

Recent and current product development

Ivan Tsonevsky

ivan.tsonevsky@ecmwf.int

Outline

- EFI/SOT – recent changes for:
 - snowfall
 - CAPE and CAPE-shear
- Extended-range Hovmöller diagram – prototype products following requests at UEF2020
- Improving visibility forecasts in the IFS
 - alterations in the extinction coefficients which account for the impact of aerosols and hydrometeors on optical wavelengths

EFI & SOT

recent changes

Extending available forecast steps for snowfall EFI/SOT

EFI/SOT total precipitation

24-h (up to day 7)

72-h (up to day 10)

120-h (up to day 15)

240-h (from T+0h)

360-h (from T+0h)

EFI/SOT snowfall

24-h (up to day 7)

72-h (up to day 10)

120-h (up to day 15)

240-h (from T+0h)

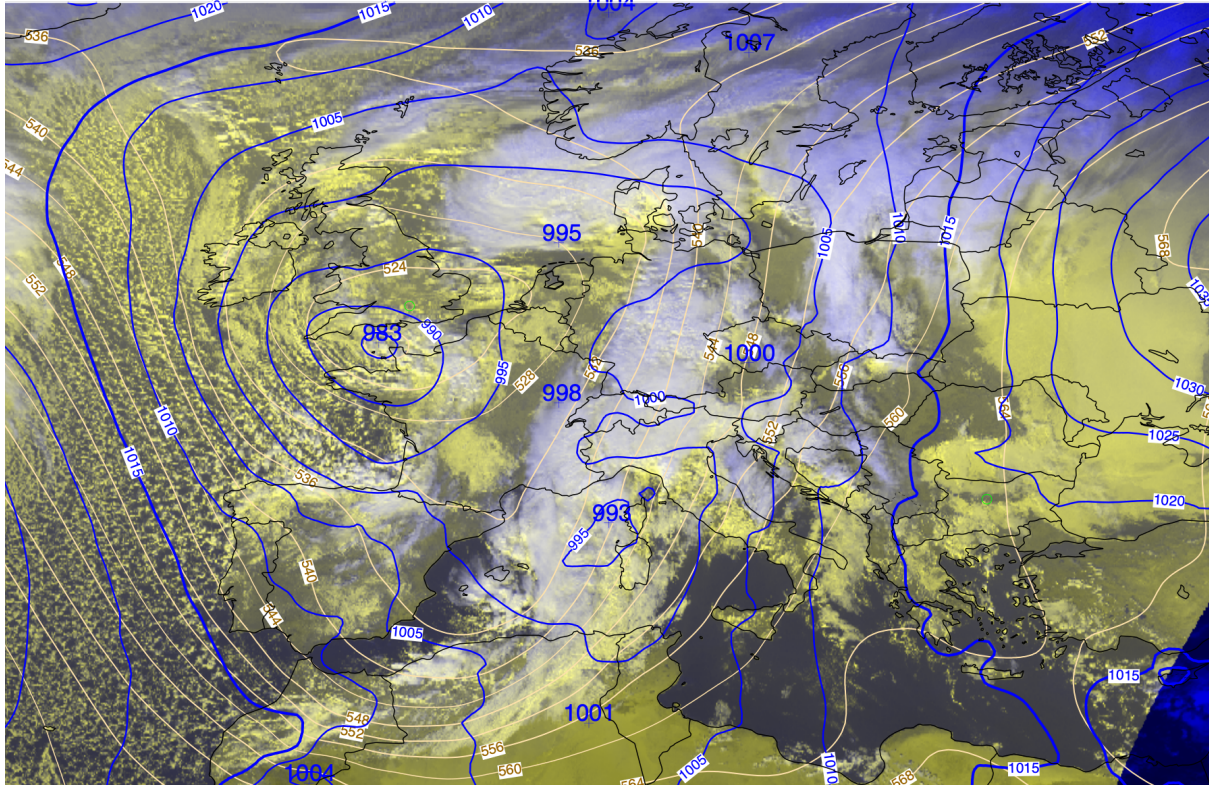
360-h (from T+0h)

- Useful for forecasting heavy snowfall events spanning for more than 1 calendar day
- Additional steps cover longer forecast ranges (beyond day 7)

Extreme snowfall event in the Alps – beginning of December 2020

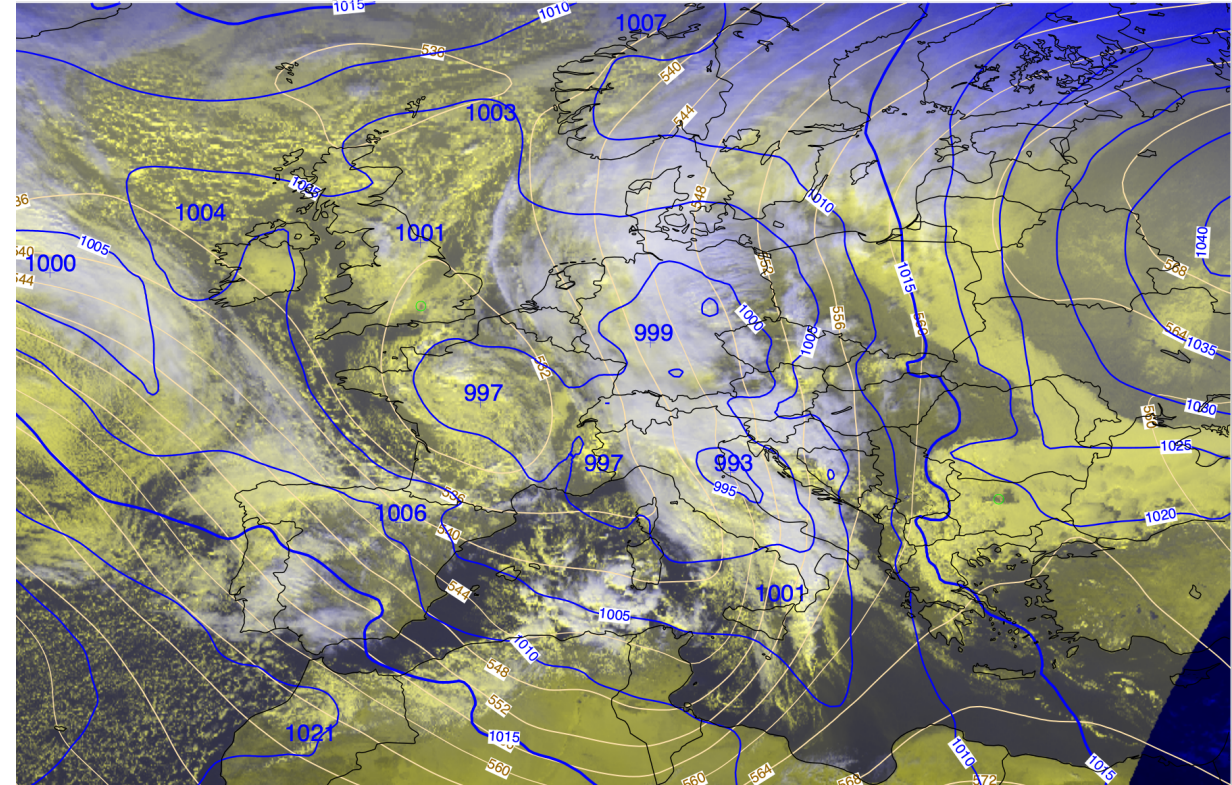
5 Dec 2020 12 UTC

2020-12-05T12:15:00Z; MSLP T+12h VT: 05/12/2020 12UTC; Z500 T+ 12h VT: 05/12/2020 12UTC



6 Dec 2020 12 UTC

2020-12-06T12:00:00Z; MSLP T+12h VT: 06/12/2020 12UTC; Z500 T+ 12h VT: 06/12/2020 12UTC

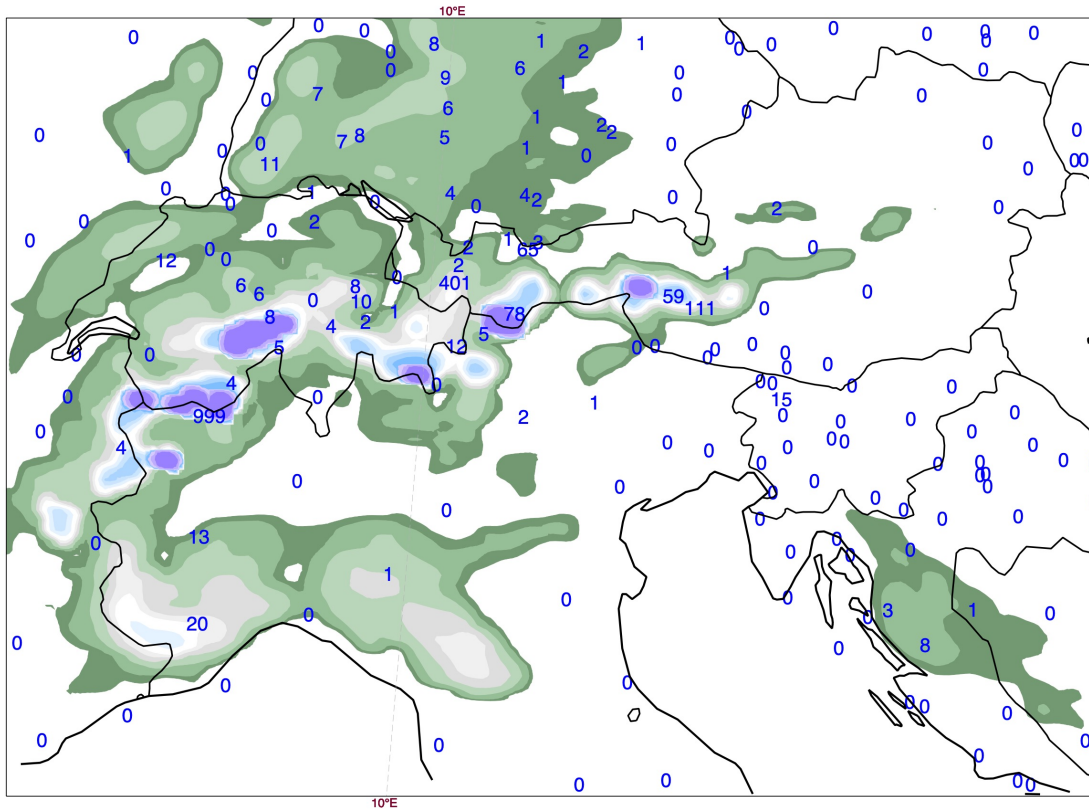
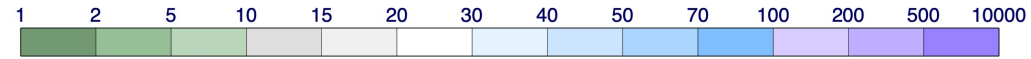


- A deep cyclone centred over Western Europe with a trough extending southwards bringing moist air with a strong southerly flow towards the Alps

Extreme snowfall event in the Alps – beginning of December 2020

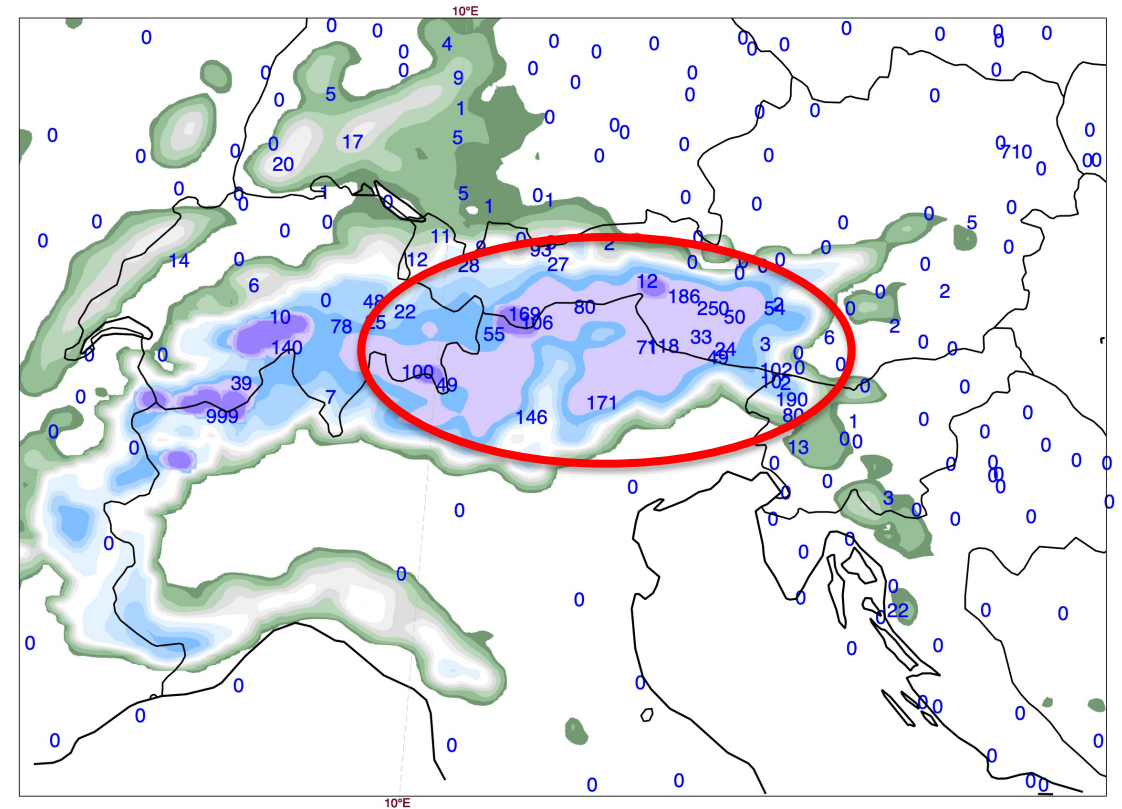
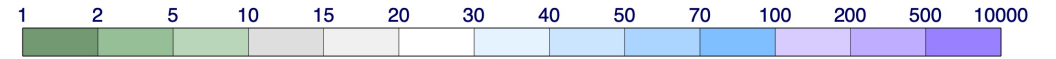
At the beginning of the event

Wednesday 02 December 2020 06 UTC ecmf t+0 VT:Wednesday 02 December 2020 06 UTC surface Snow depth



At the end of the event

Tuesday 08 December 2020 06 UTC ecmf t+0 VT:Tuesday 08 December 2020 06 UTC surface Snow depth

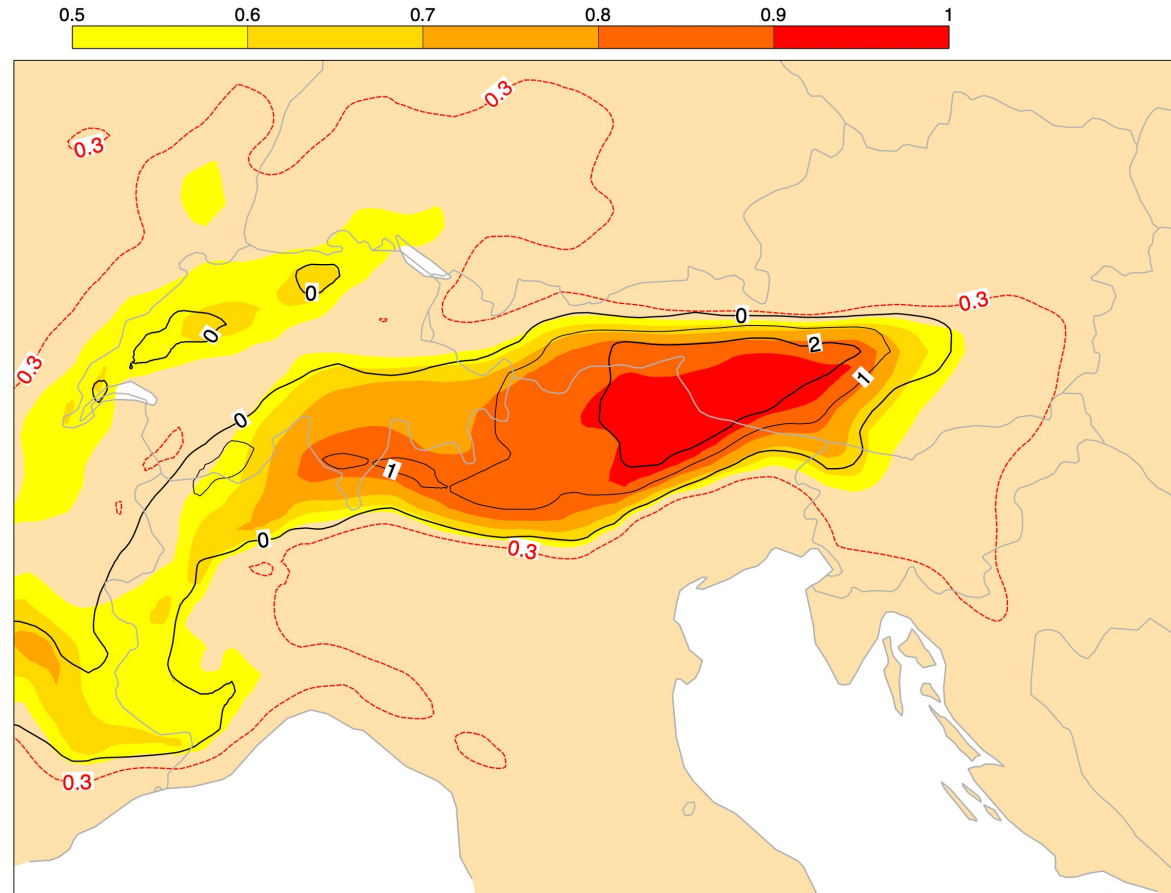


- Snow depth reached 1-1.5 m at low parts of the Apls in Austria and 2-4 m higher up.

EFI/SOT for snowfall

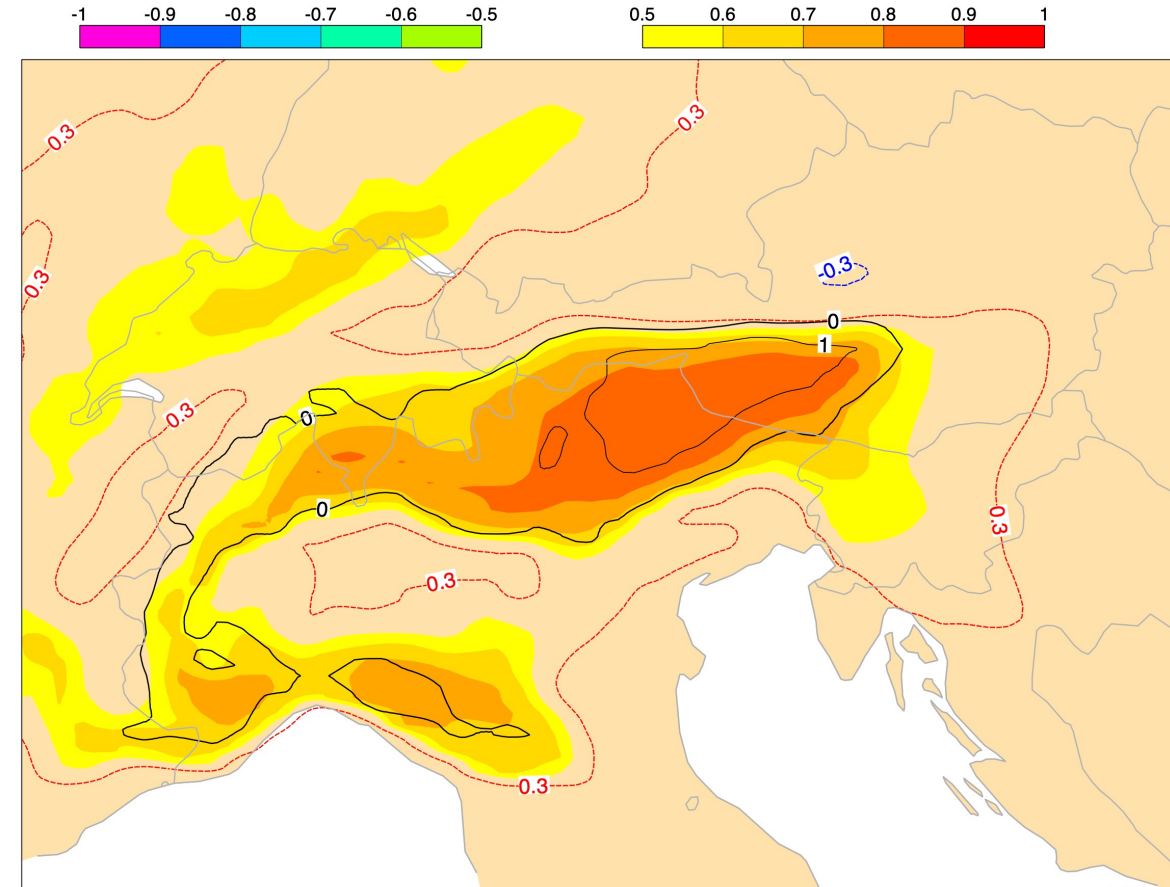
5-day snowfall accumulations

Mon 30 Nov 2020 00UTC @ECMWF expver = 1 VT: Thu 03 Dec 2020 00UTC - Tue 08 Dec 2020 00UTC 72-192h
Extreme forecast index and Shift of Tails (black contours 0,1,2,5,8) for: snowfall



10-day snowfall accumulations

Mon 30 Nov 2020 00UTC @ECMWF expver = 1 VT: Mon 30 Nov 2020 00UTC - Thu 10 Dec 2020 00UTC 0-240h
Extreme forecast index and Shift of Tails (black contours 0,1,2,5,8) for: snowfall



Plots on the web open charts

Home / EFI snow fall

EFI snow fall

Extreme forecast index

Time
Wed 19 May 2021 00 UTC

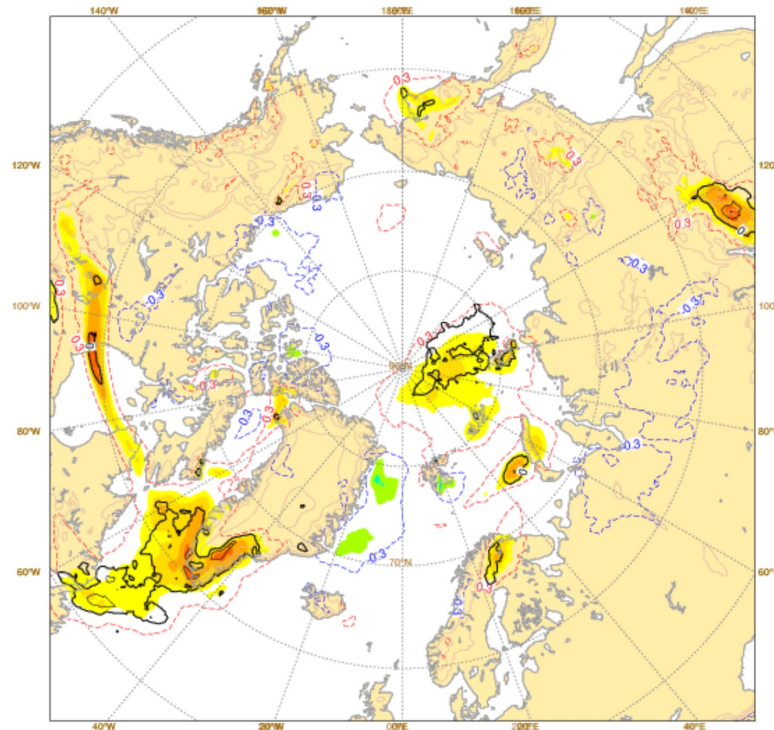
Day
1-10

Quantile
99

Area
Arctic

EFI/SOT

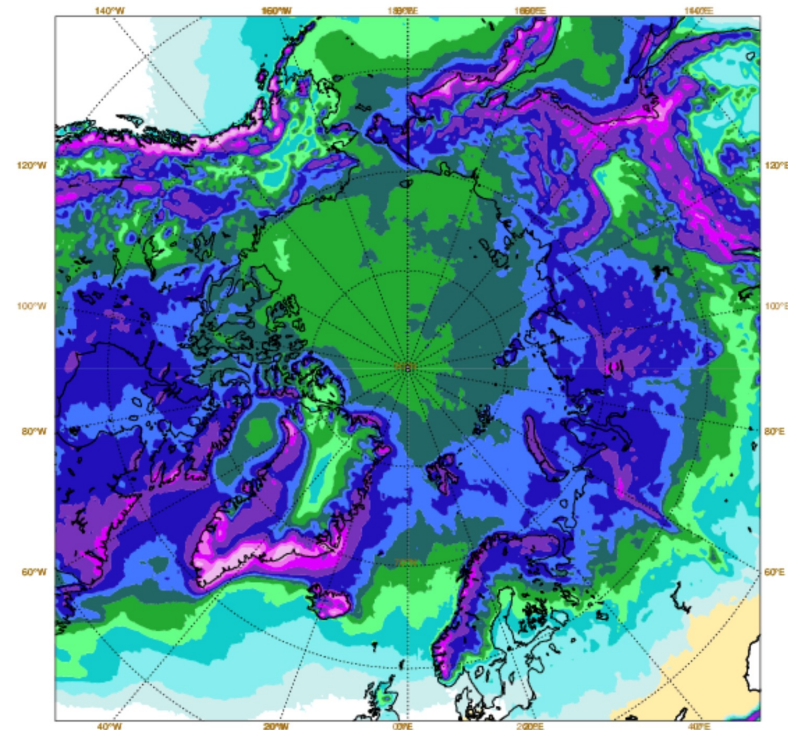
Wed 19 May 2021 00UTC ©ECMWF t+0-240h VT: Wed 19 May 2021 00UTC - Sat 29 May 2021 00UTC
Extreme forecast index and Shift of Tails (black contours 0,1,2,5,8) for total snowfall



Day 1-10

Model climate

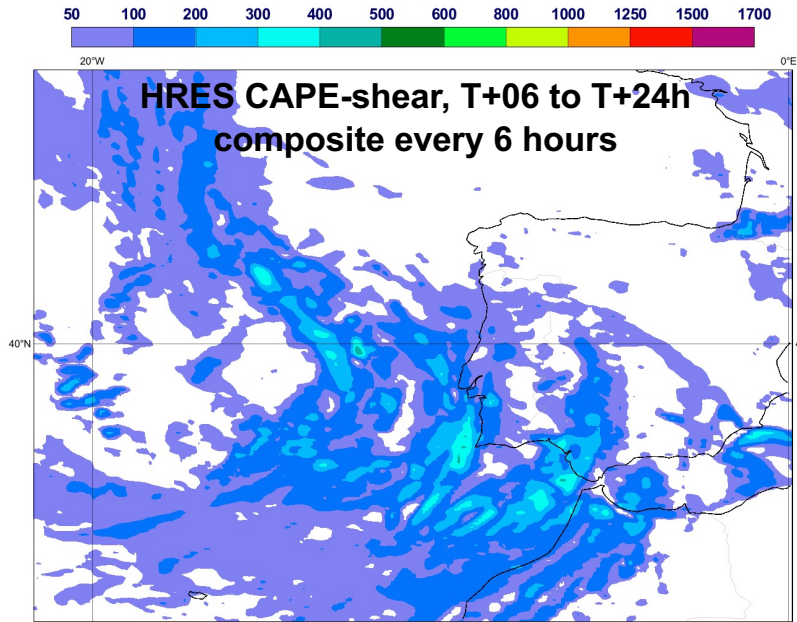
Mon 17 May 2021 00UTC ©ECMWF VT: Wed 19 May 2021 00UTC - Sat 29 May 2021 00UTC 0-240h
total snowfall (in mm) Model climate Q99 (one in 100 occasions realises more than value shown)



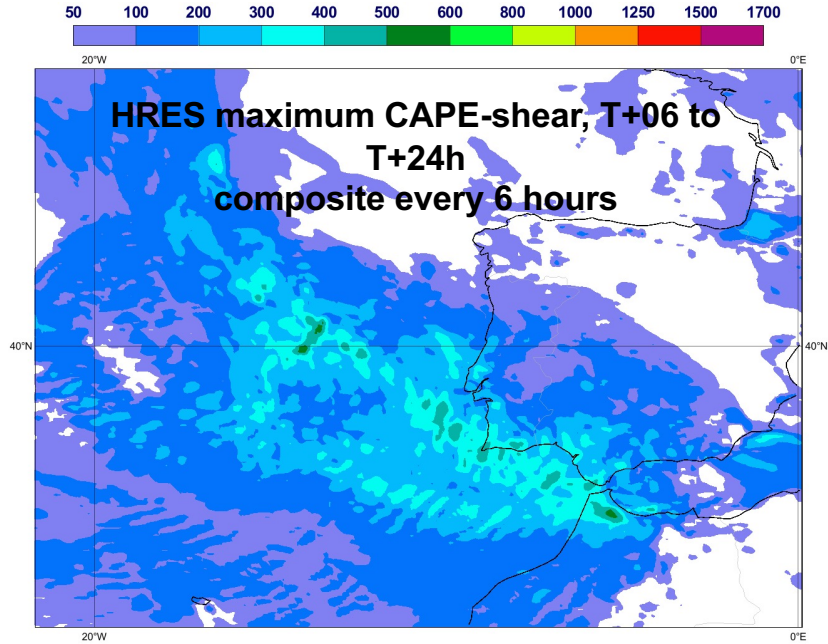
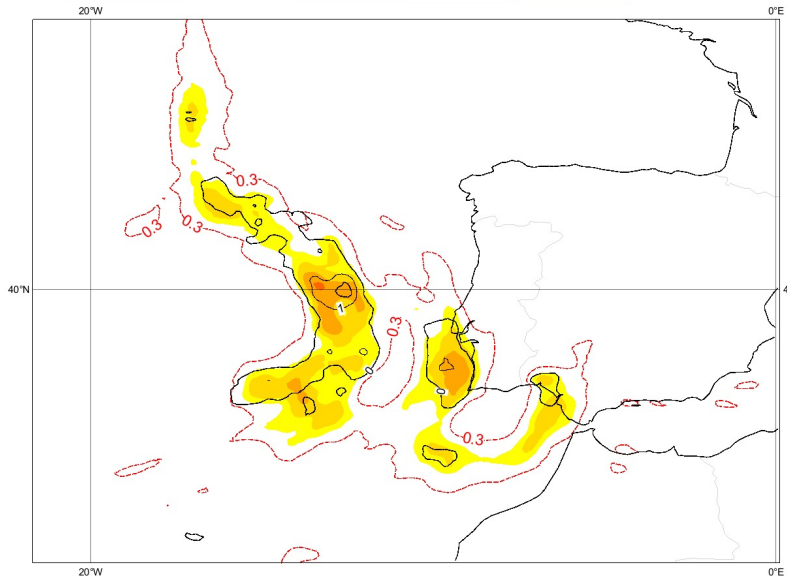
Day 1-10

https://apps.ecmwf.int/webapps/opencharts/products/efi2web_sf

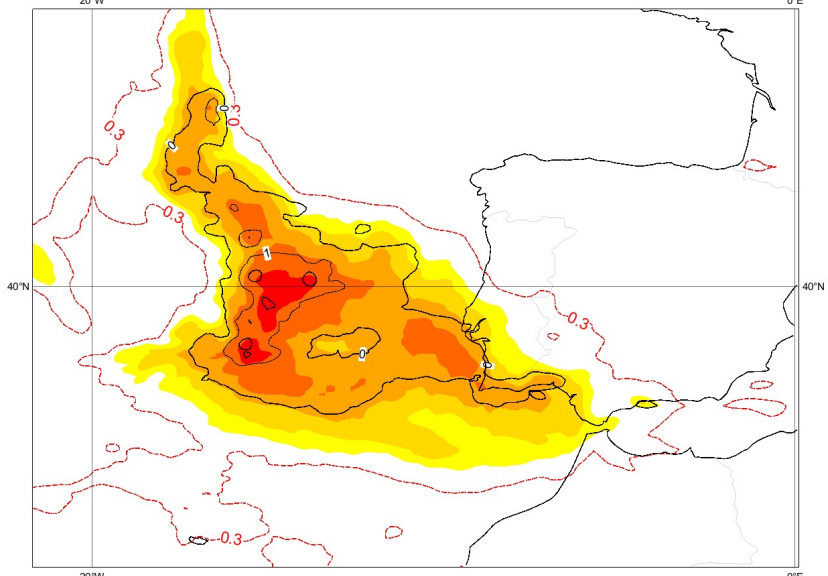
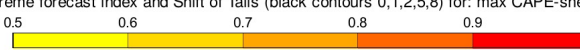
EFI/SOT with mxcape6 and mxcapes6 from 47r1



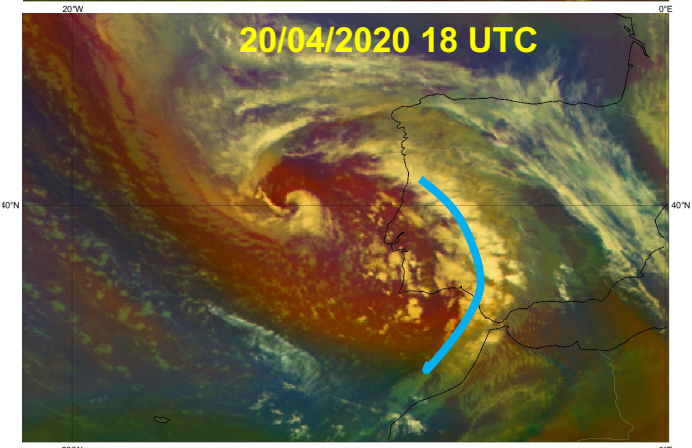
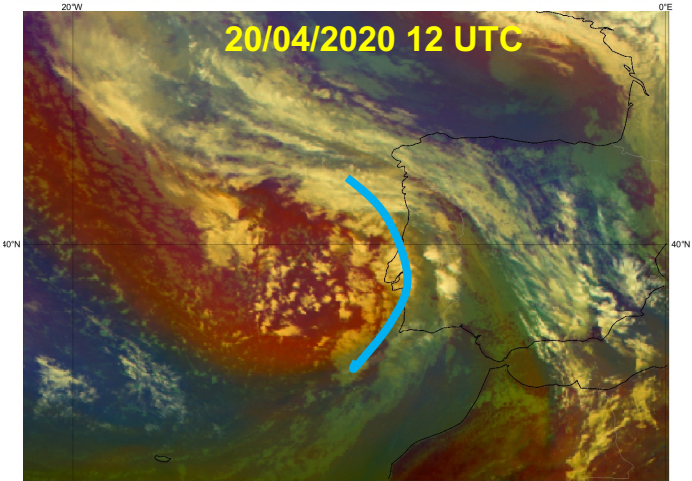
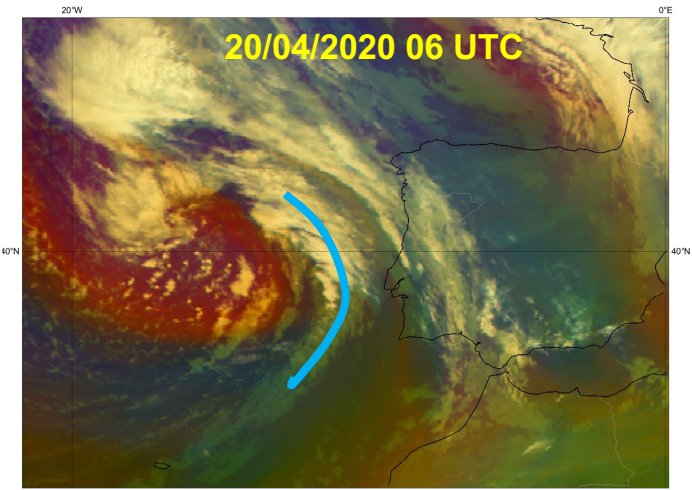
Mon 20 Apr 2020 00UTC @ECMWF expver = 1 VT: Mon 20 Apr 2020 00UTC - Tue 21 Apr 2020 00UTC 0-24h
Extreme forecast index and Shift of Tails (black contours 0,1,2,5,8) for: CAPE-shear



Mon 20 Apr 2020 00UTC @ECMWF expver = 0001 VT: Mon 20 Apr 2020 00UTC - Tue 21 Apr 2020 00UTC 0-24h
Extreme forecast index and Shift of Tails (black contours 0,1,2,5,8) for: max CAPE-shear

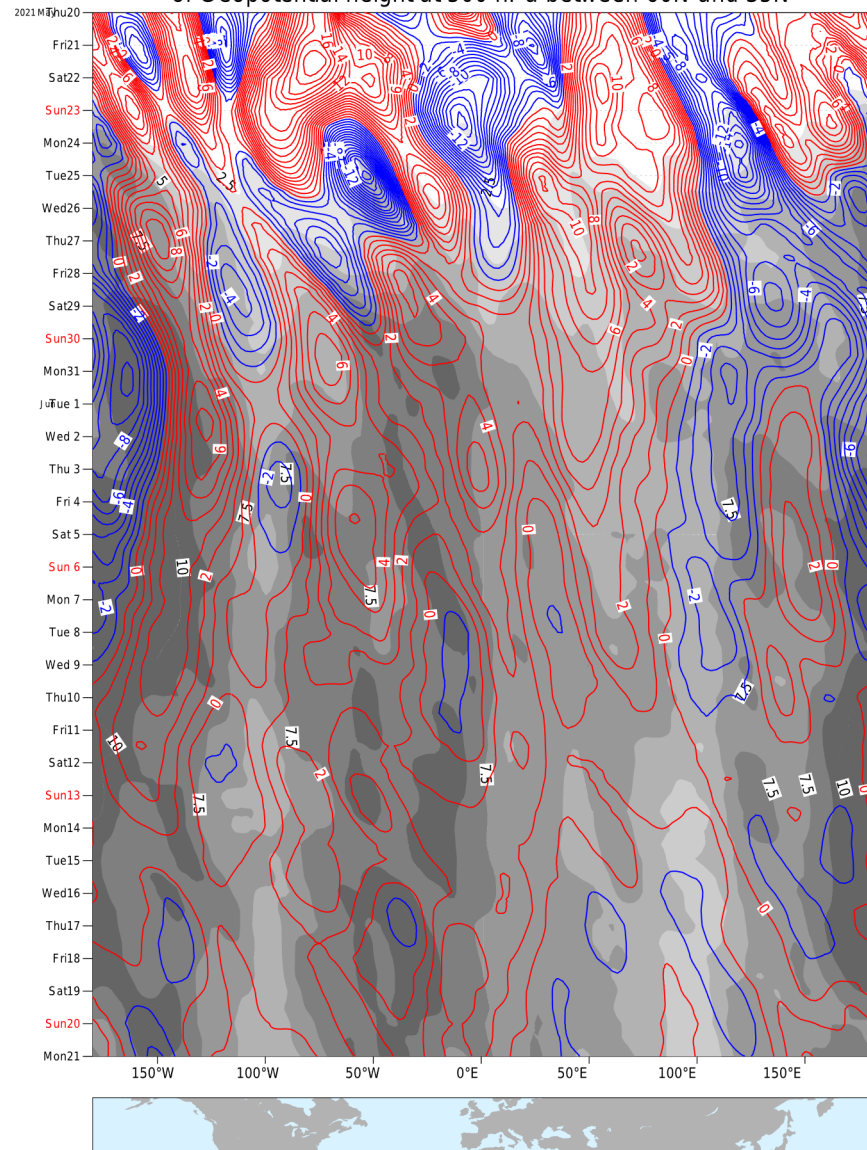


IUI



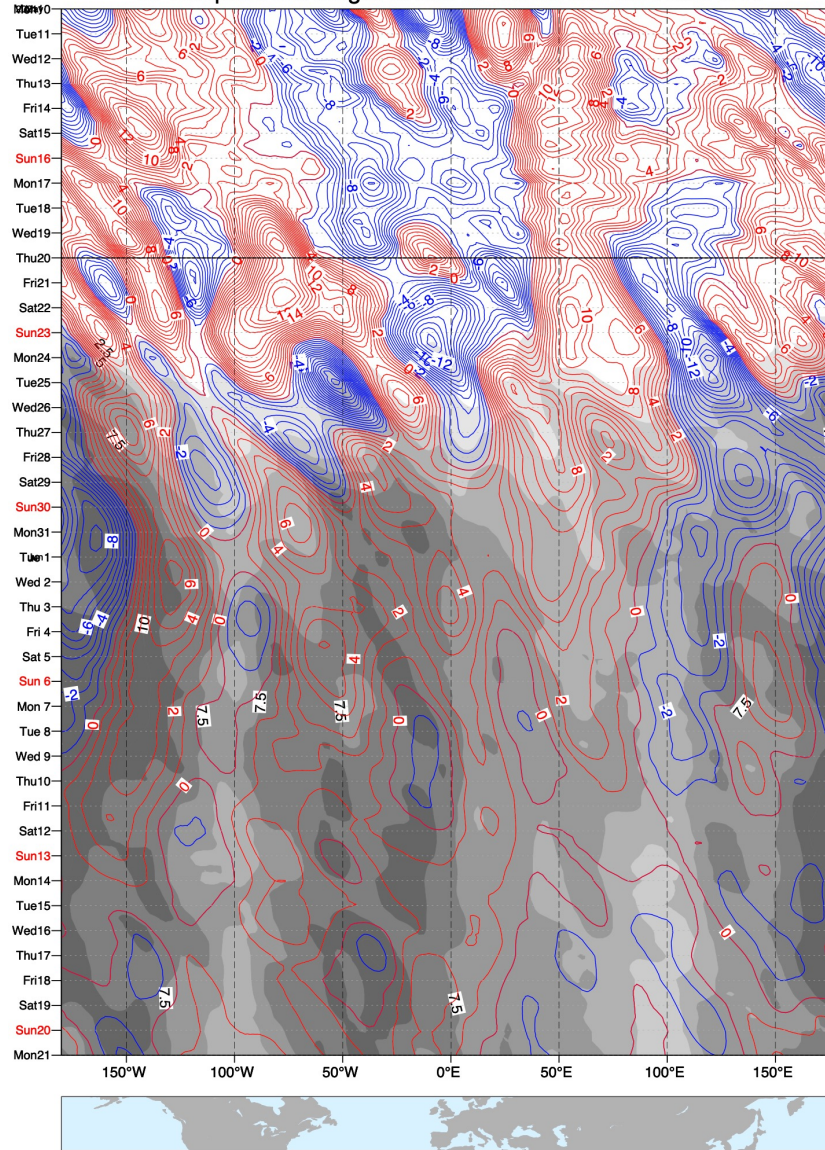
Extended-range Hovmöller Diagram

Time-longitude diagram of monthly forecast from 20210520:00
 Ensemble mean anomaly (contours) and spread (shading)
 of Geopotential height at 500 hPa between 60N and 35N



Operational

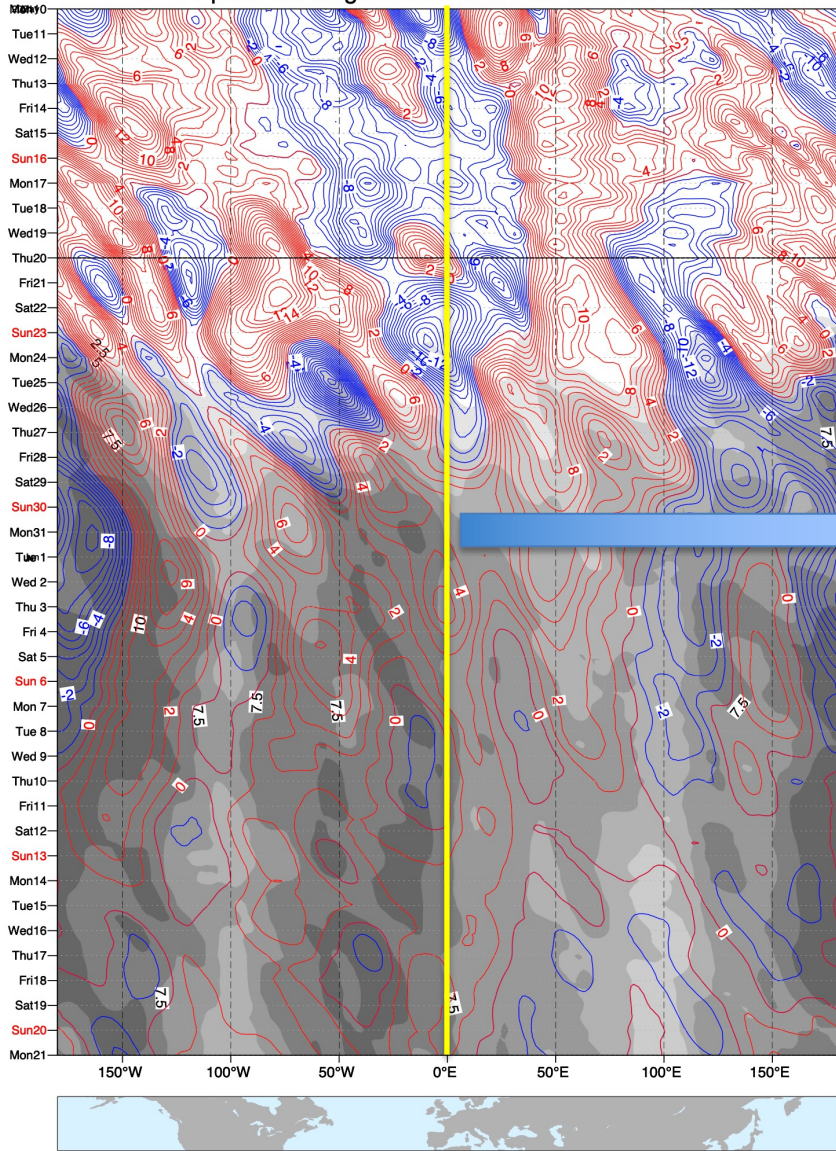
Time-longitude diagram of monthly forecast from 20210520 00 UTC
 Ensemble mean anomaly (contours) and spread (shading)
 of Geopotential height at 500 hPa between 60N and 35N



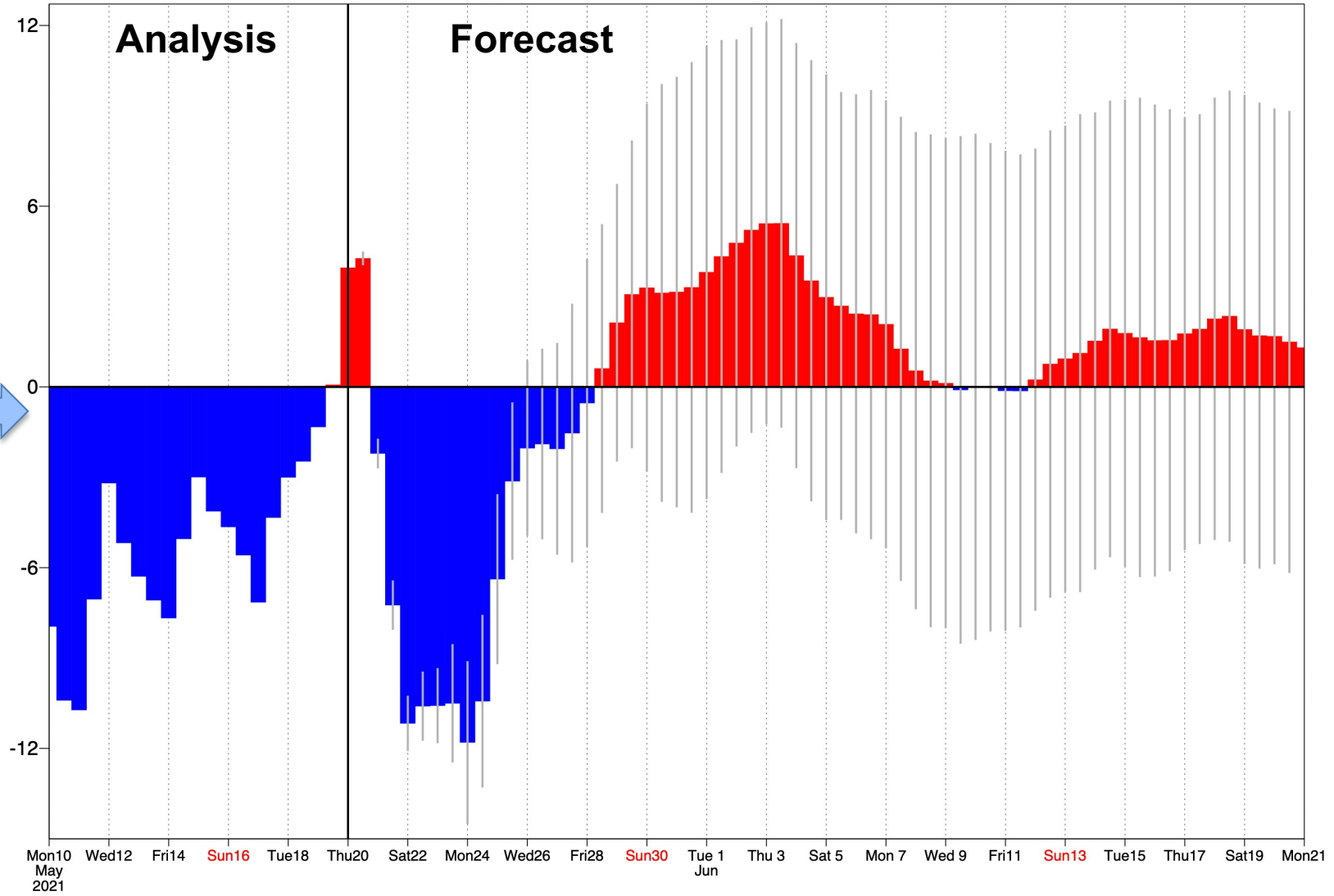
New

- Z500 anomalies and spread
- 10-day analysis added

Time-longitude diagram of monthly forecast from 20210520 00 UTC
 Ensemble mean anomaly (contours) and spread (shading)
 of Geopotential height at 500 hPa between 60N and 35N

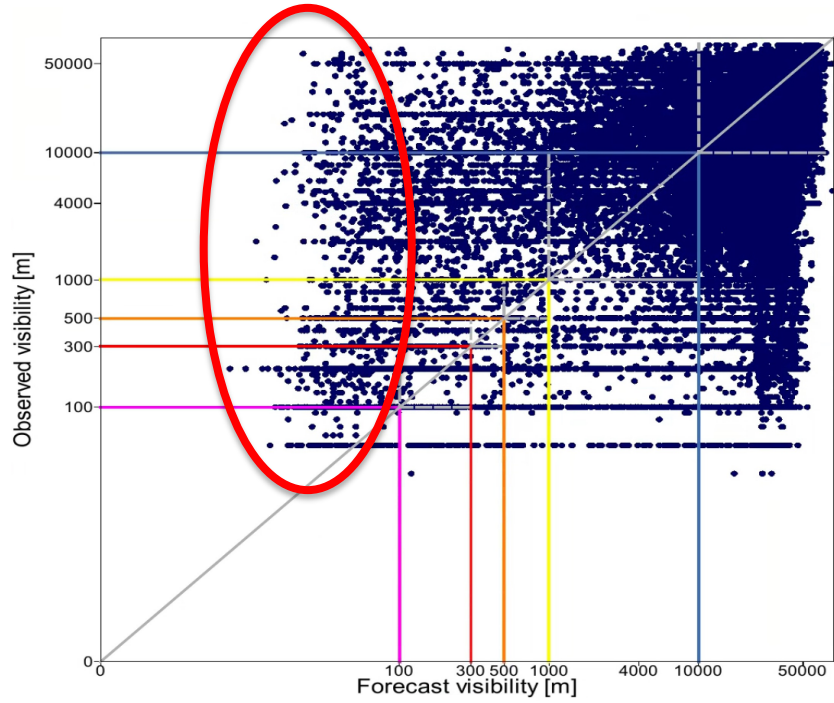


Time series of ensemble mean anomaly (coloured bars) and spread (grey solid lines)
 of Geopotential height at 500 hPa at 0E longitude between 60N and 35N

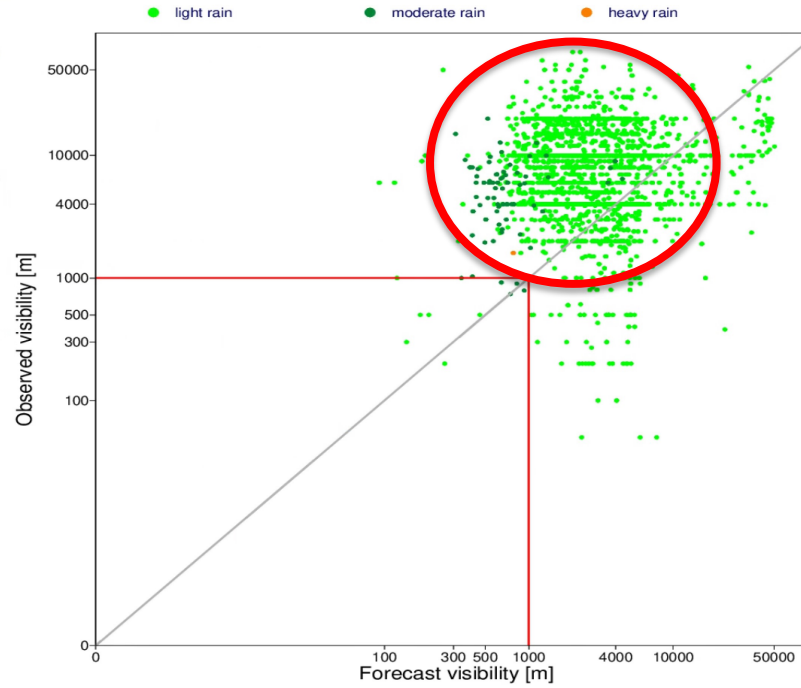


Modification in Forecast Visibility

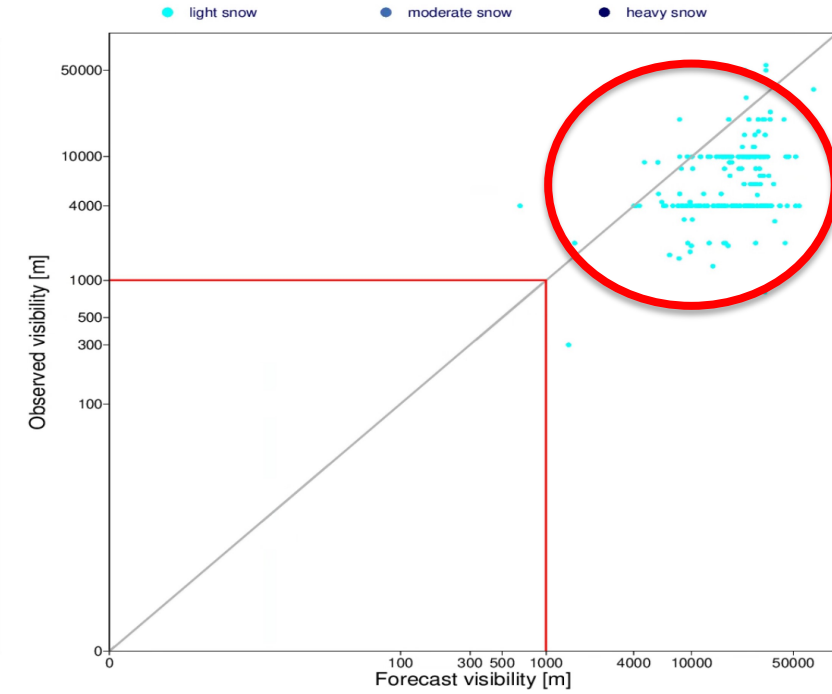
Forecast visibility – Europe, autumn 2020, operational forecast



Too low visibility in fog



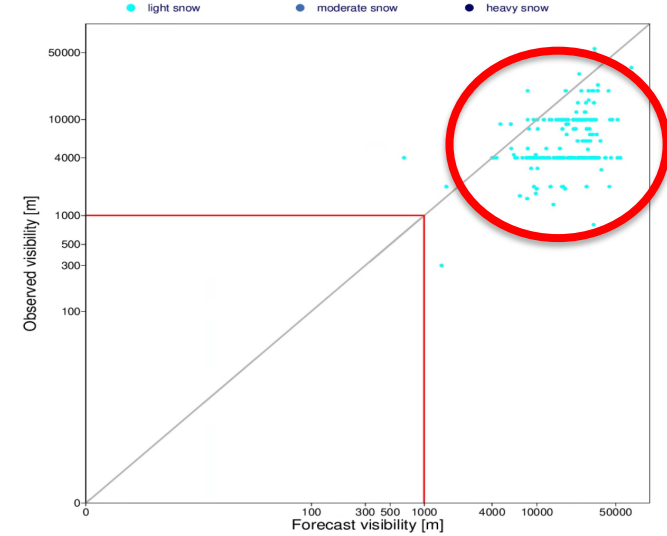
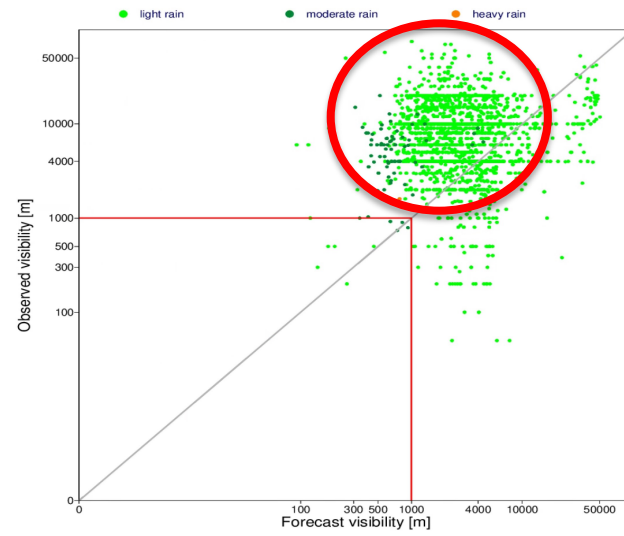
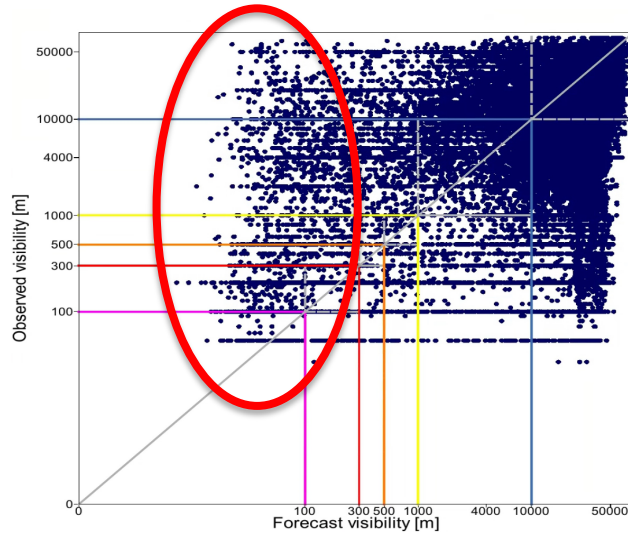
Too low visibility in rain



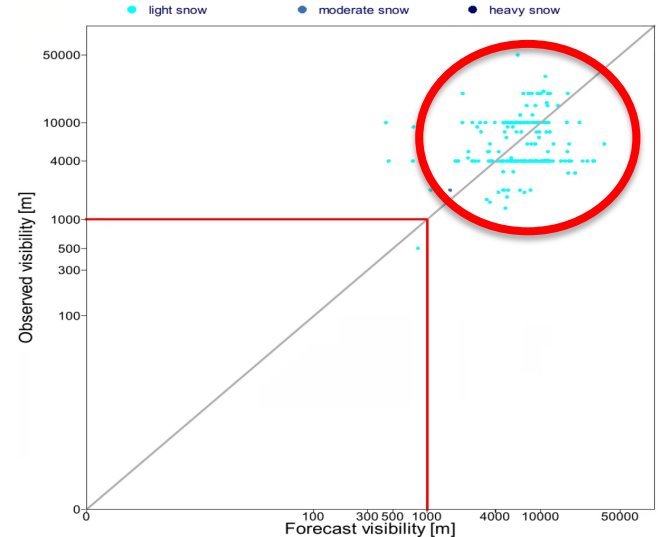
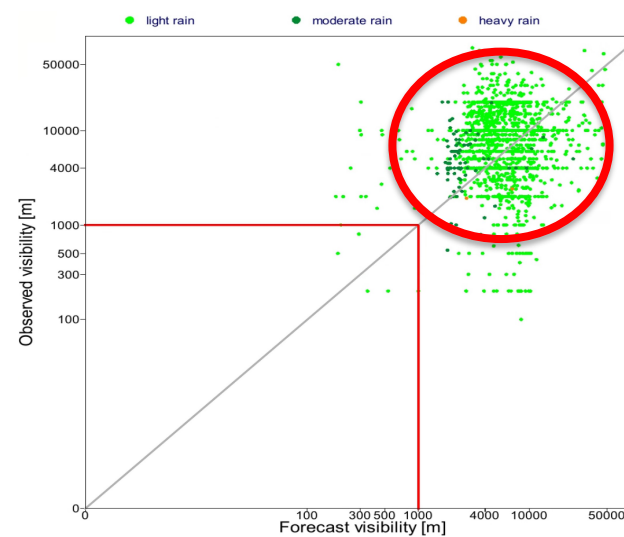
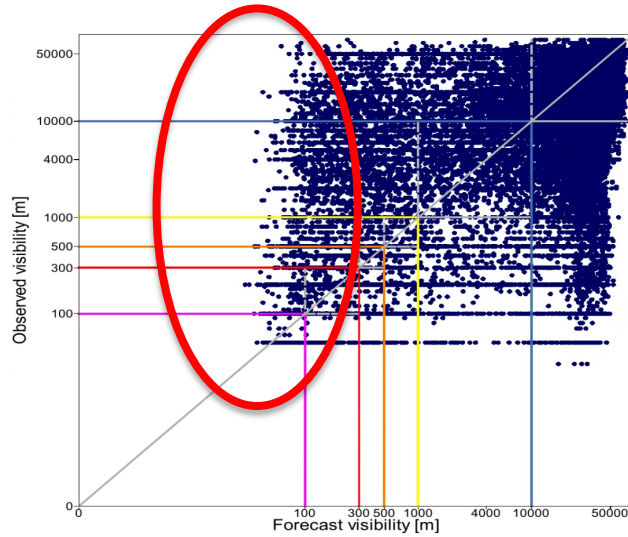
Too high visibility in snow

Improved visibility in fog, rain and snow

Control



Modified visibility
(47r3)



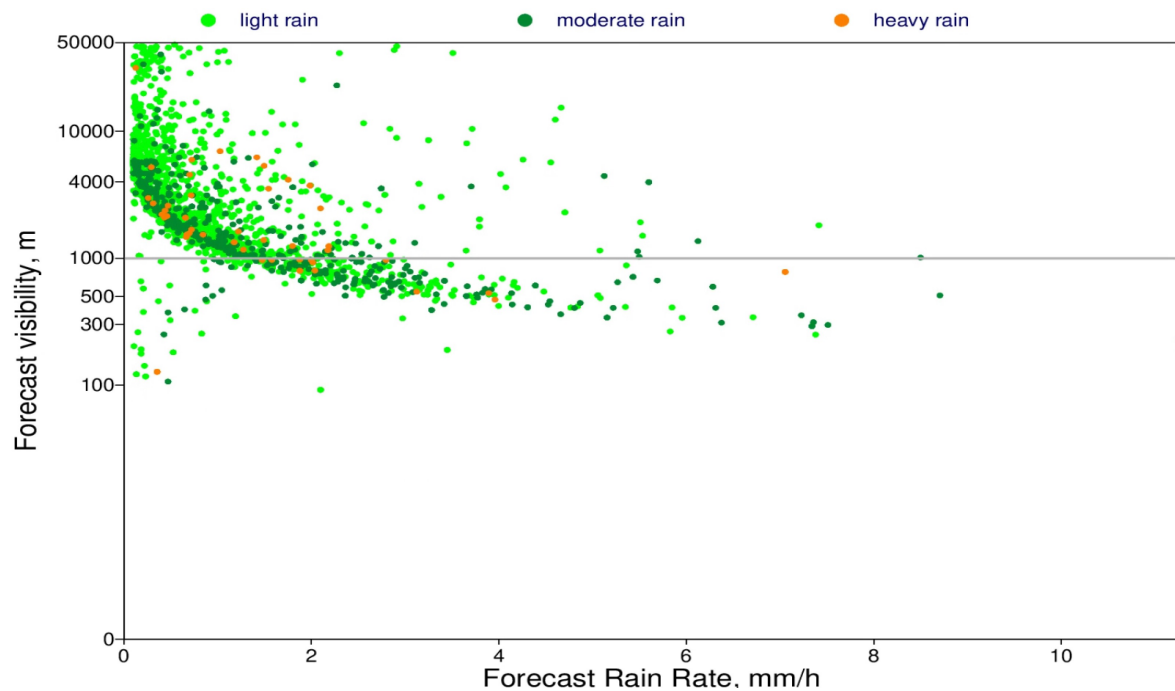
Reduction of the very low forecast visibility

Averaged visibility in rain increased, now much closer to observations

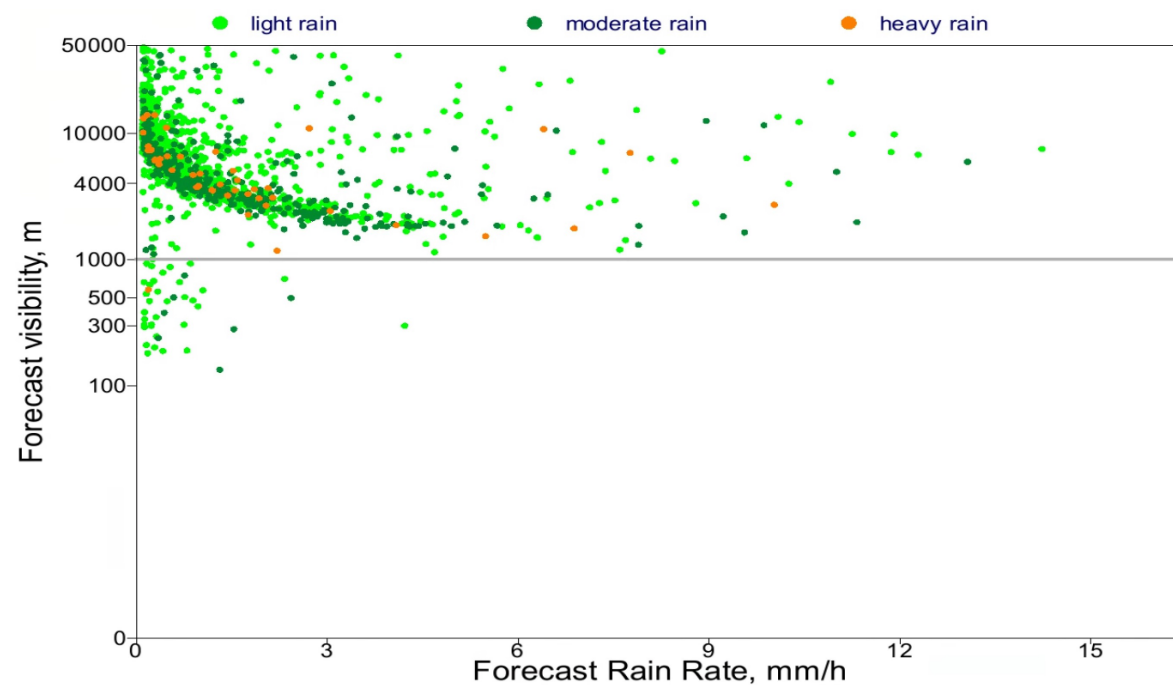
Averaged visibility in snow reduced, now much closer to observations

Visibility in rain

Control



Modified visibility



Average Visibility	Light rain	Moderate rain
OBS	~ 9500 m	~ 5600 m
Control	~ 4500 m	~ 880 m
Modified visibility	~ 7500 m	~ 3100 m