



Monitoring the ECMWF forecast system

Fernando Prates

Diagnostic Team, Forecast Department, ECMWF

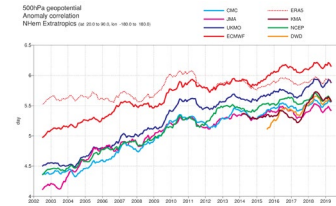
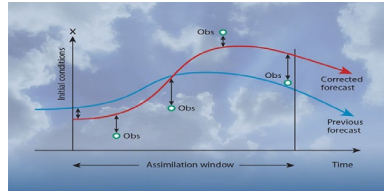
fernando.prates@ecmwf.int



The Weather Room



Basic steps in NWP



Observations

Observation types
Conventional
Polar satellites
Geostationary sat.

Quality control

Common issues

Data assimilation

Algorithms
Background error
Observation error

Increments

Forecast

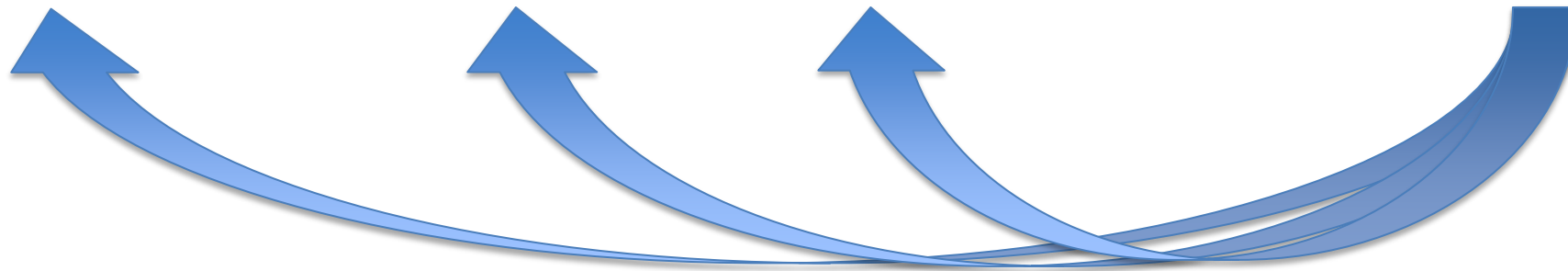
Model components
Dynamics
Atm. Physics
Surface
Ocean

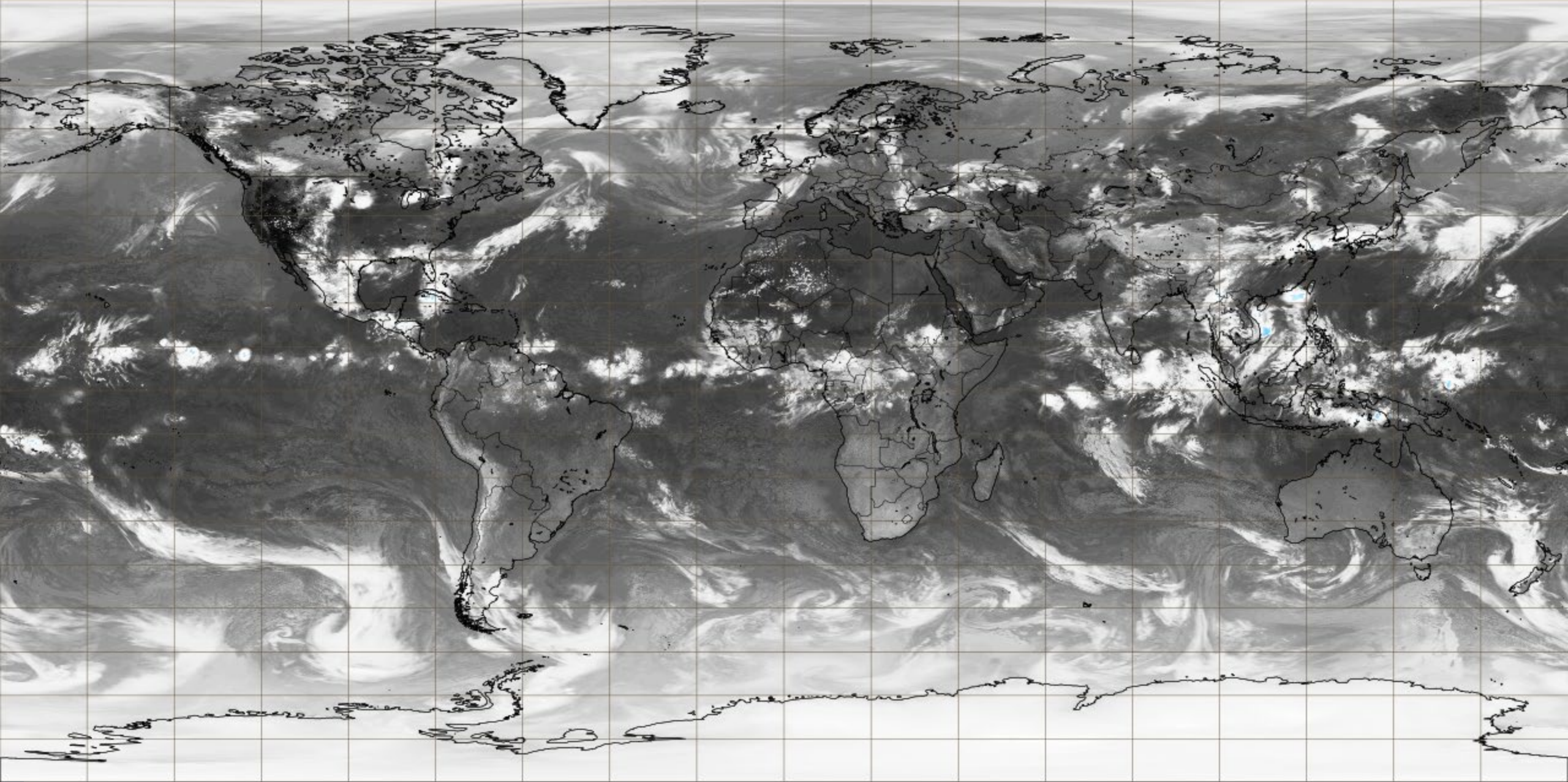
Dissimilation

Reliability
Timeliness
Post-processing
Products

Evaluation

Daily errors
Statistical evaluation
Diagnostics
Current issues



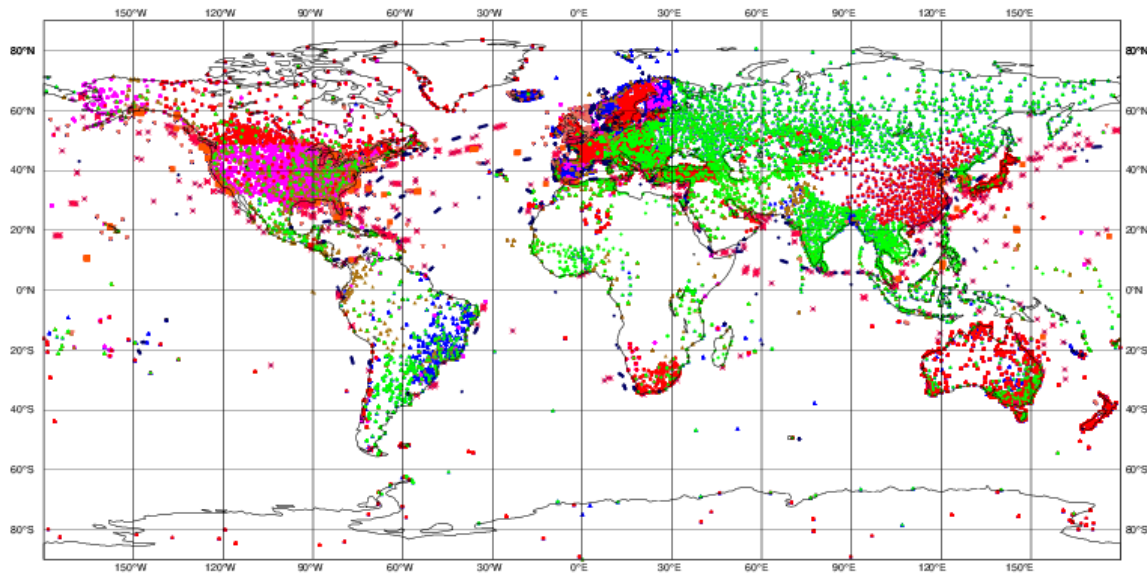
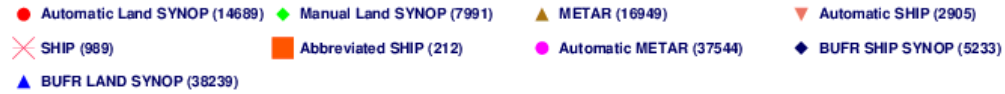


Observation coverage - surface

ECMWF data coverage (all observations) - SYNOP-SHIP-METAR

2021070421 to 2021070503

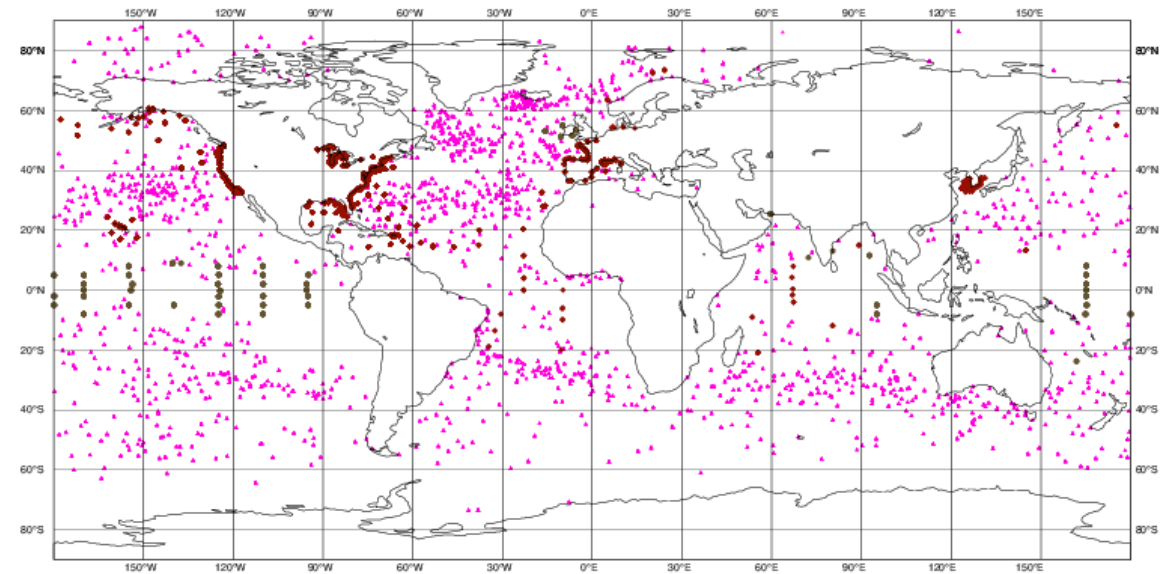
Total number of obs = 124751



ECMWF data coverage (all observations) - BUOY

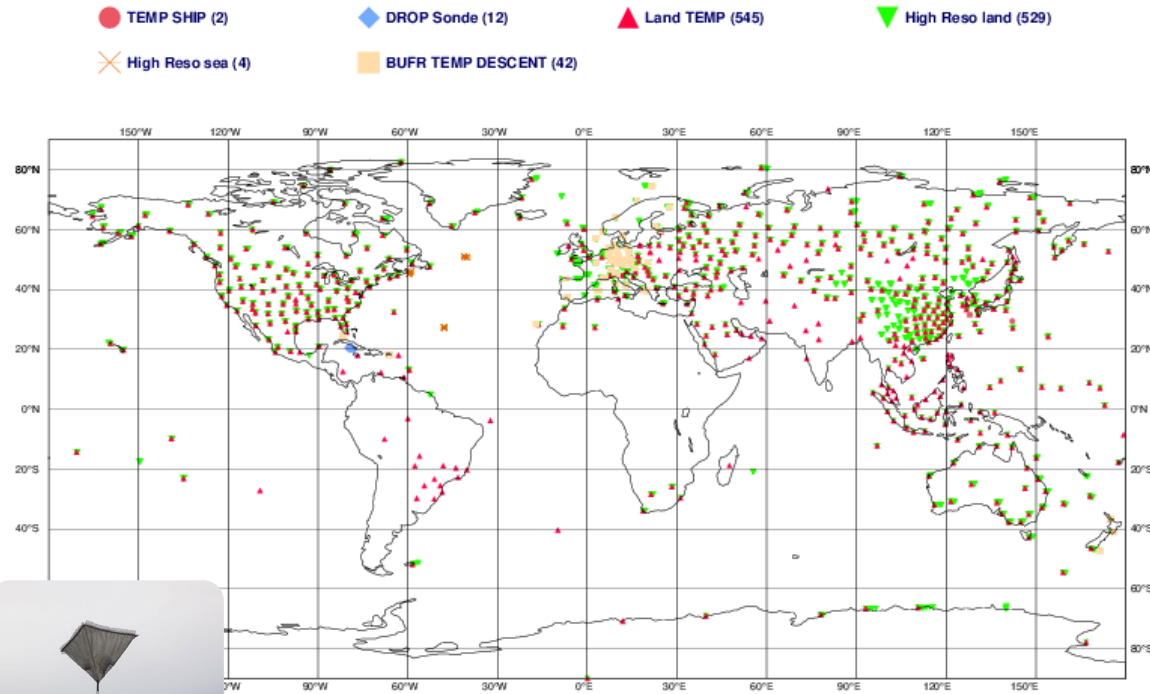
2021070421 to 2021070503

Total number of obs = 2027

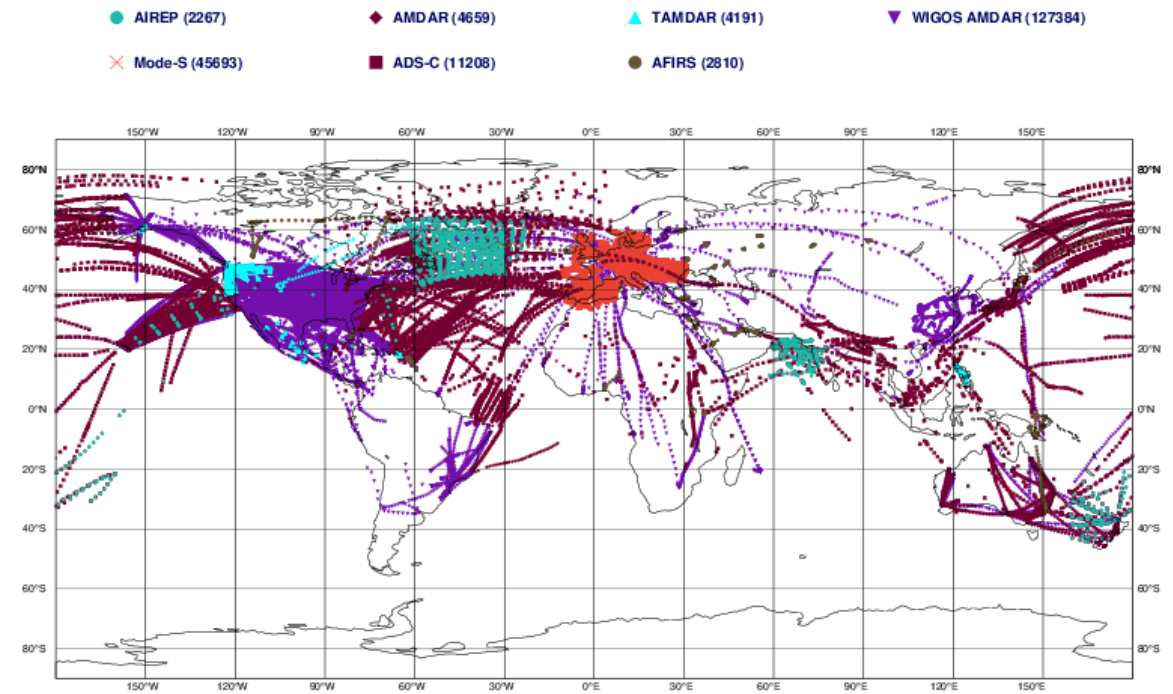


Observation Coverage – upper air

ECMWF data coverage (all observations) - RADIOSONDE
2021070421 to 2021070503
Total number of obs = 1134

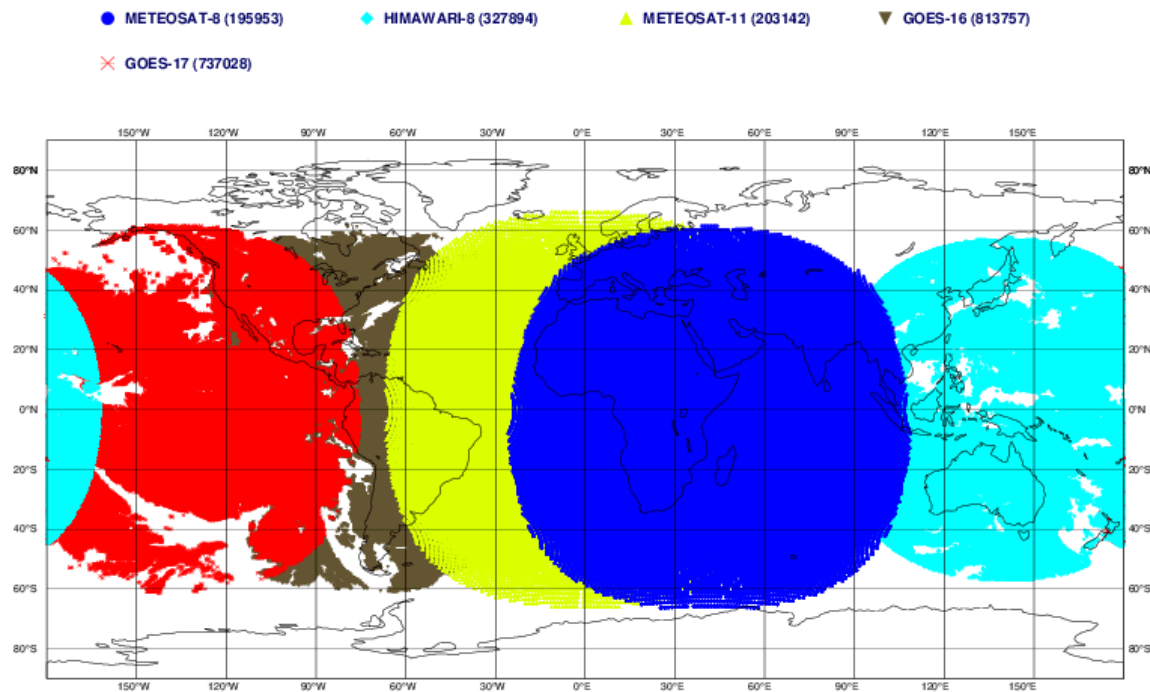


ECMWF data coverage (all observations) - AIRCRAFT
2021070421 to 2021070503
Total number of obs = 198212

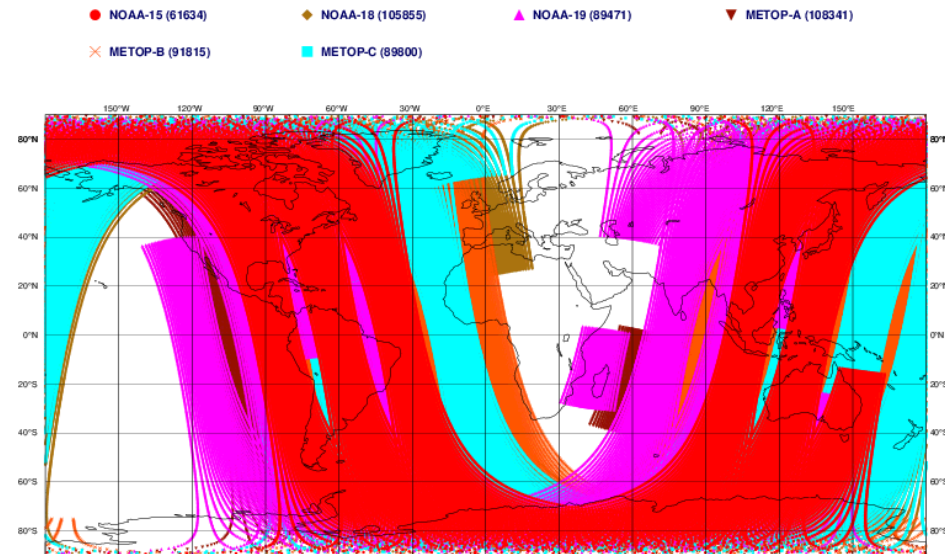


Observation coverage - satellites

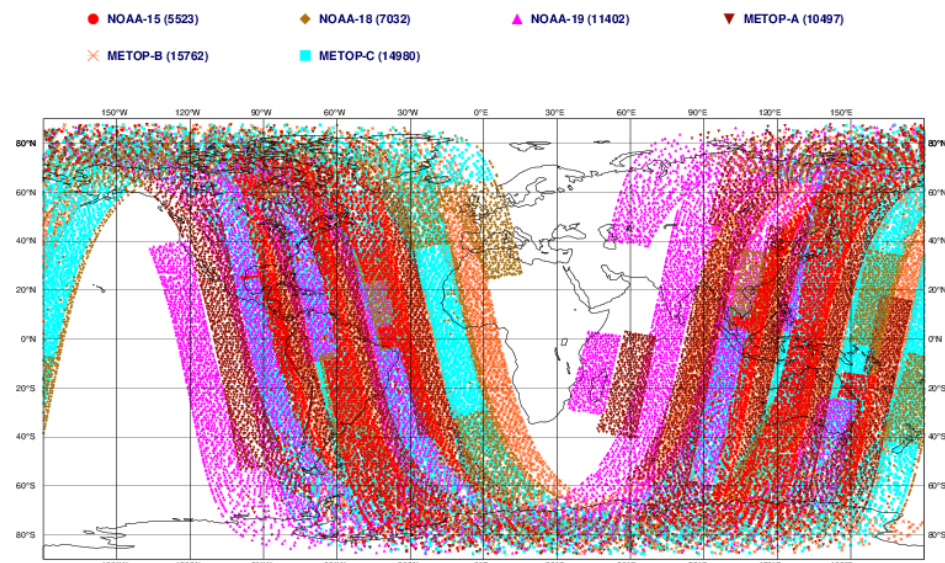
ECMWF data coverage (all observations) - GEOSTATIONARY RADIANCES
2021070421 to 2021070503
Total number of obs = 2277774



ECMWF data coverage (all observations) - AMSUA
2021070421 to 2021070503
Total number of obs = 546916

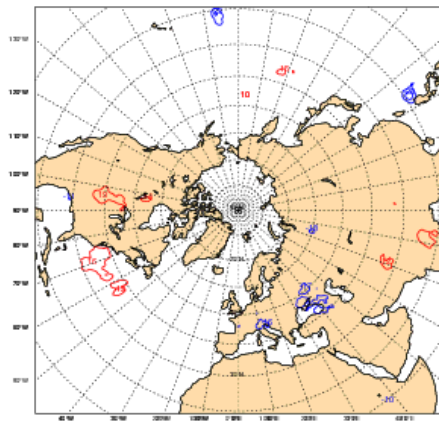


ECMWF data coverage (used observations) - AMSUA
2021070421 to 2021070503
Total number of obs = 65196

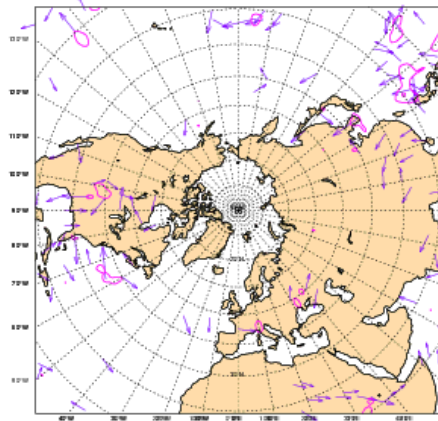


Producing the new analysis

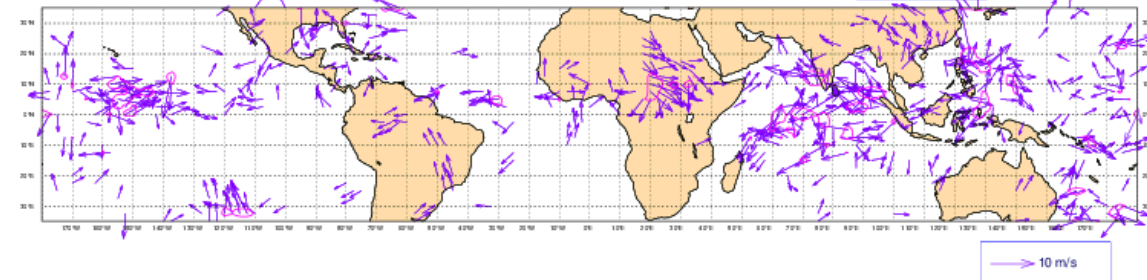
ECMWF Analysis Sunday 4 July 2021 12UTC
200hPa Geopotential
AN: stream=LWDA time=12 date=20210704 - FG: stream=LWDA time=6 date=20210704 step=6



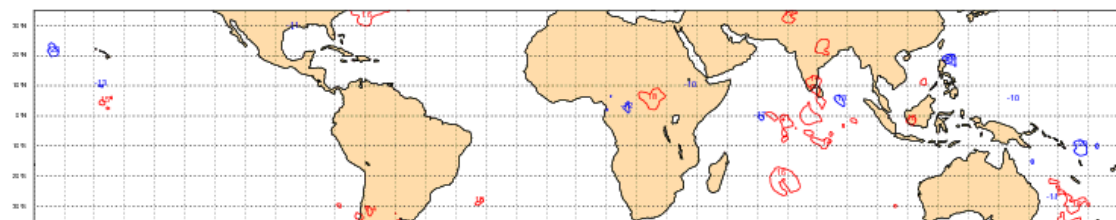
ECMWF Analysis Sunday 4 July 2021 12UTC
200hPa V velocity
AN: stream=LWDA time=12 date=20210704 - FG: stream=LWDA time=6 date=20210704 step=6



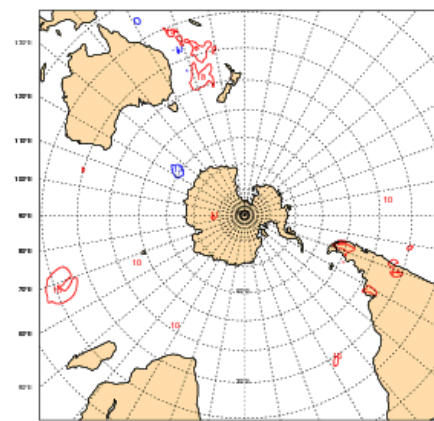
ECMWF Analysis Sunday 4 July 2021 12UTC
200hPa V velocity
AN: stream=LWDA time=12 date=20210704 - FG: stream=LWDA time=6 date=20210704 step=6



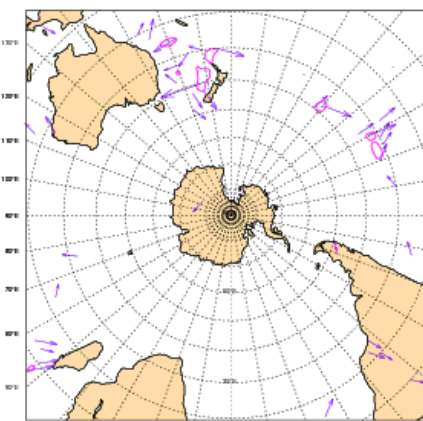
ECMWF Analysis Sunday 4 July 2021 12UTC
200hPa Geopotential
AN: stream=LWDA time=12 date=20210704 - FG: stream=LWDA time=6 date=20210704 step=6



ECMWF Analysis Sunday 4 July 2021 12UTC
200hPa Geopotential
AN: stream=LWDA time=12 date=20210704 - FG: stream=LWDA time=6 date=20210704 step=6

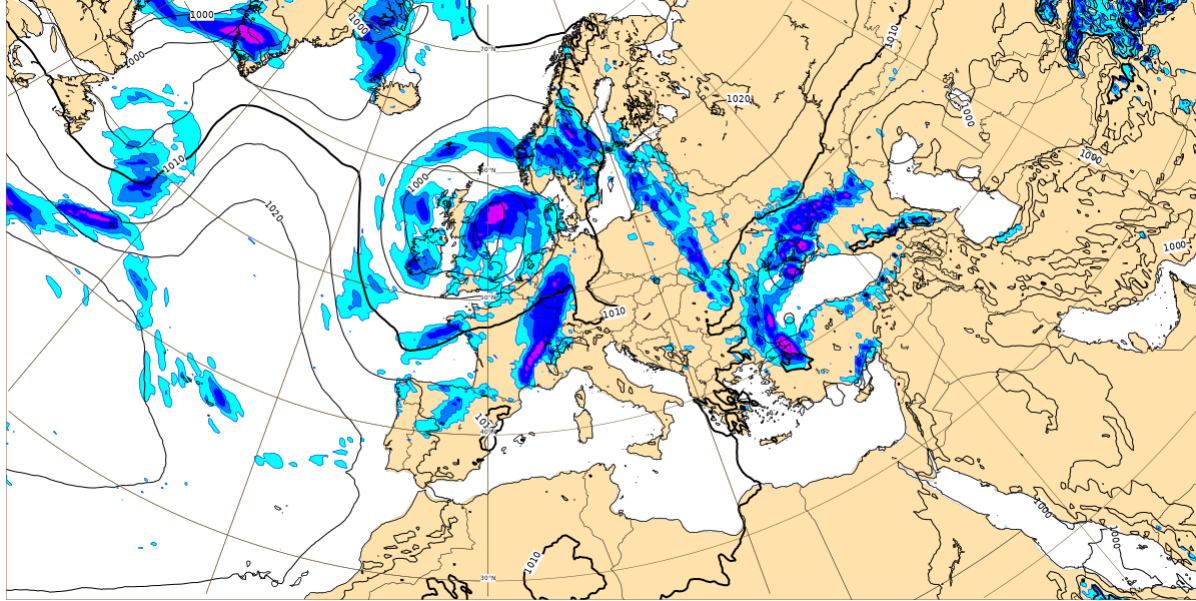


ECMWF Analysis Sunday 4 July 2021 12UTC
200hPa V velocity
AN: stream=LWDA time=12 date=20210704 - FG: stream=LWDA time=6 date=20210704 step=6

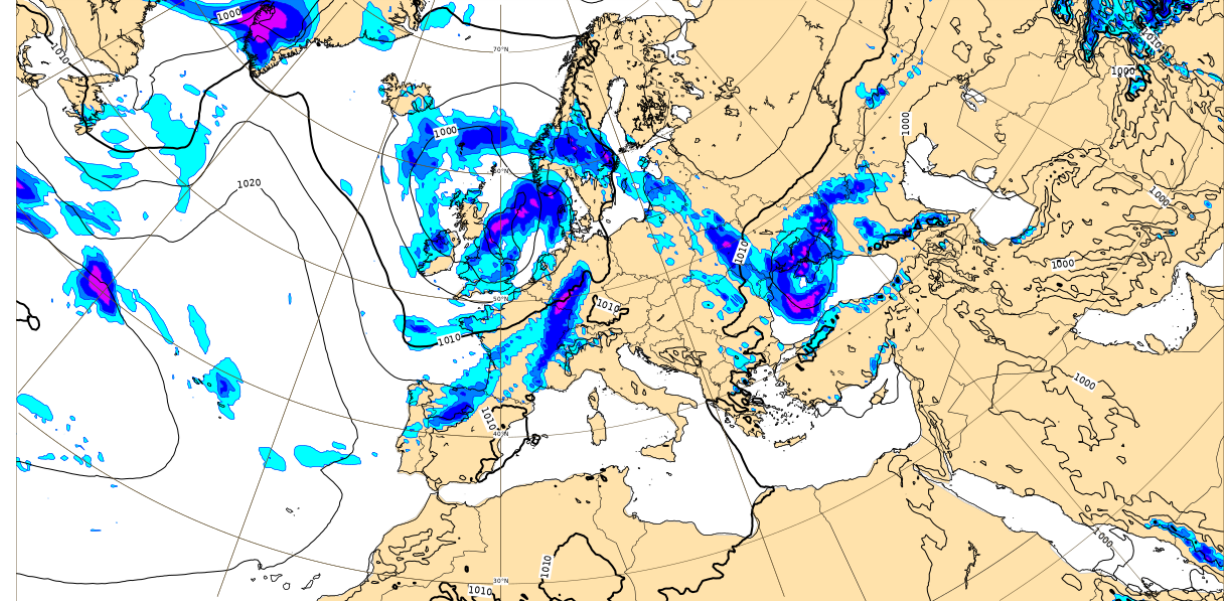


HRES Forecast

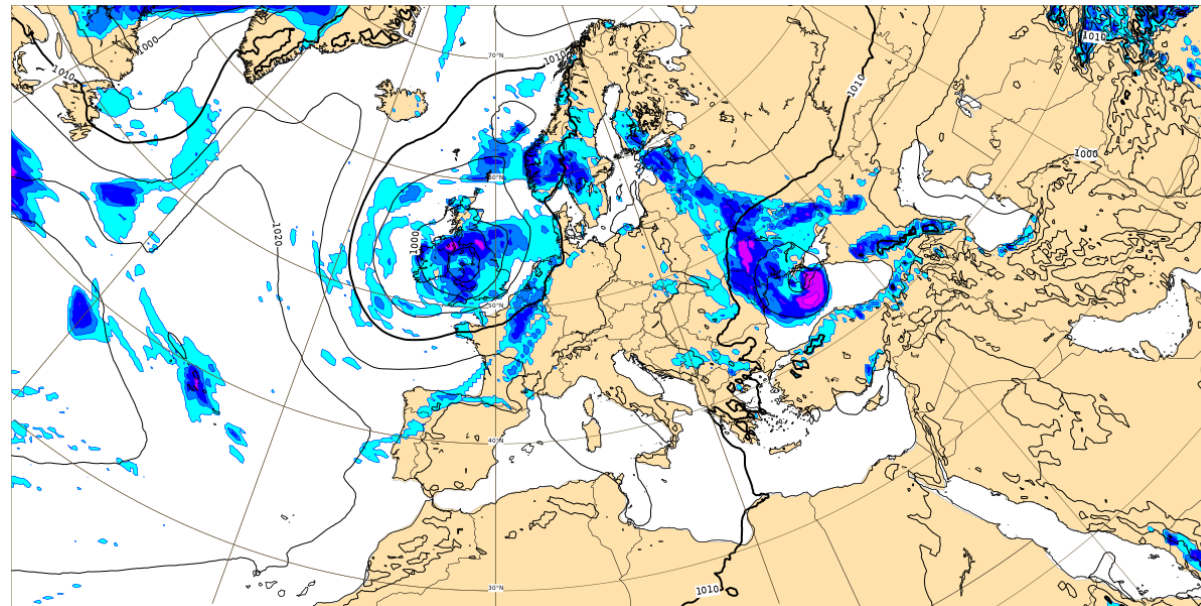
Forecast for Today from this morning



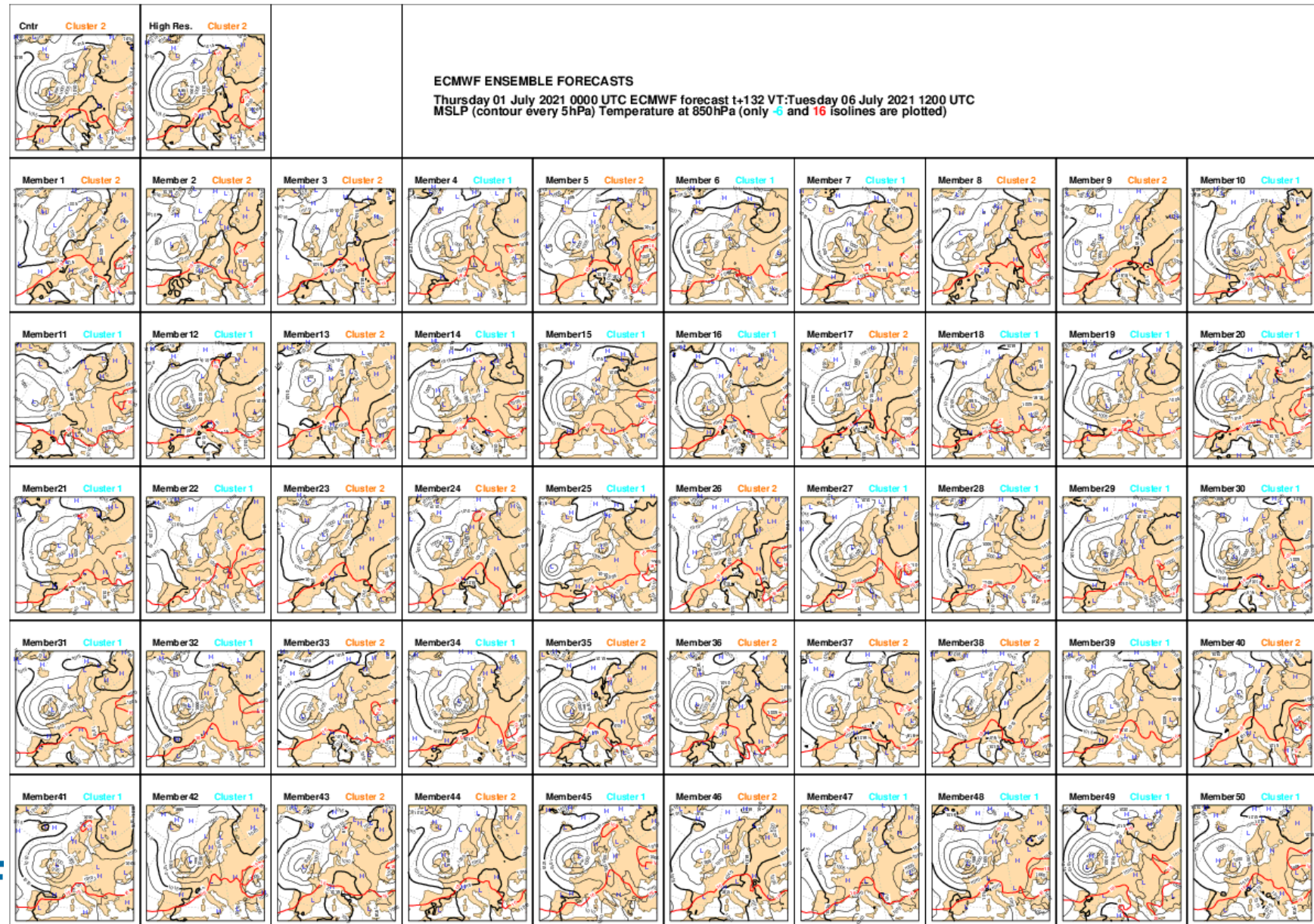
Forecast for Today from Saturday morning (3.5 days)



Forecast for Today
from Thursday
morning (5.5 days)



Ensemble forecast

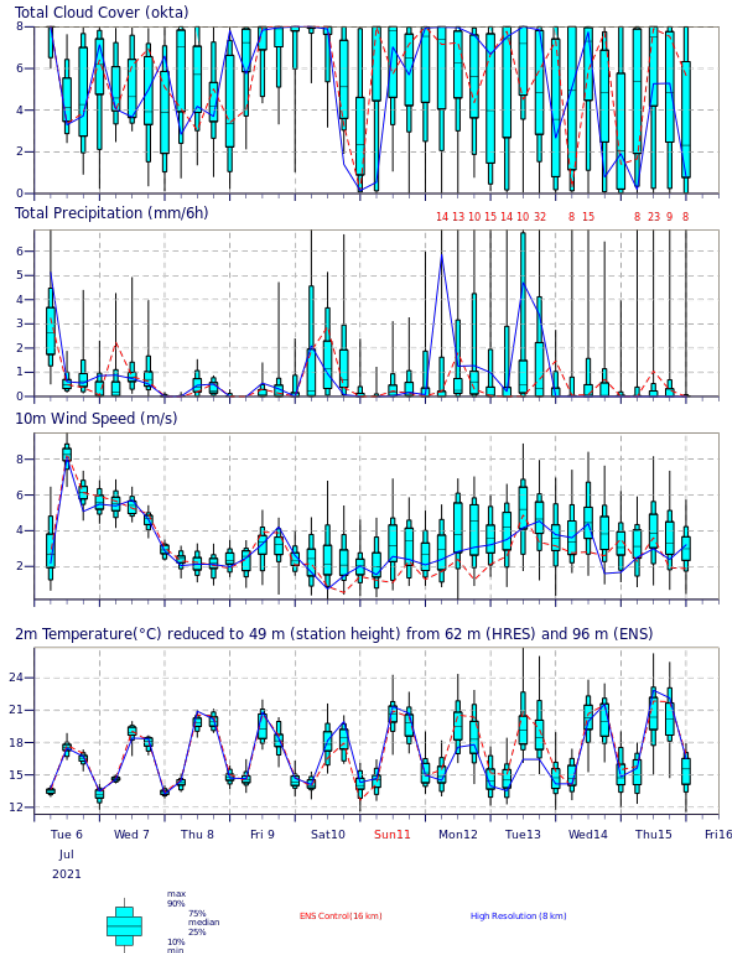


Ensemble forecast from today for Reading

ENS Meteogram

51.38°N 0.97°W (ENS land point) 49 m

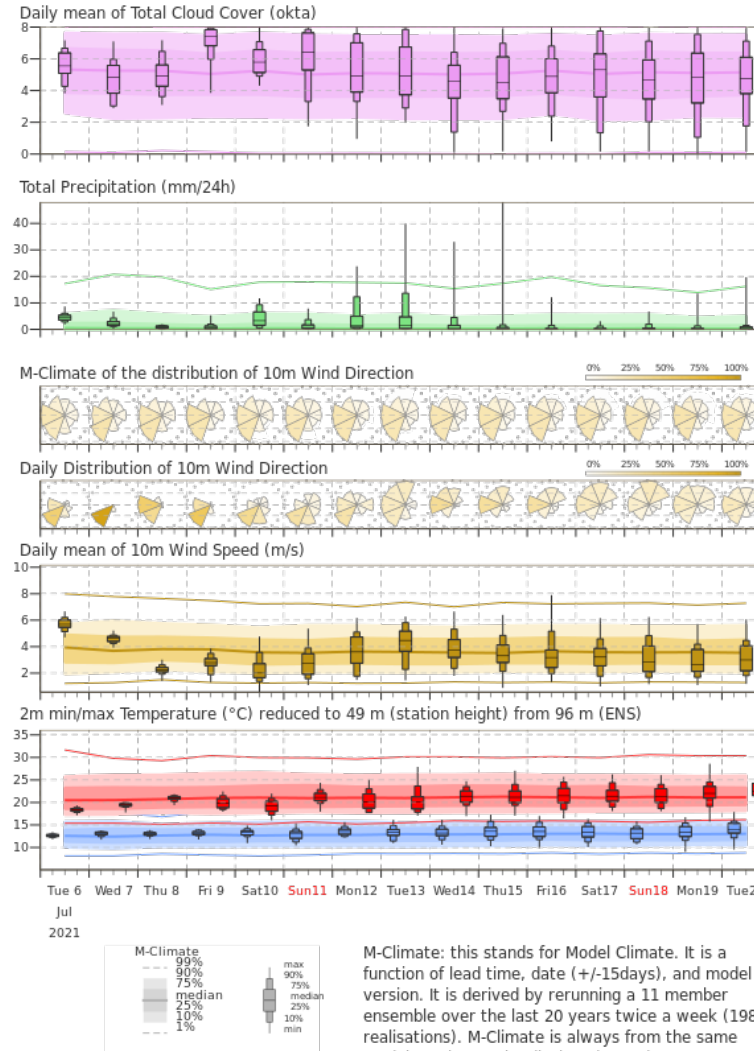
High Resolution Forecast and ENS Distribution Tuesday 6 July 2021 00 UTC



ENS Meteogram

51.38°N 0.97°W (ENS land point) 49 m

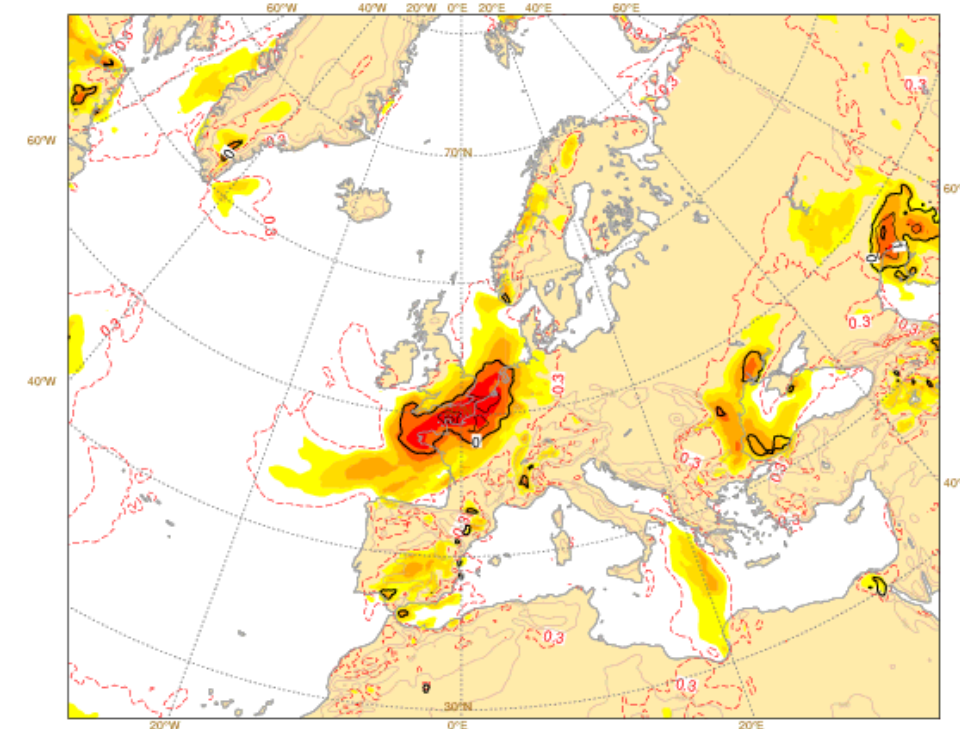
Forecast based on ENS distribution Tuesday 6 July 2021 00 UTC



M-Climate: this stands for Model Climate. It is a function of lead time, date (+/-15days), and model version. It is derived by rerunning a 11 member ensemble over the last 20 years twice a week (1980 realisations). M-Climate is always from the same model version as the displayed ENS data.

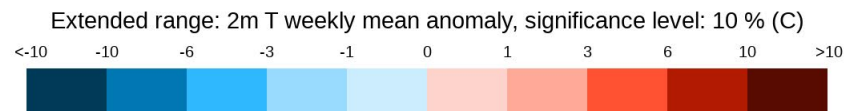
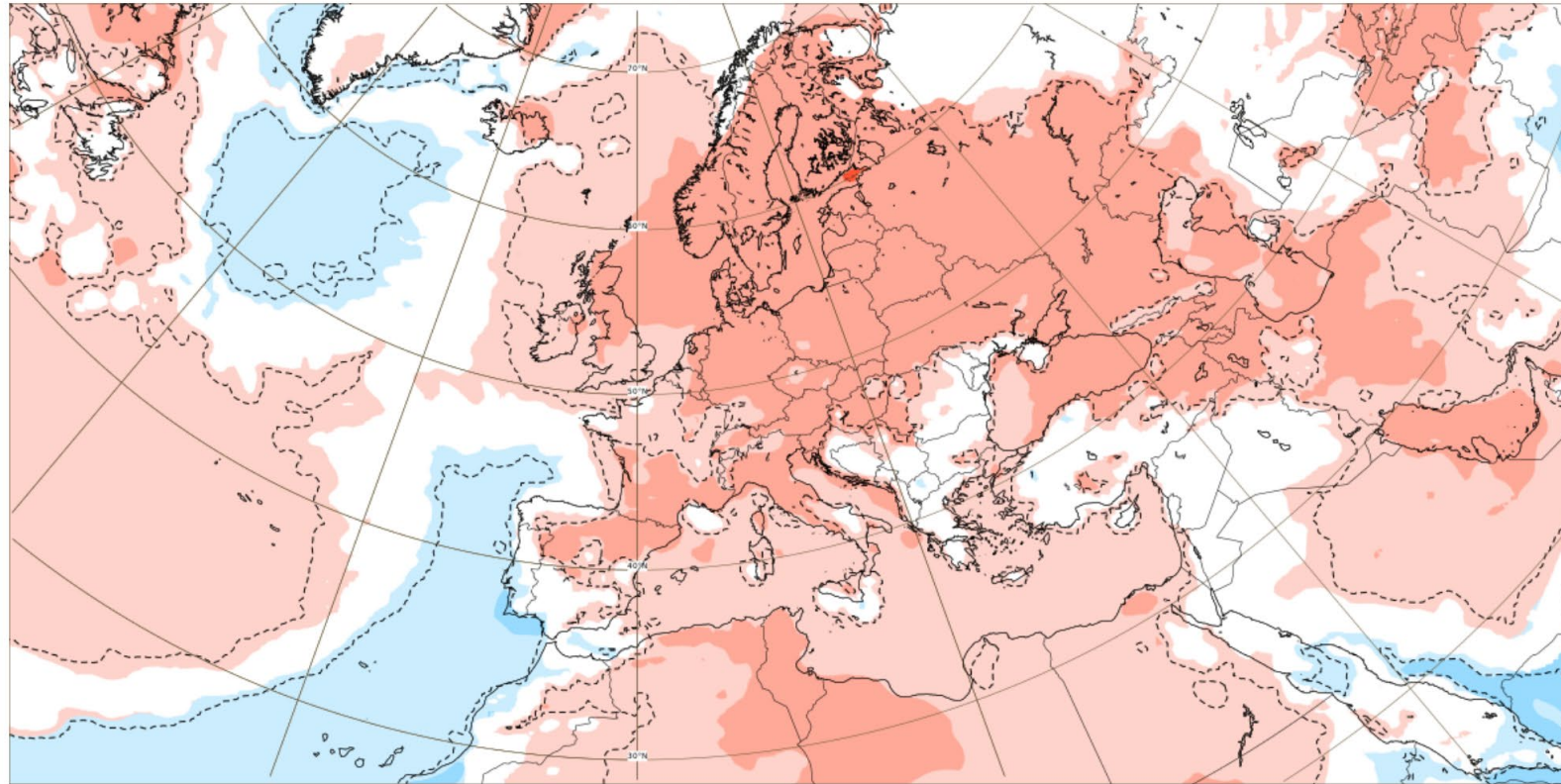
Extreme forecast index for wind gusts

Mon 05 Jul 2021 12UTC ©ECMWF t+12-36h VT: Tue 06 Jul 2021 00UTC - Wed 07 Jul 2021 00UTC
Extreme forecast index and Shift of Tails (black contours 0,1,2,5,8) for 10m wind gusts



2m temperature: Weekly mean anomalies

Base time: Mon 05 Jul 2021, Valid time: Mon 19 Jul 2021 - Mon 26 Jul 2021, - T+504 h, Area : Europe



Tropical cyclone Elsa

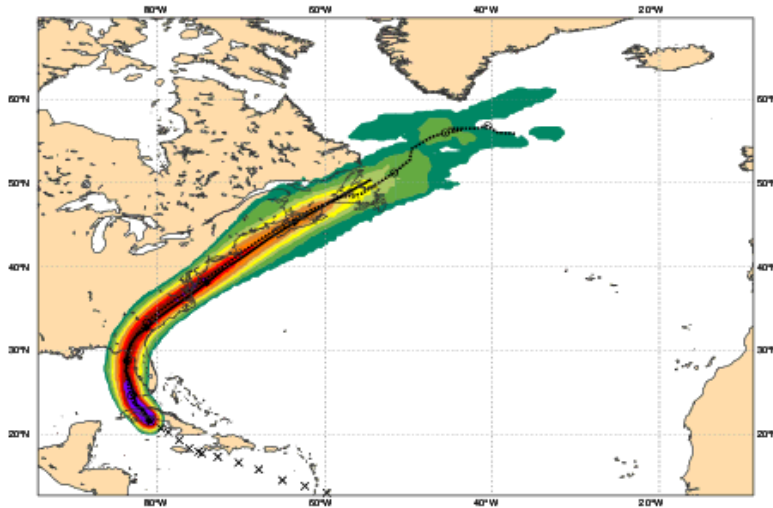
Forecast from yesterday

Date 20210705 12 UTC @ECMWF

Probability that **ELSA** will pass within 120 km radius during the next 240 hours

tracks: **solid**=HRES; **dot**=Ens Mean [reported minimum central pressure (hPa) **1006**]

5-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80 80-90 > 90%

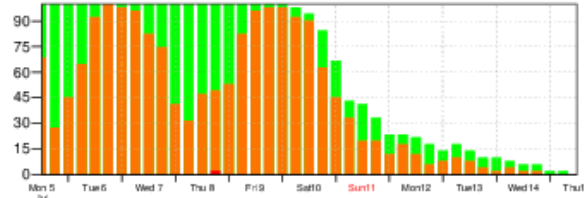


List of ensemble members forecast Tropical Cyclone

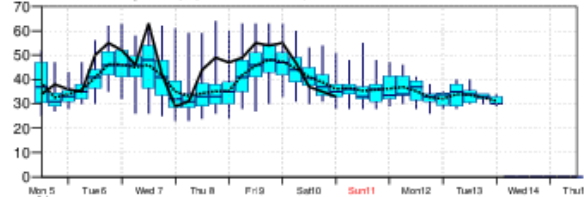
Intensity category in colours: **TD**[up to 33] **TS**[34-63] **HR1**[64-82] **HR2**[83-95] **HR3**[> 95 kt]

+024 h : 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
 +048 h : 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
 +072 h : 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
 +096 h : 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
 +120 h : 01 02 03 04 05 06 07 08 10 12 13 14 15 16 17 18 19 20 21 22 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
 +144 h : 01 06 10 12 13 16 22 25 26 28 29 30 31 34 35 36 39 42 44 46 49 50
 +168 h : 01 06 10 12 14 16 25 26 30 34 35 39 42 44 46 49 50
 +192 h : 01 06 10 14 16 25 26 30 34 35 39 42 44 46 49 50
 +216 h : 01 06 10 14 16 25 26 30 34 35 39 42 44 46 49 50
 +240 h : 01 06 10 14 16 25 26 30 34 35 39 42 44 46 49 50

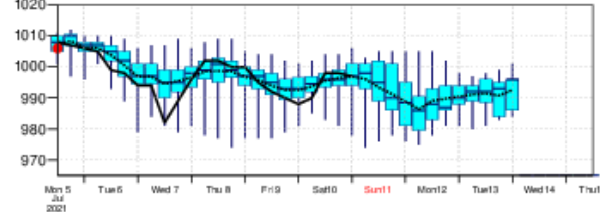
Probability (%) of Tropical Cyclone Intensity falling in each category
TD[up to 33] **TS**[34-63] **HR1**[64-82] **HR2**[83-95] **HR3**[> 95 kt]



10m Wind Speed (kt) **solid**=HRES; **dot**=Ens Mean



Mean Sea Level Pressure in Tropical Cyclone Centre (hPa) **solid**=HRES; **dot**=Ens Mean



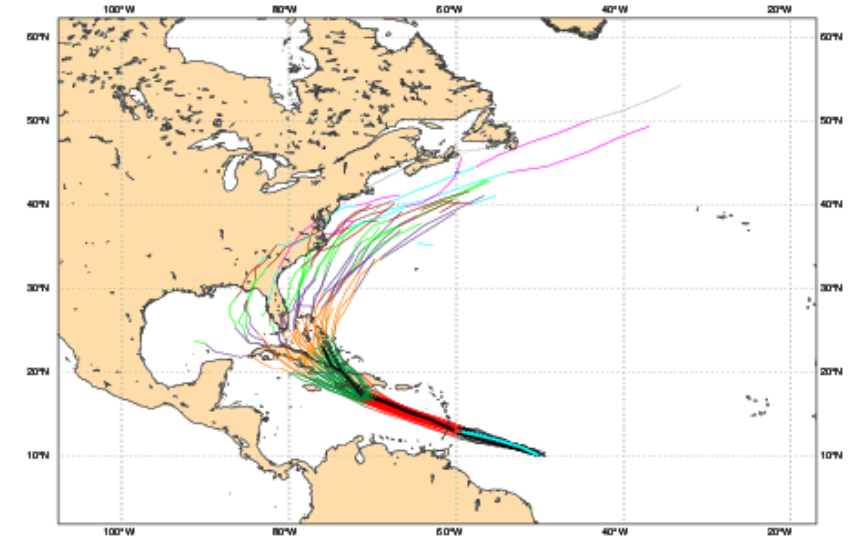
Forecast from Thursday

Date 20210701 12 UTC @ECMWF

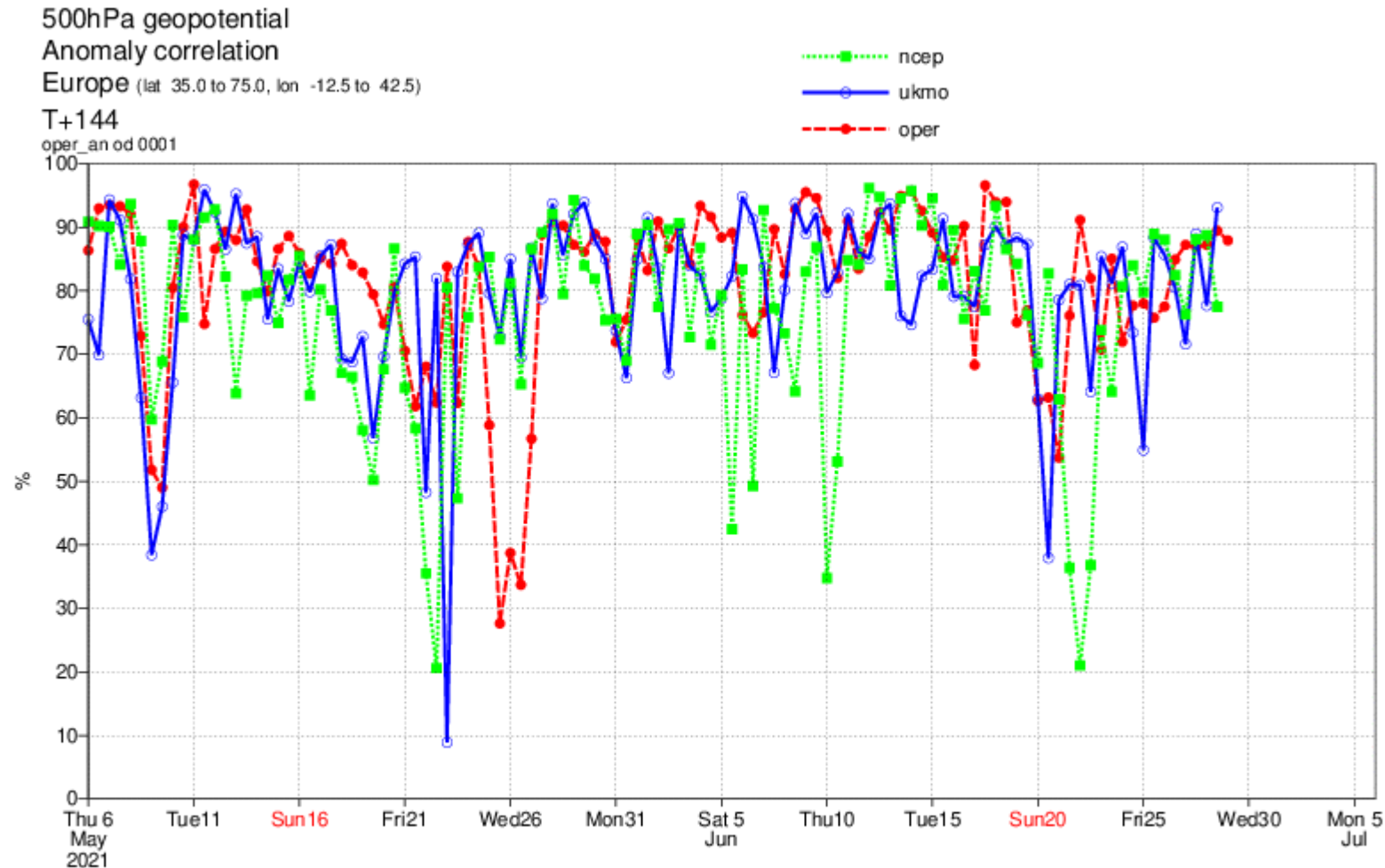
Individual trajectories for **ELSA** during the next 240 hours

tracks: **thick solid**=HRES; **thick dot**=CTRL; **thin solid**=EPS members [coloured]

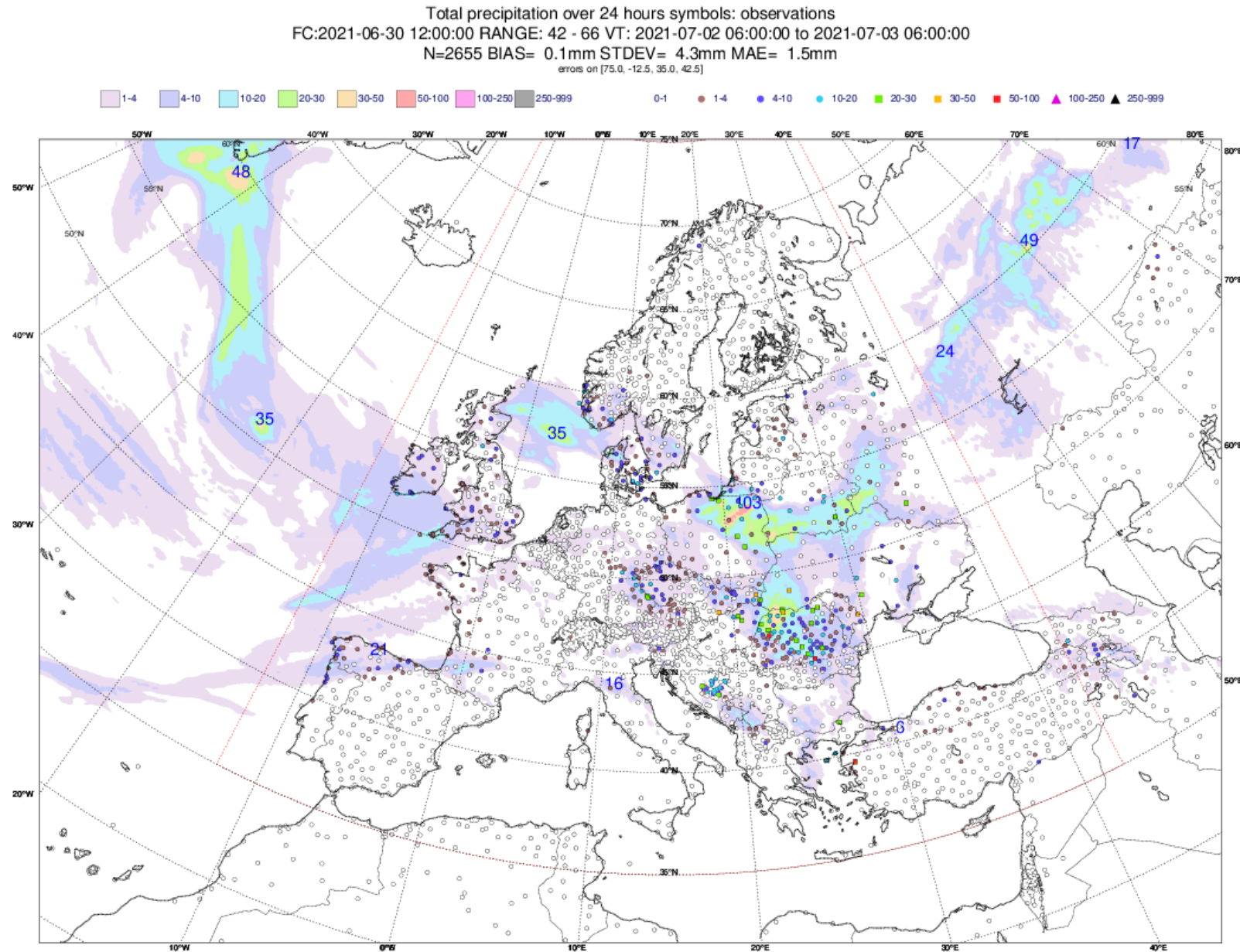
0-24h 24-48h 48-72h 72-96h 96-120h 120-144h 144-168h 168-192h 192-216h 216-240h



Forecast evaluation – Scores for 6-day forecasts for Europe



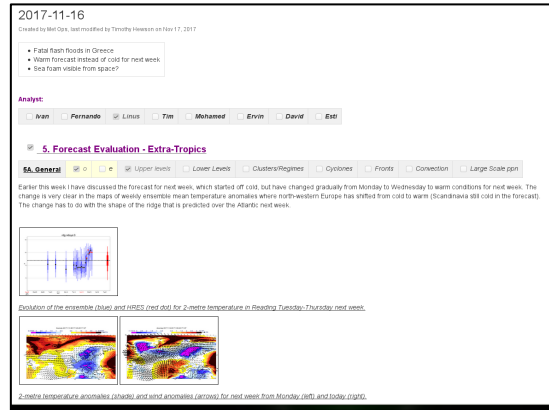
Forecast evaluation



Questions from users

Forecast quality monitoring at ECMWF

Daily report



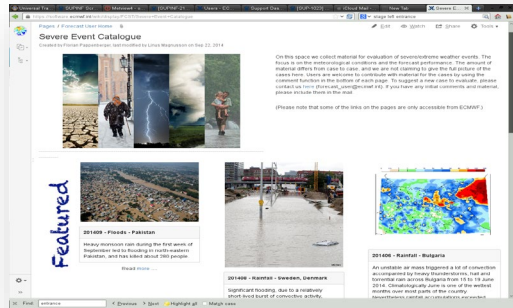
Weekly weather discussions



Quarterly evaluation and development meeting

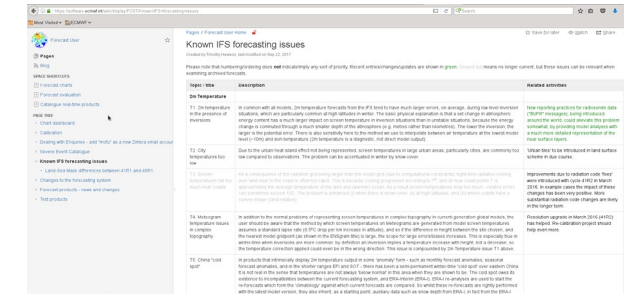


Severe event catalogue

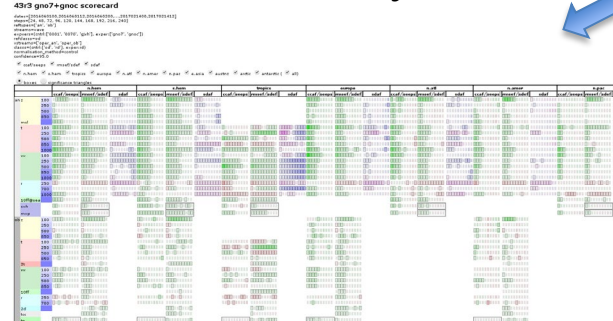


Research activities

Known forecast issues



New model cycles



Questions and thank you for listening