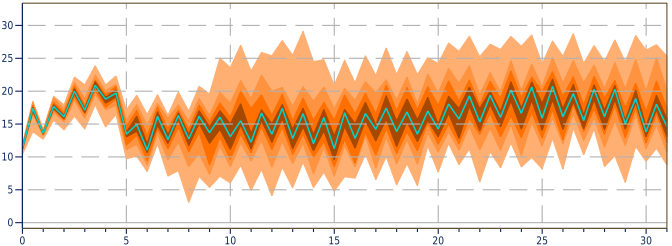
Extended-range forecast charts

Plumes

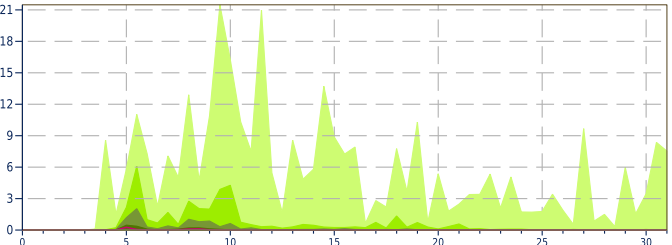
ECMWF Ensemble forecasts for TURKEY - ANKARA
 Location: 39.95°N 32.88°E
 Base Time: Monday 24 May 2021 00 UTC

Extremes 12.5-87.5% 25-75% 37.5-62.5%
 Median

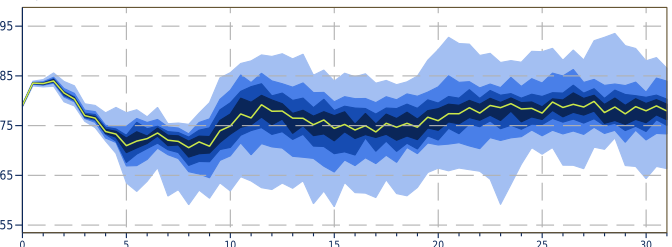
Temperature at 850 hPa (C) - Ensemble distribution



Total Precipitation (mm) - Ensemble distribution

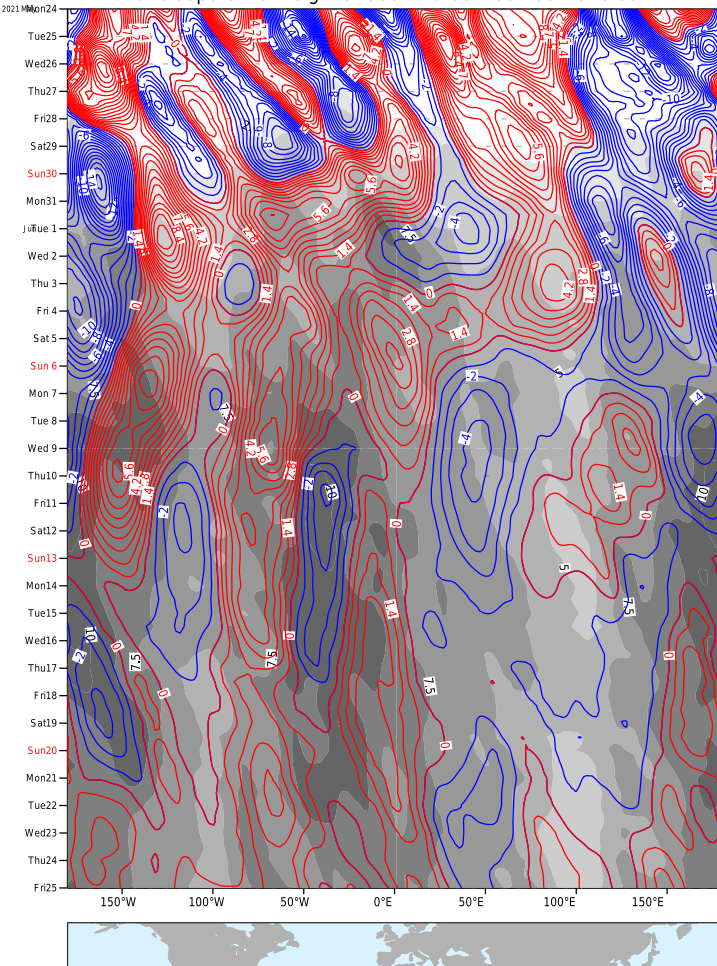


Geopotential at 500 hPa (dam) - Ensemble distribution



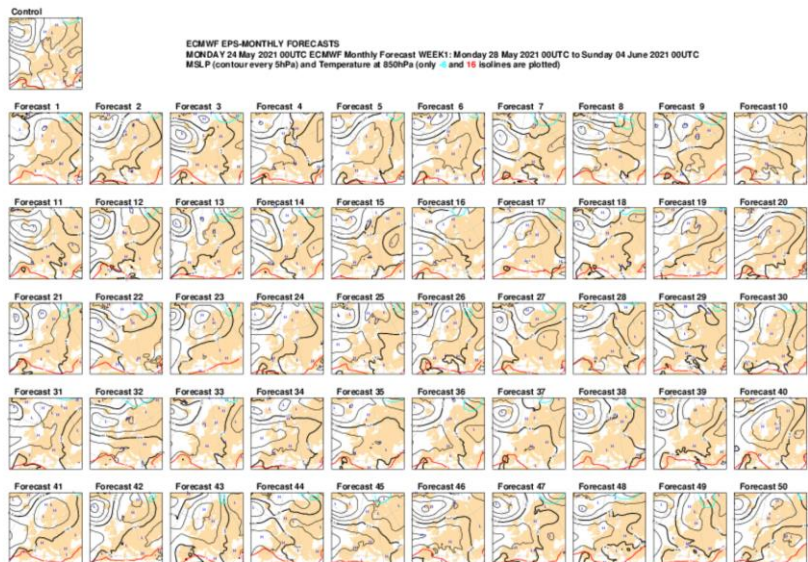
Hovmoeller diagrams

Time-longitude diagram of monthly forecast from 20210524:00
 Ensemble mean anomaly (contours) and spread (shading)
 of Geopotential height at 500 hPa between 60N and 35N



Stamp maps

Mean sea level pressure and z500 stamps -
 Extended range forecast



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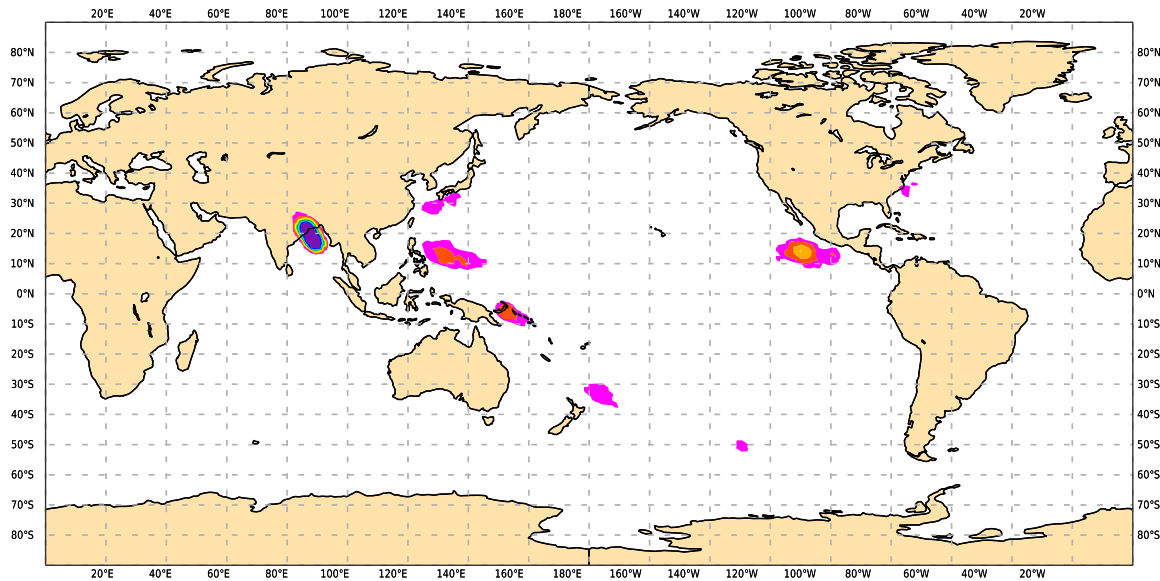
Extended-range forecast charts

Tropical cyclone activity

Tropical cyclone strike probability

Weekly mean Tropical Storm Strike Probability. Date: 20210524 0 UTC t+(0-168)
Probability of a TS passing within 300km radius

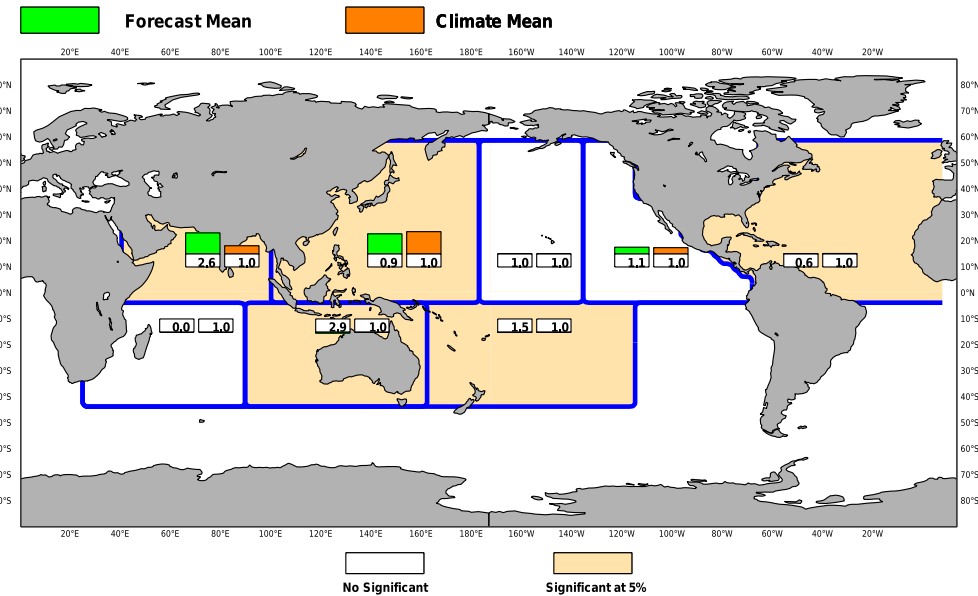
5-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80 80-90 90-110



Accumulated cyclone energy

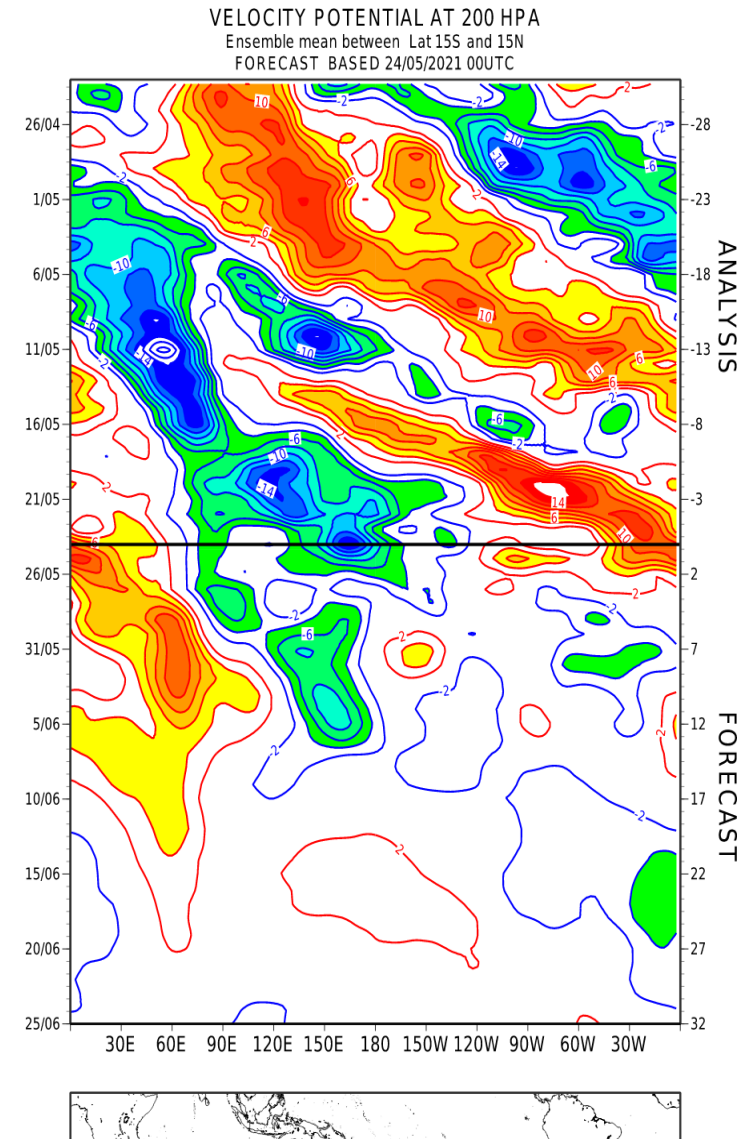
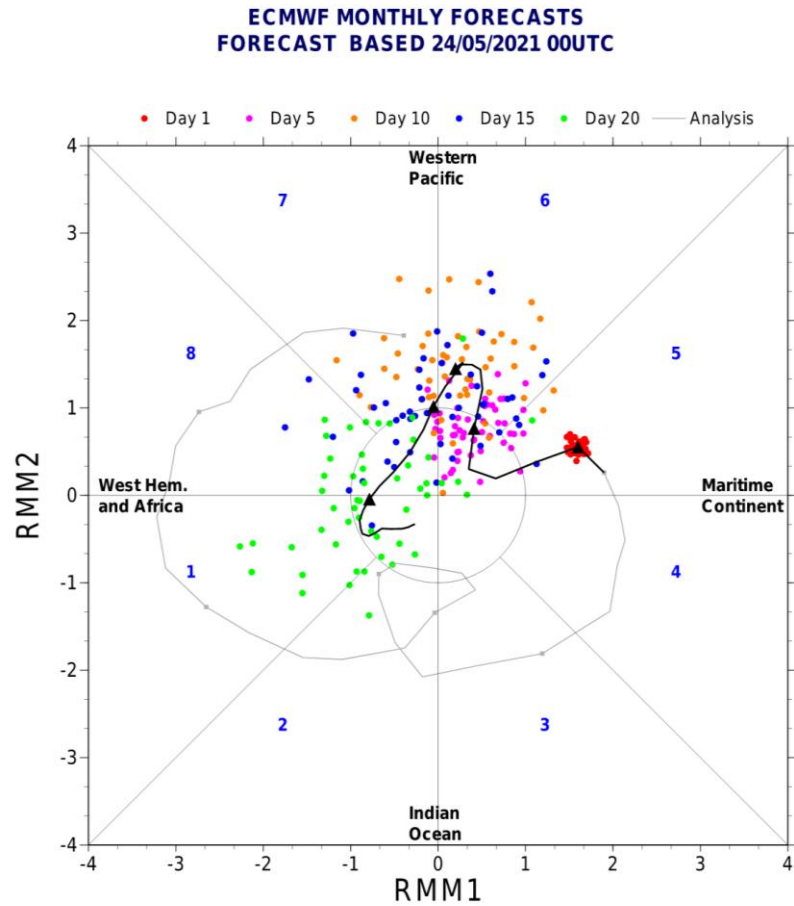
ECMWF Monthly Forecast
Accumulated Cyclone Energy
Forecast start reference is 24/05/2021
Ensemble size = 51, climate size = 220

DAY 01-07
24/05-30/05/2021
Climate = 2001-2020



Extended-range forecast charts

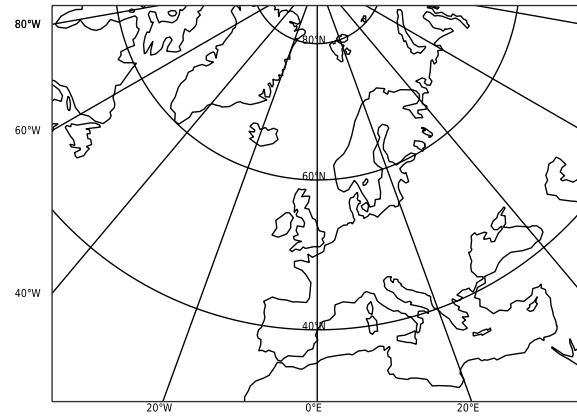
MJO Forecast products



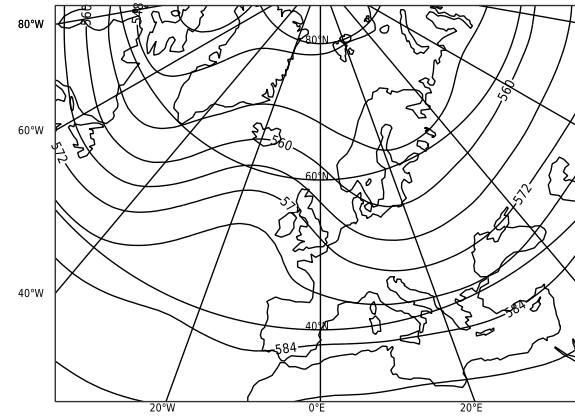
Extended-range forecast charts

Weather regime clusters

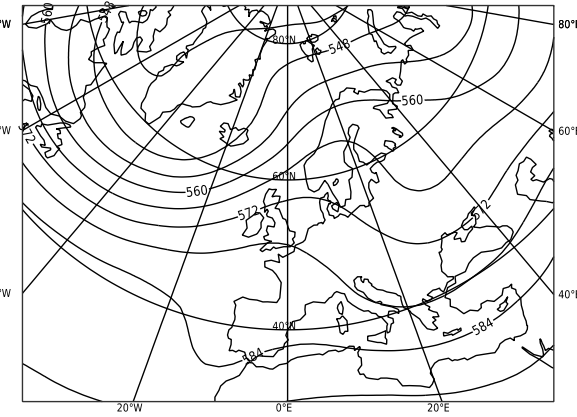
24-05-2021 week4 : step 504-672
Reg 1 **



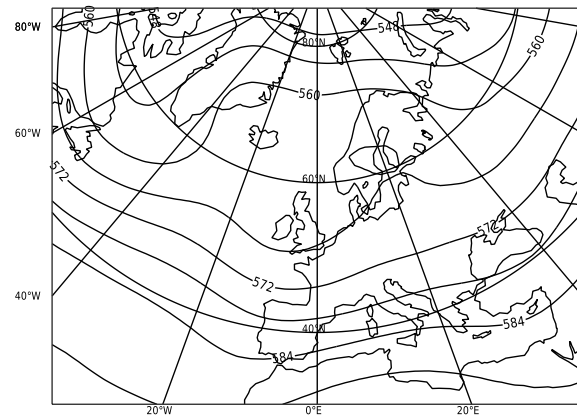
24-05-2021 week4 : step 504-672
Reg 2 ** Cluster mean (15)



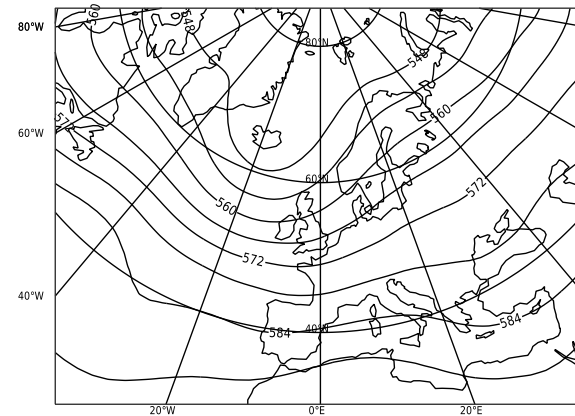
24-05-2021 week4 : step 504-672
Reg 3 ** Cluster mean (9)



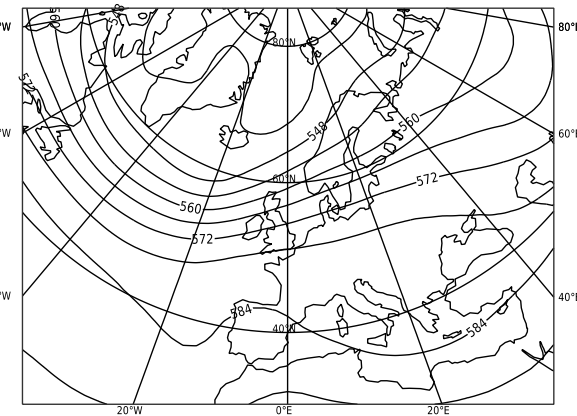
24-05-2021 week4 : step 504-672
Reg 4 ** Cluster mean (15) - CTR



24-05-2021 week4 : step 504-672
Reg 5 ** Cluster mean (6)



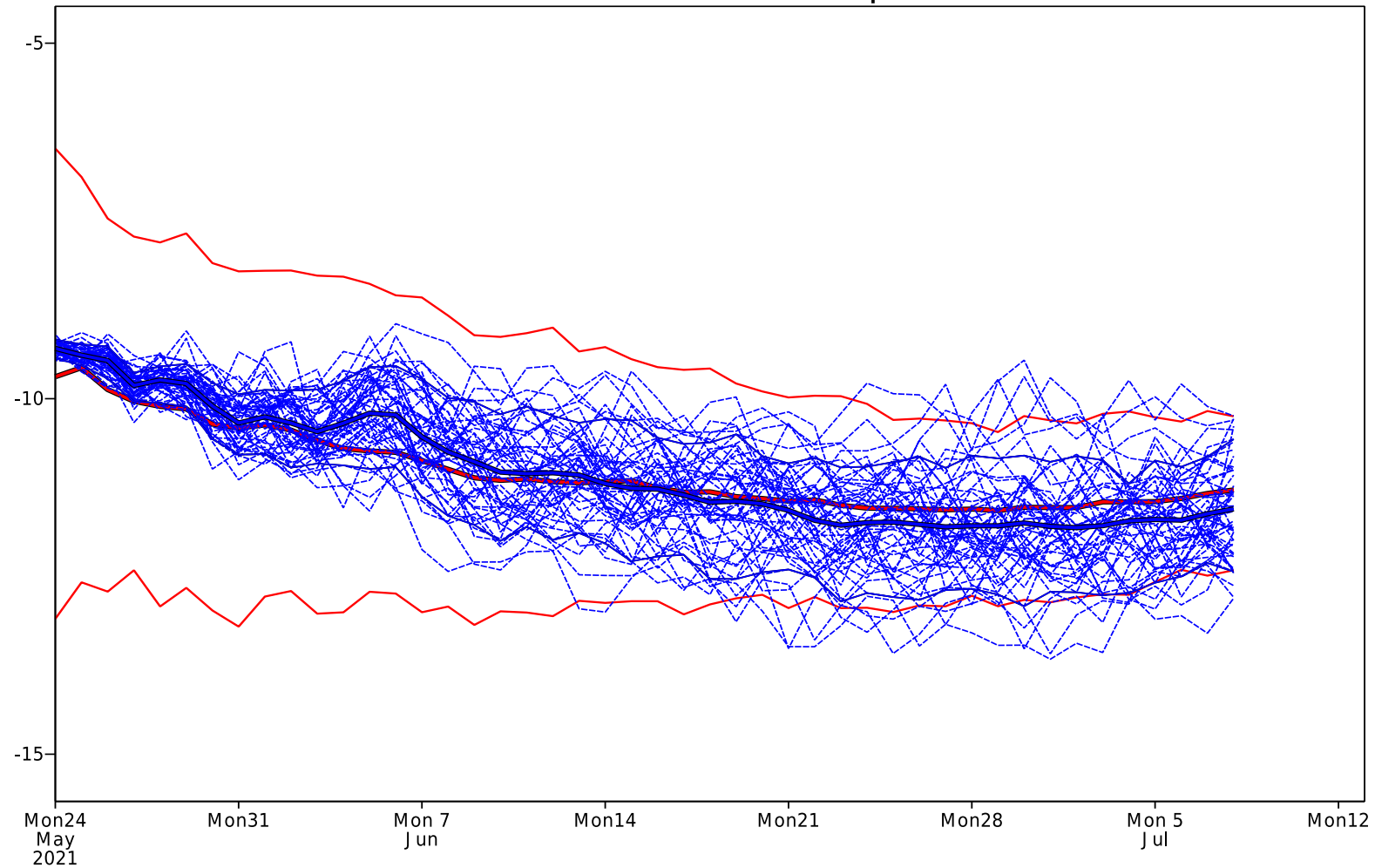
24-05-2021 week4 : step 504-672
Reg 6 ** Cluster mean (5)



New Extended-range forecast chart

Sudden Stratospheric Warming events

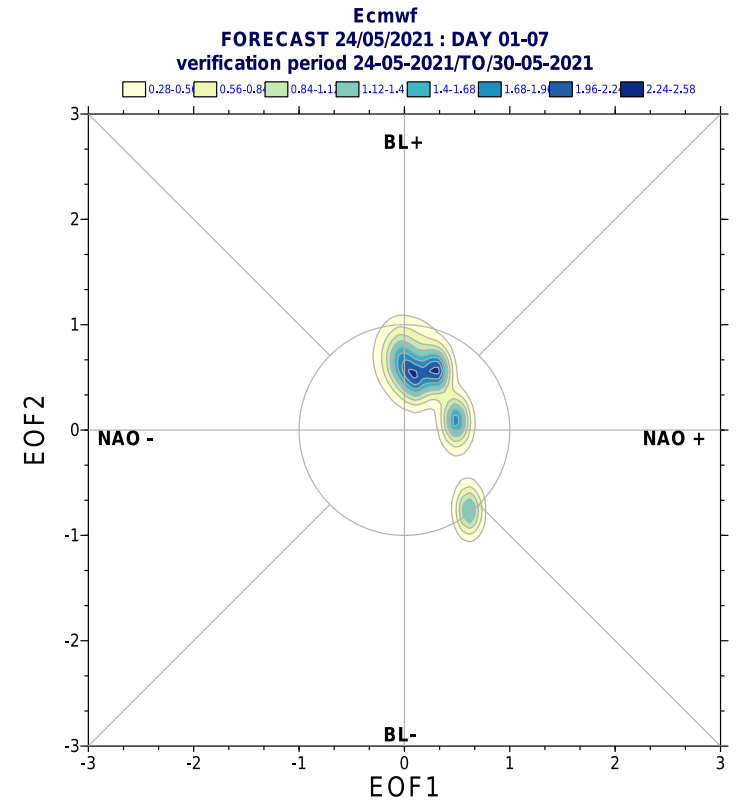
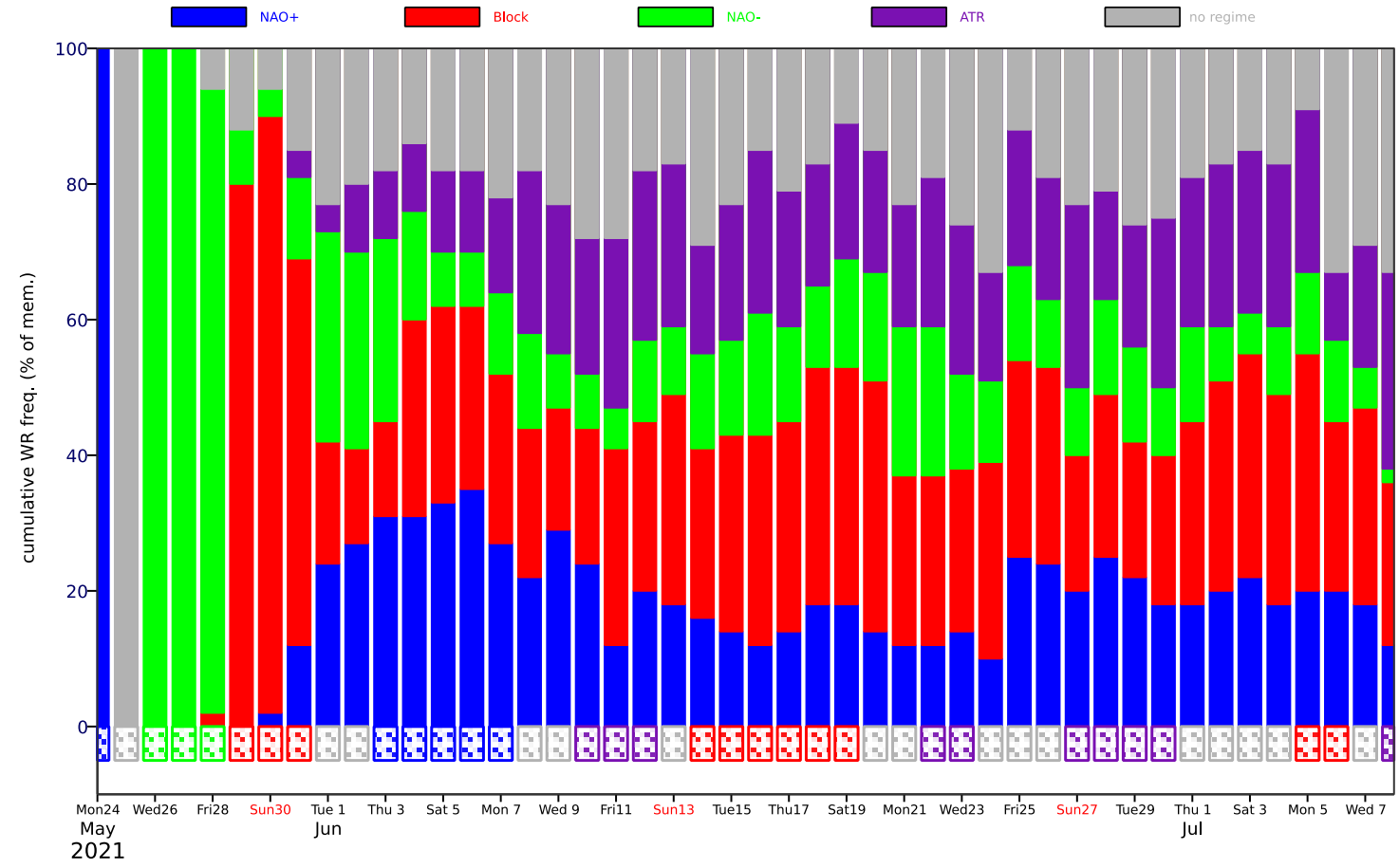
Zonal mean zonal wind at 10Hpa 20210524



New Extended-range forecast chart

Euro-Atlantic Weather regimes

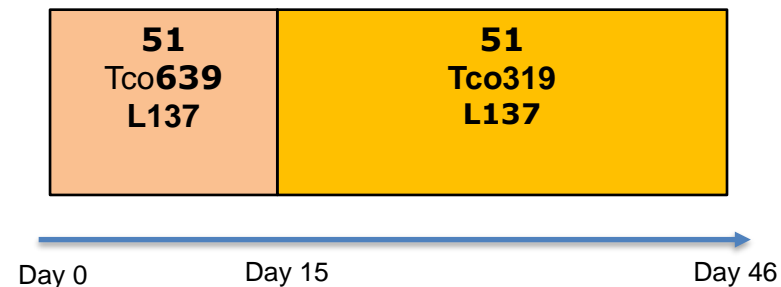
Weather Regime frequency
Ensemble Forecast: 20210524



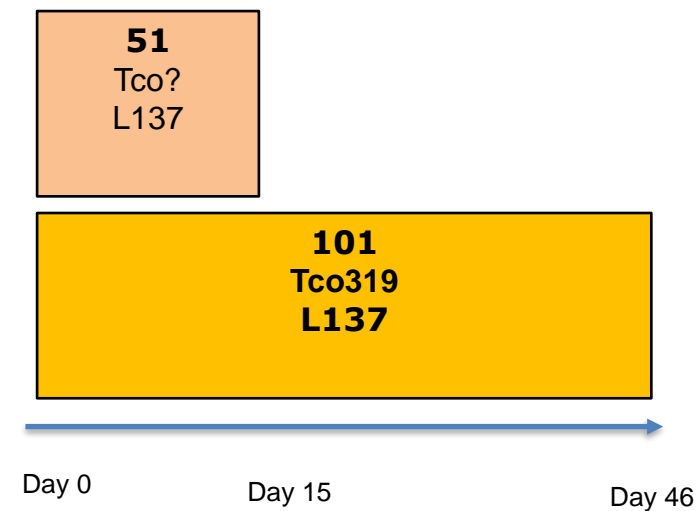
Future configuration (Bologna HPC):

1. Same horizontal resolution as now (Tco319)
2. Daily real-time forecasts (00Z) instead of twice weekly
3. 100 members instead of 51
4. Extended-range ensemble (lower resolution) starting at step 0, separately from the 15-day medium-range ensemble (higher resolution)
5. *Re-forecast are run daily (instead of twice weekly) but with lower ensemble size (to be introduced in a later cycle)*

Current configuration



Next configuration



Hres	Vres	Time Step	RT Ens per week	RFC Ens per week	Fct length	Cost
Tco319	137	1200s	102	440	Day 14-46	1
Tco319	137	1200s	700	440	Day 0-46	3.2

Extended-range products will need to be revised for this configuration change (e.g stamp maps, weekly definitions..)