ECMWF Products including:
- Precipitation Type,
- Extreme Forecast Index (EFI) and Shift of Tails (SOT)

High latitude Winter Weather course 2023

30 January 2023

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User Outreach and Engagement

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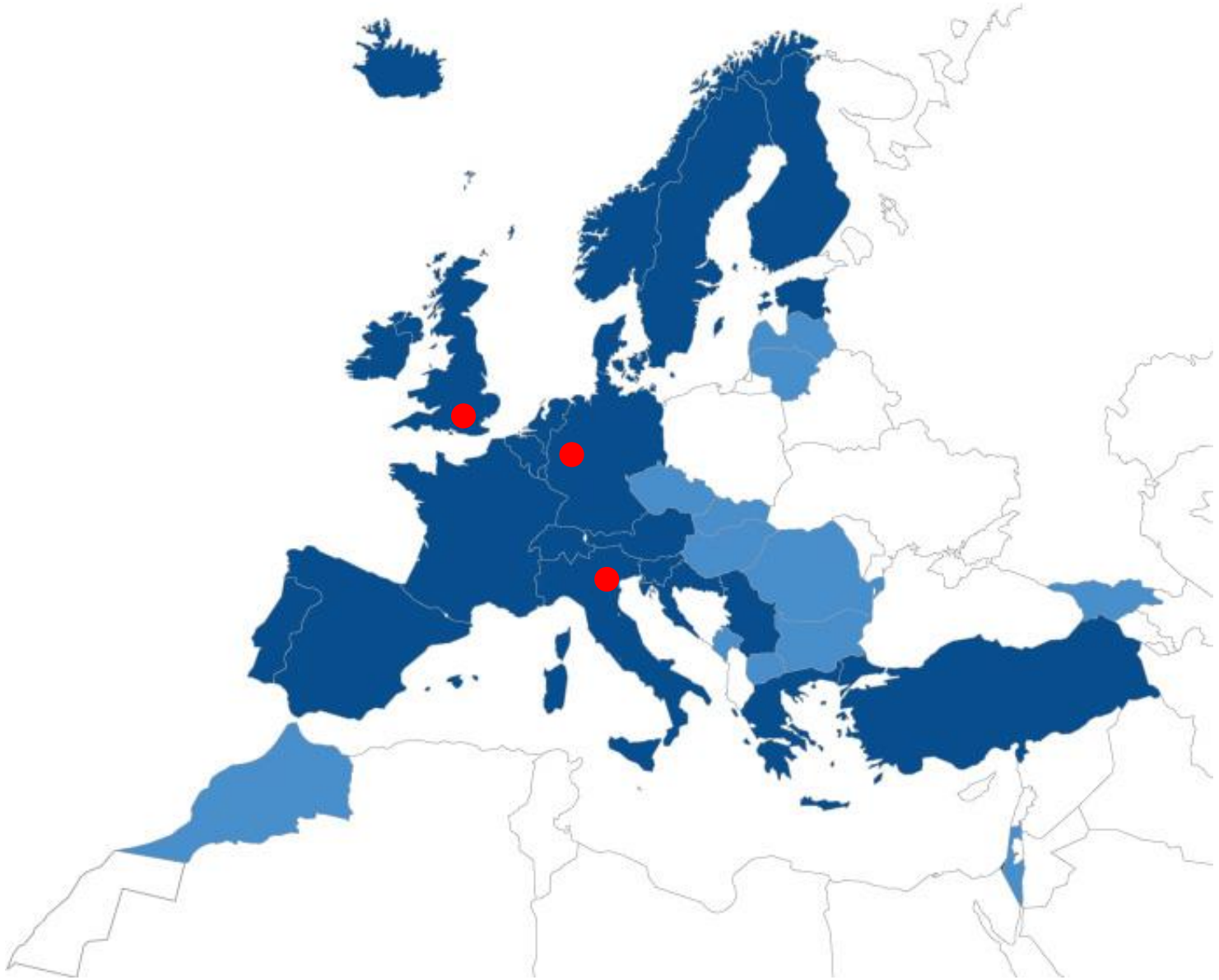
ECMWF



ECMWF

European Centre for Medium-Range Weather Forecasts

An independent intergovernmental organisation

Established in 1975

With
- 23 Member States
- 12 Co-operating States

The operational forecasting system

High resolution forecast (HRES) :

- twice per day **9 km** 137 levels, to 10 days ahead

Ensemble forecast (ENS):

- twice per day 51 members, **18 km** 137 levels, to 15 days ahead
- Monday/Thursday 00 UTC extended to 1 month ahead (**Monthly Forecast, 18/36 km**)

Ocean waves: twice per day

- **HRES-WAM**: 10 days ahead at **14 km** (coupled)
- **ENS-WAM:** 15 days ahead at **28 km** (coupled)

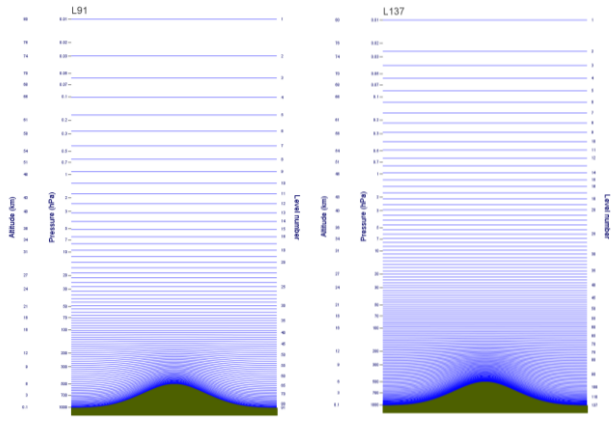
Seasonal forecast: once a month

- 51-members, **~35 km** 91 levels, to 7 months ahead
- sub-set of 15 members is run for 13 months every quarter (**30 years of hindcasts**)

Major updates in 48r1 – June 2023

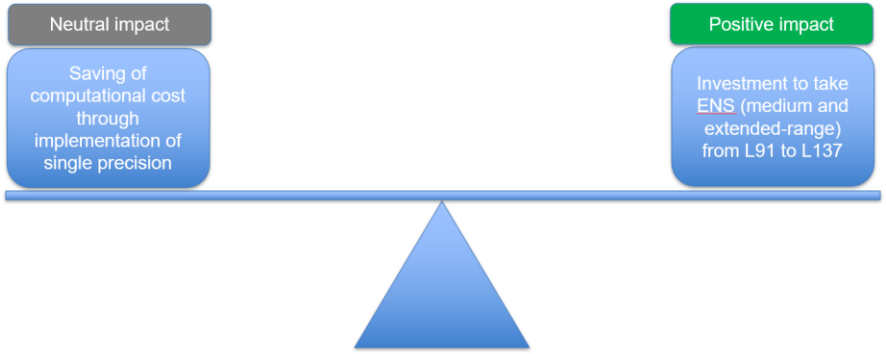
Implementation of ECMWF new model cycles 47r2 and 47r3

Successfully implemented
47r2 – 11th May 2021
47r3 – 12th October 2021



47r2

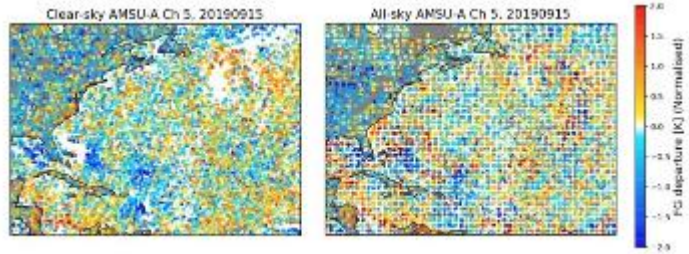
- Single Precision – models less computationally expensive to run
- Increased model levels from 91 -> 137
- New parameters for humidity, UV, Infrared and orography
- More Tropical Cyclone tracks



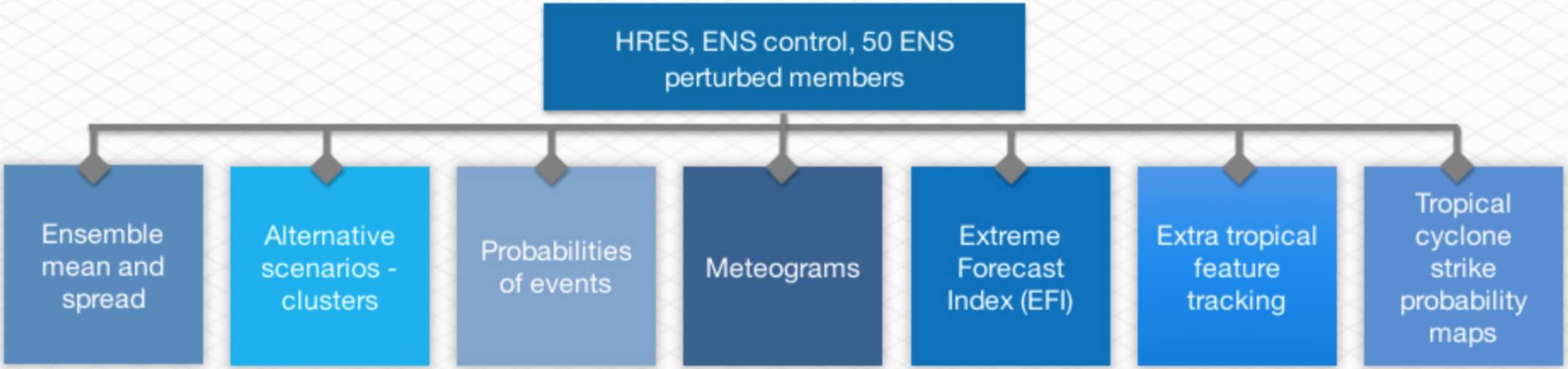
47r3

- Changes to observation usage in the assimilation
- Weak constraint 4DVar for stratosphere in EnsembleDA
- Major revision to improve the physical and numerical basis for moist processes in the IFS – clouds, convection, turbulent mixing, microphysics

https://confluence.ecmwf.int/display/FCST/Implementation+of+IFS+Cycle+47r2
https://confluence.ecmwf.int/display/FCST/Implementation+of+IFS+Cycle+47r3

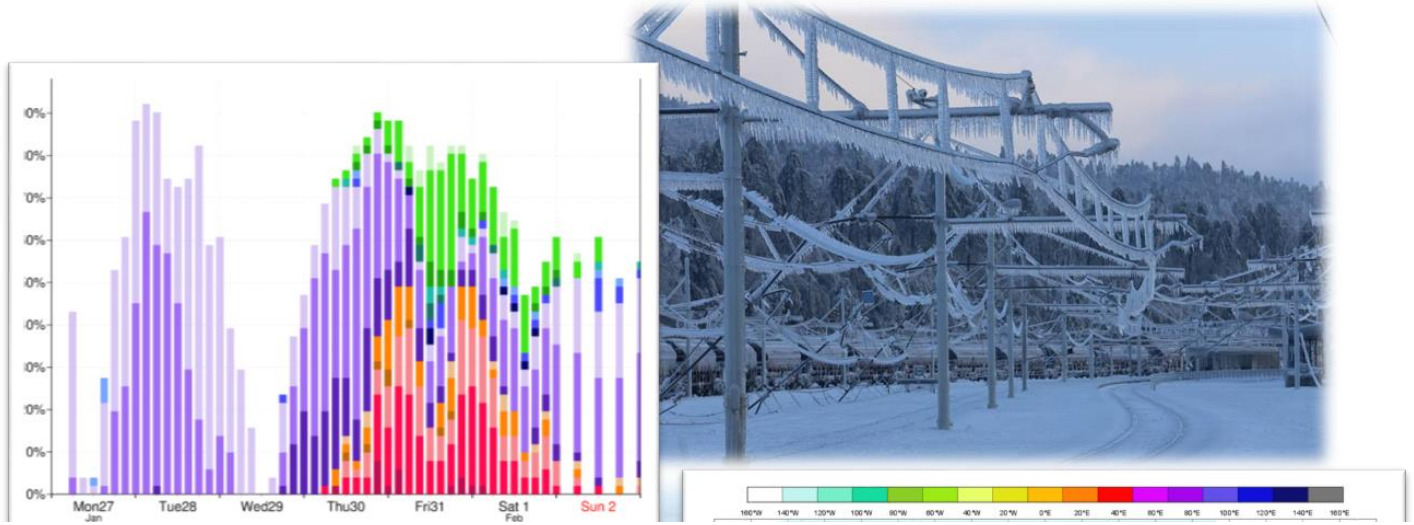


ECMWF forecast products



Precipitation Type

Estimation with ECMWF probabilistic products



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Why these probabilistic products?

- Difficulties of accurate forecasting of precipitation type in winter at ground level, specially mixed (freezing rain).

- Freezing rain is particularly hazardous due to its ice-loading effects on power wires and because it can make travel extremely dangerous. But also heavy snowfalls.

- The uncertainty of mixed phases forecasting can be partially reduce using ensemble forecast.

- We also used a technique with precipitation rate variable to classify dry from precipitating in order to try to enforce a zero frequency bias for each precipitation types: reduce misses and false alarms.

ECMWF

Methodology

50 perturbed forecast +1 control forecast IFS (ECMWF)

- 0-168 h (3-hourly)
- ~18 km resolution
- Twice a day: 00 and 12 UTC

6 types

- Rain
- Sleet
- Snow
- Wet snow
- Freezing rain
- Ice pellets

Precipitation type variable

Precipitation rate variable

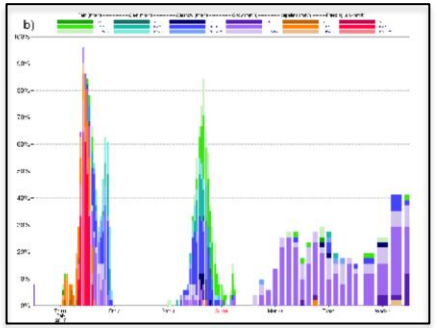
Instantaneous variables

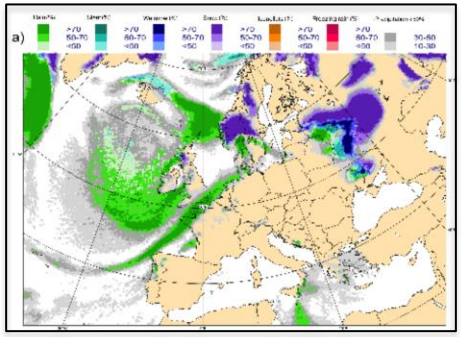
3 categories

- Low intensity (Rmin-0.2 mm/h)
- Medium intensity (0.2-1 mm/h)
- High intensity (>1 mm/h)

6 precip. types x
3 precip. Rate categories
= **18 categories in total**

PROBABILITY OF PRECIPITATION TYPE

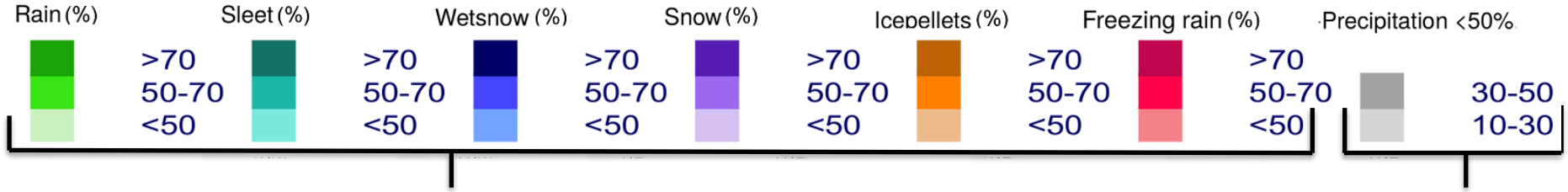




MOST PROBABLE PRECIPITATION TYPE

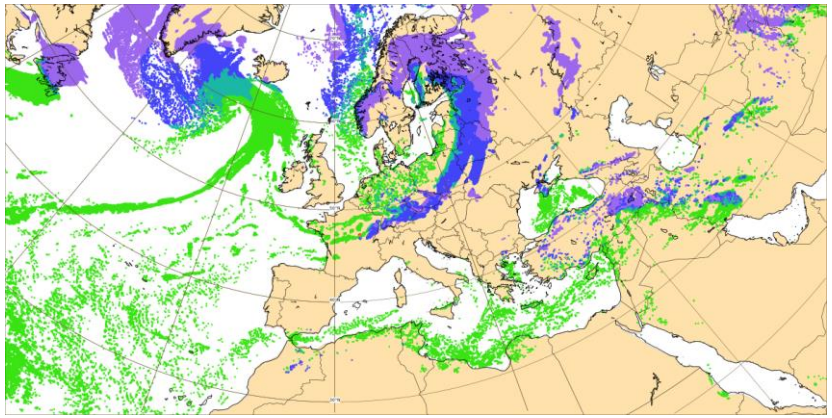
ECMWF

Most probable precipitation type product

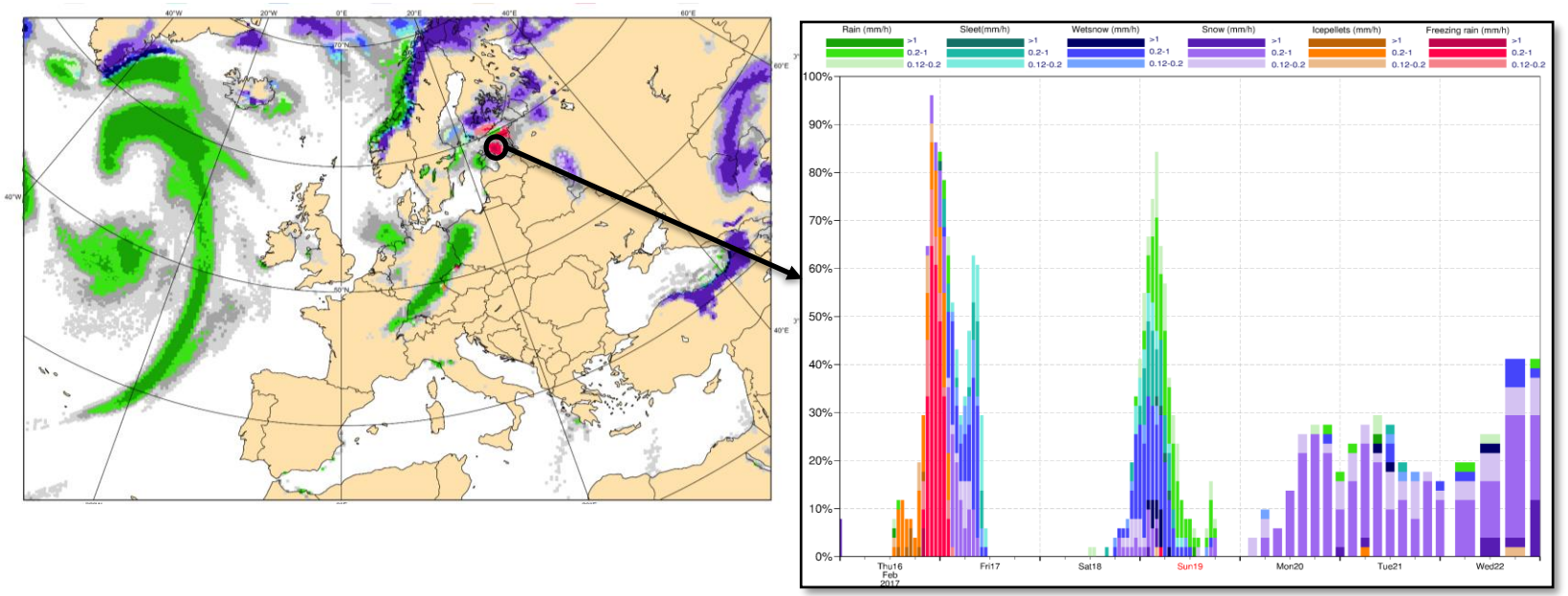


Colours: most probable precipitation type if **total precip > 50 %**

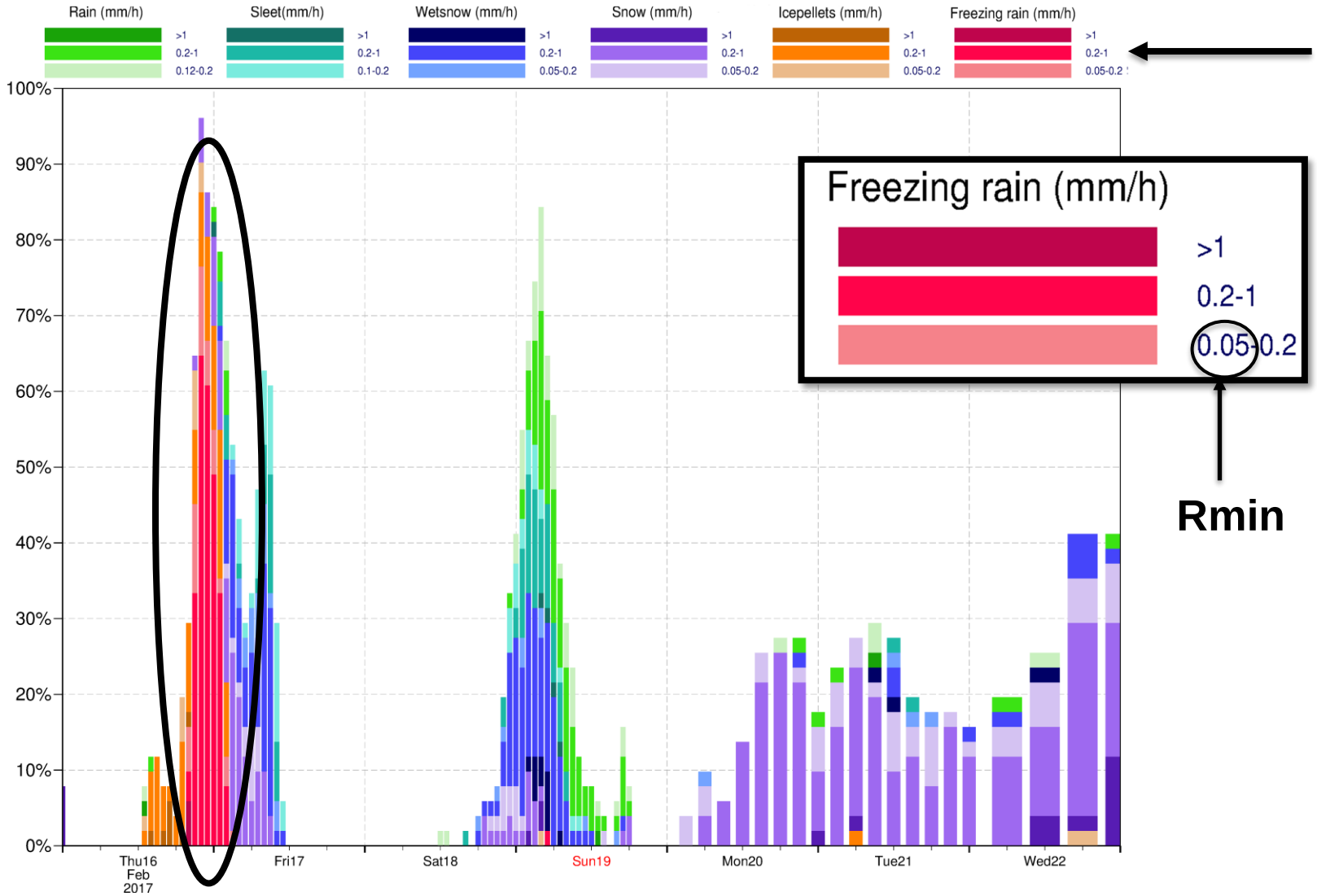
Grey shading: when the probability of any type of precipitation is **10-30%** or **30-50%. THE TYPE OF PRECIPITATION IS NOT SPECIFIED**



Current visualisation on OpenCharts



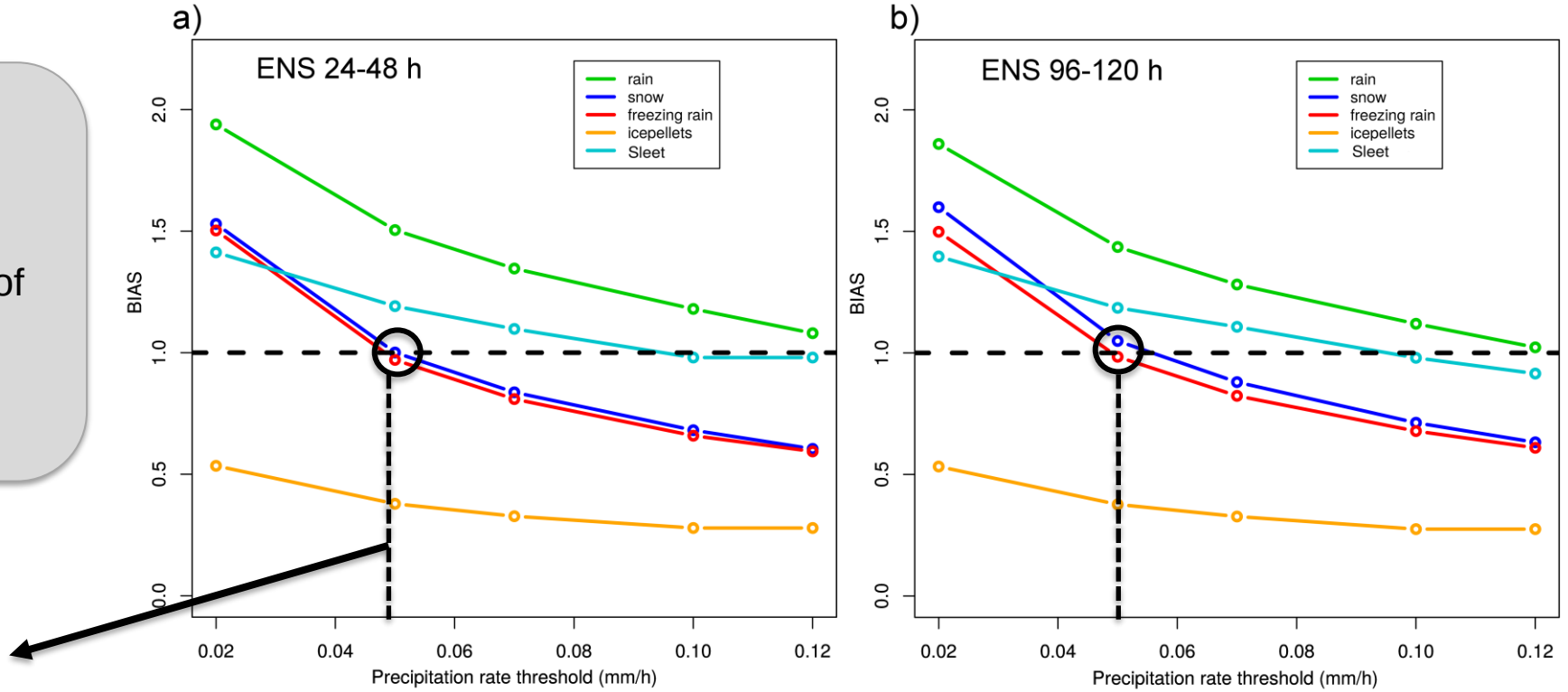
Probability of precipitation type meteograms



Reducing systematic bias with precipitation rate (frequency bias)

Categorical forecast:

Bias = (total number of events forecast)/(total number of events observed)

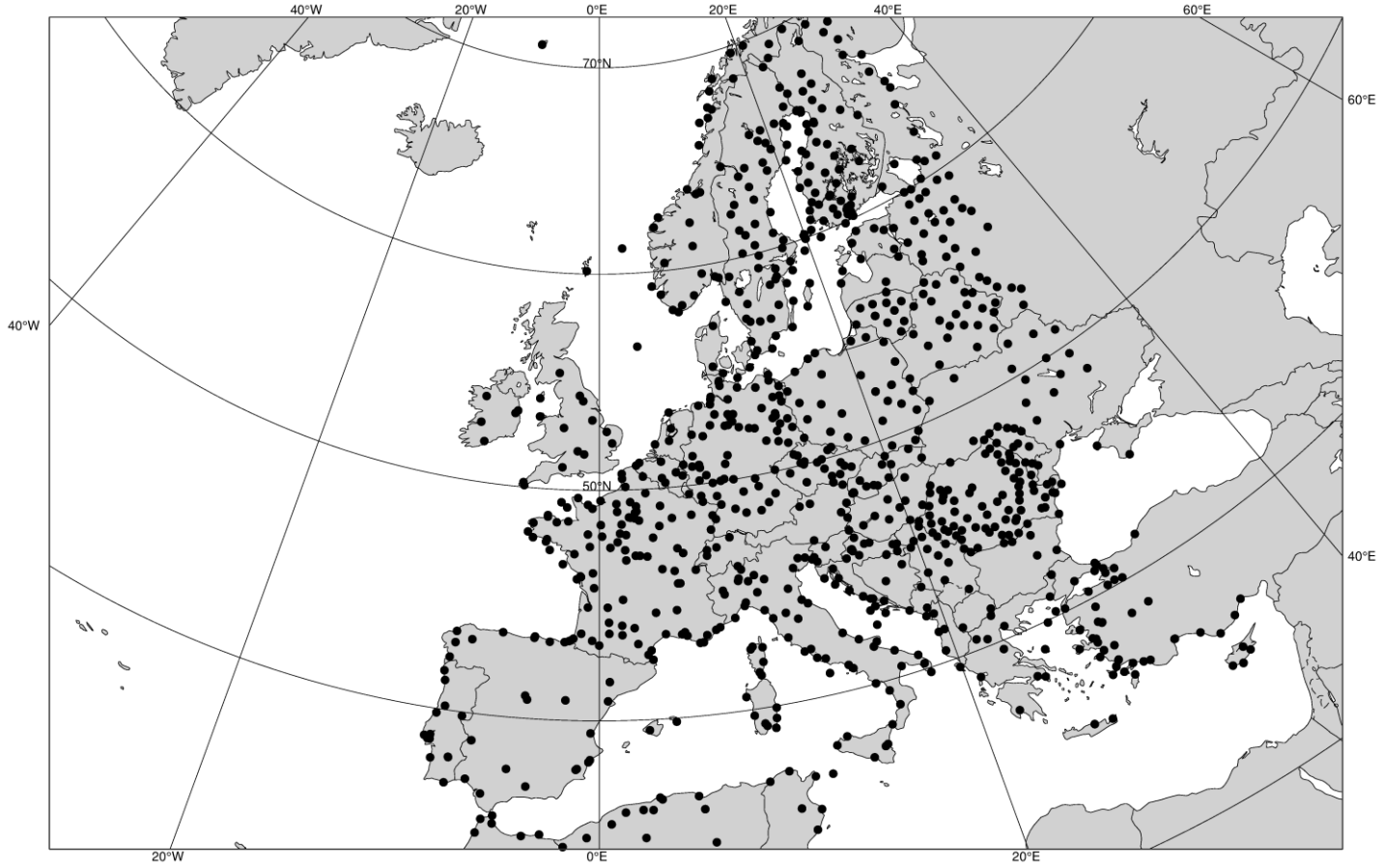


Precipitation rate threshold = **0.05 mm**

- Define **Rmin** for each ptype.
- Enforce **bias = 1** to make the total frequency of occurrence of each ptype (forecast) over all the observation sites, equal the observed frequency of those sites.

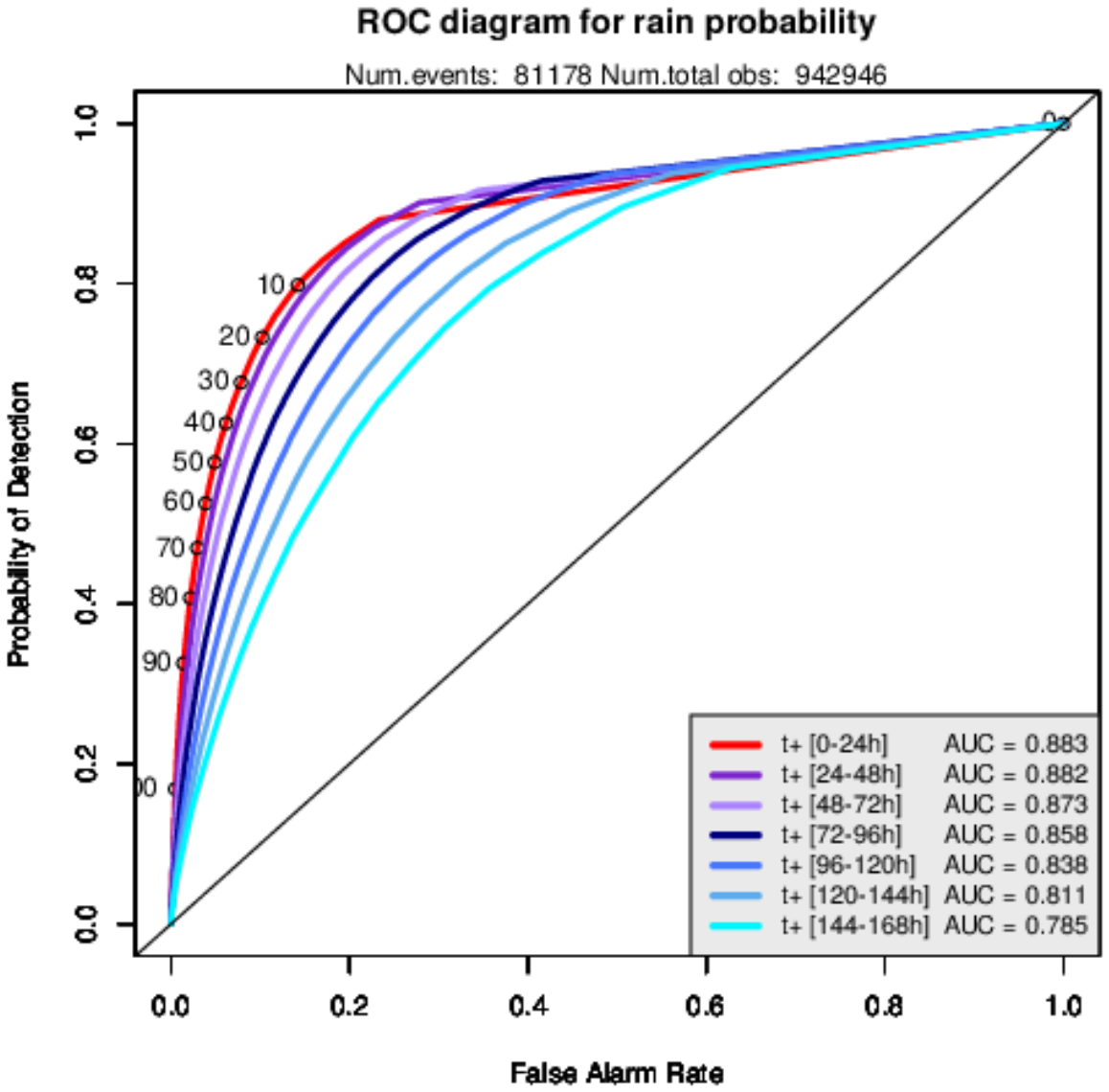
Verification

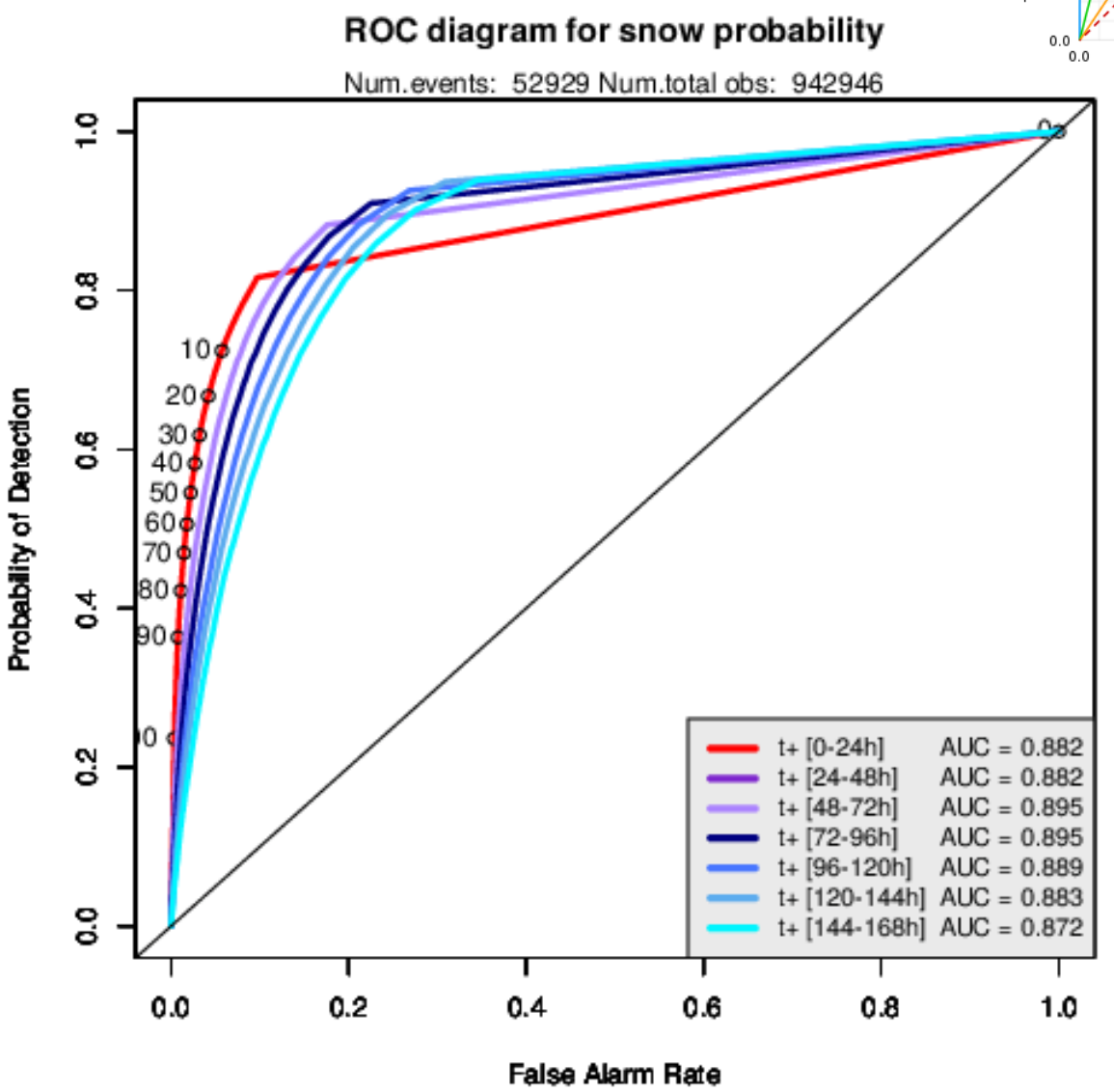
Manual SYNOP stations available



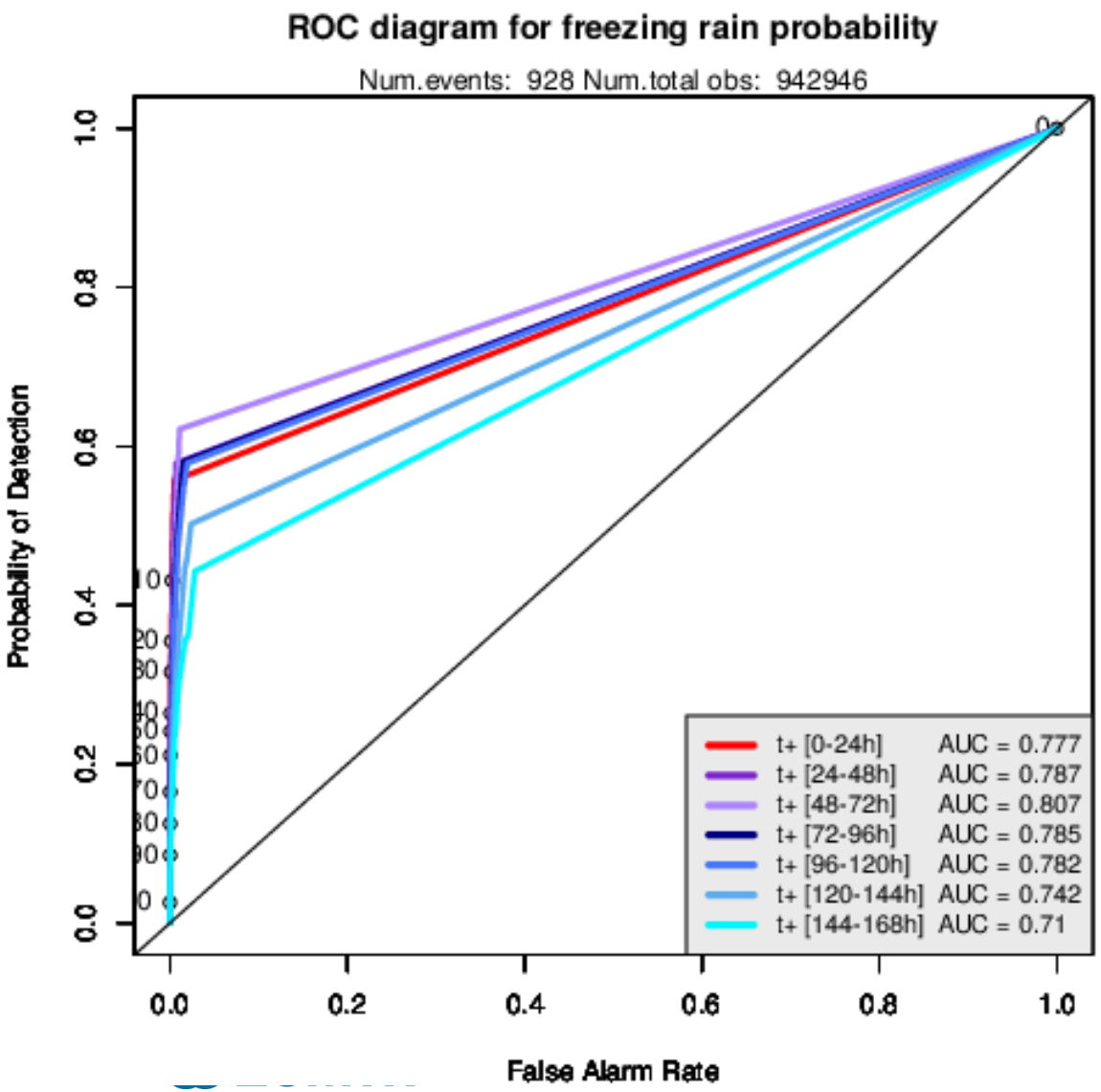
- The verification is developed using **3-hourly** observations of present weather from *manual* **SYNOP** in **Europe** in 5 months winter periods every year.
- SYNOP stations with a 150 m altitude difference with the closest ENS point are removed from the verification.

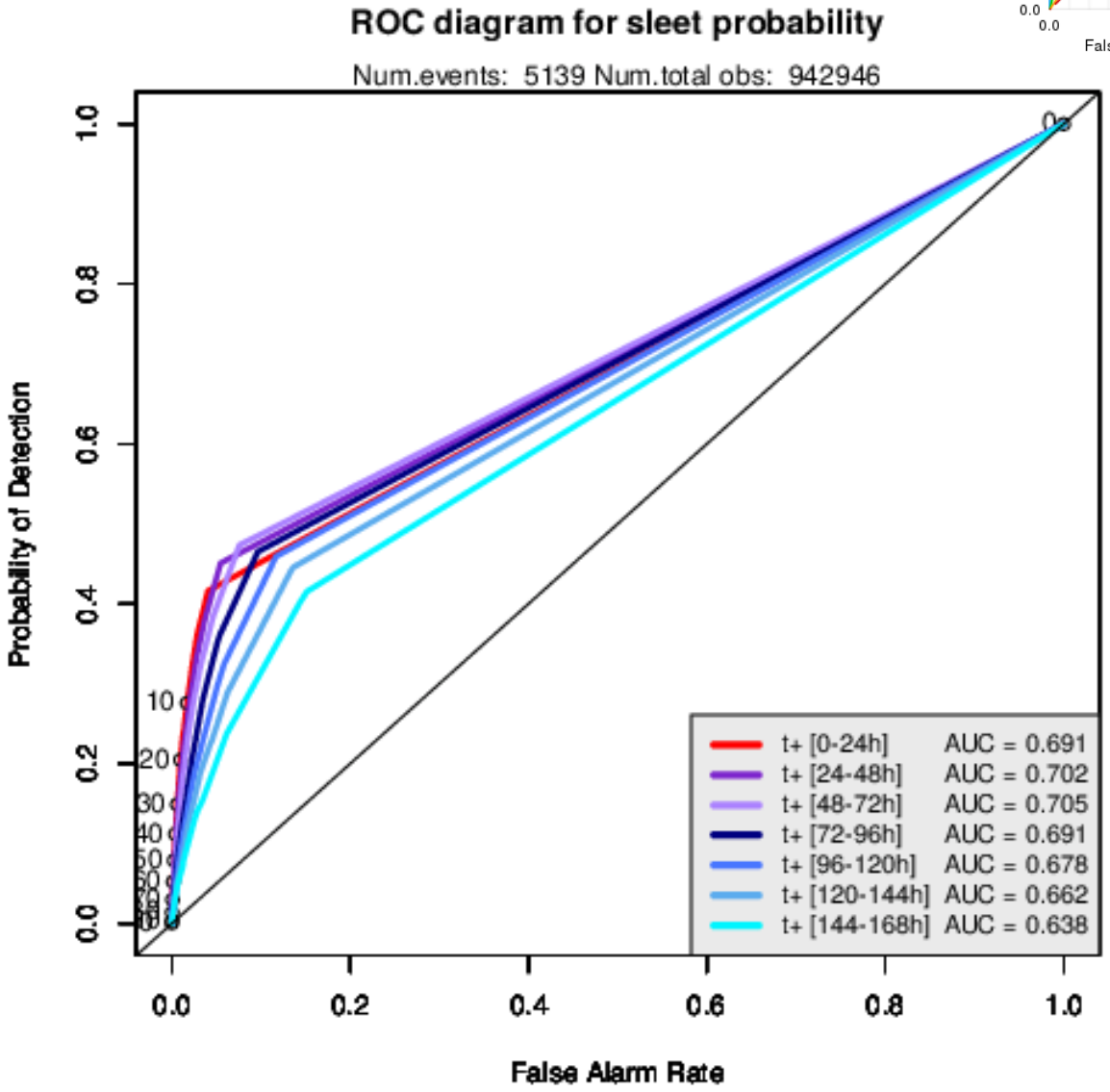
Verification: ROC curves (winter 2020-2021)



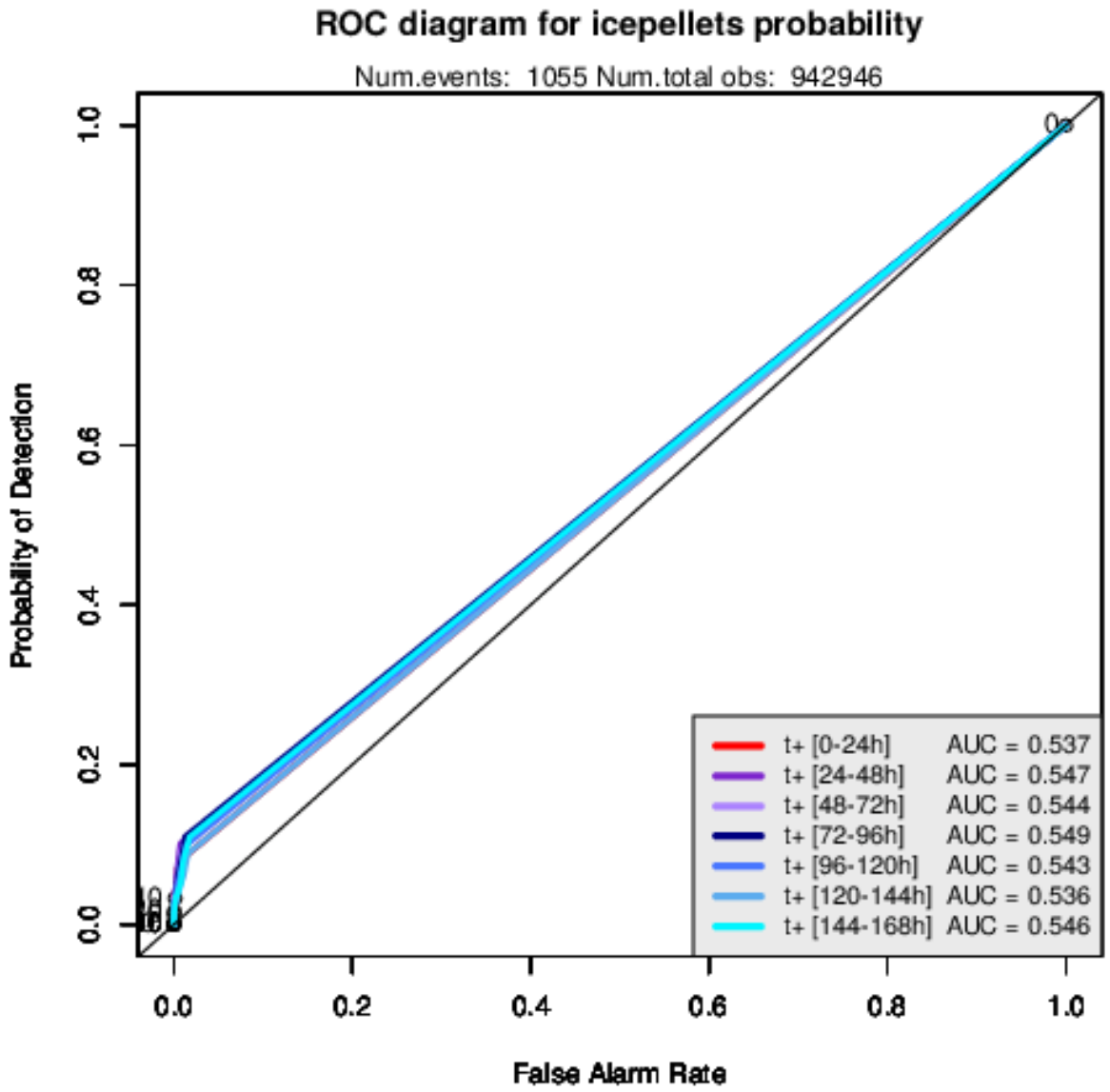


Verification: ROC curves of probabilities





Verification: ROC curves for icepellets



Improvements

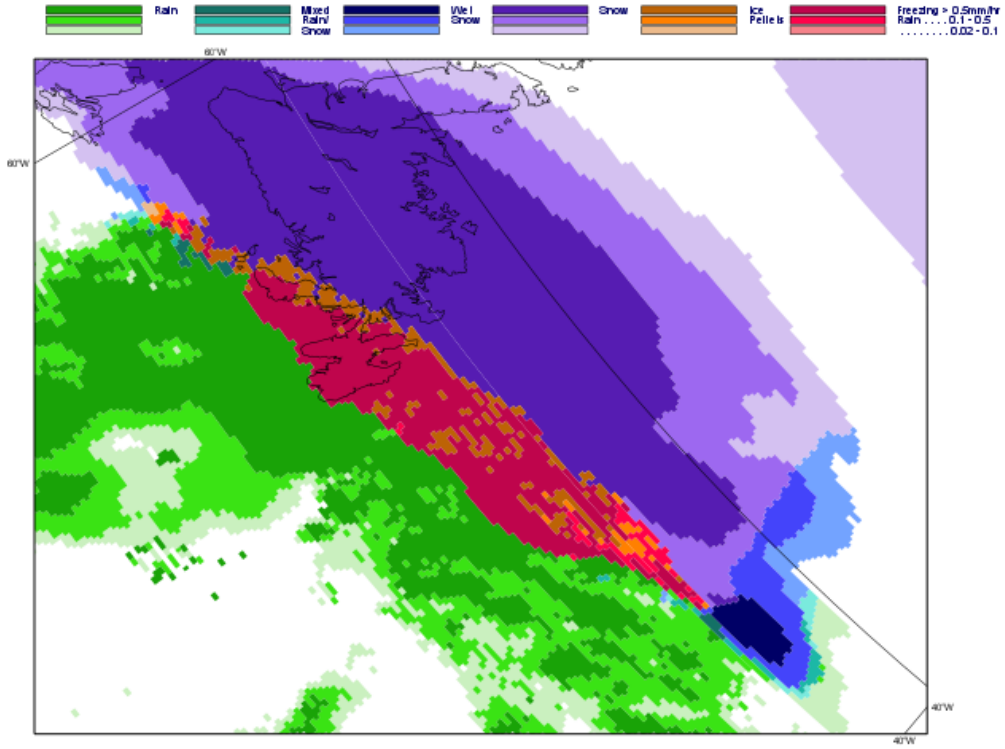
- 47r3 (12th October 2021)
  - Precipitation type diagnosis changed for icepellets and freezing rain
  - Reduction of the general precipitation bias

- 48r1 (Q2 2023) possibly
  - Including freezing drizzle in the precipitation type diagnostics

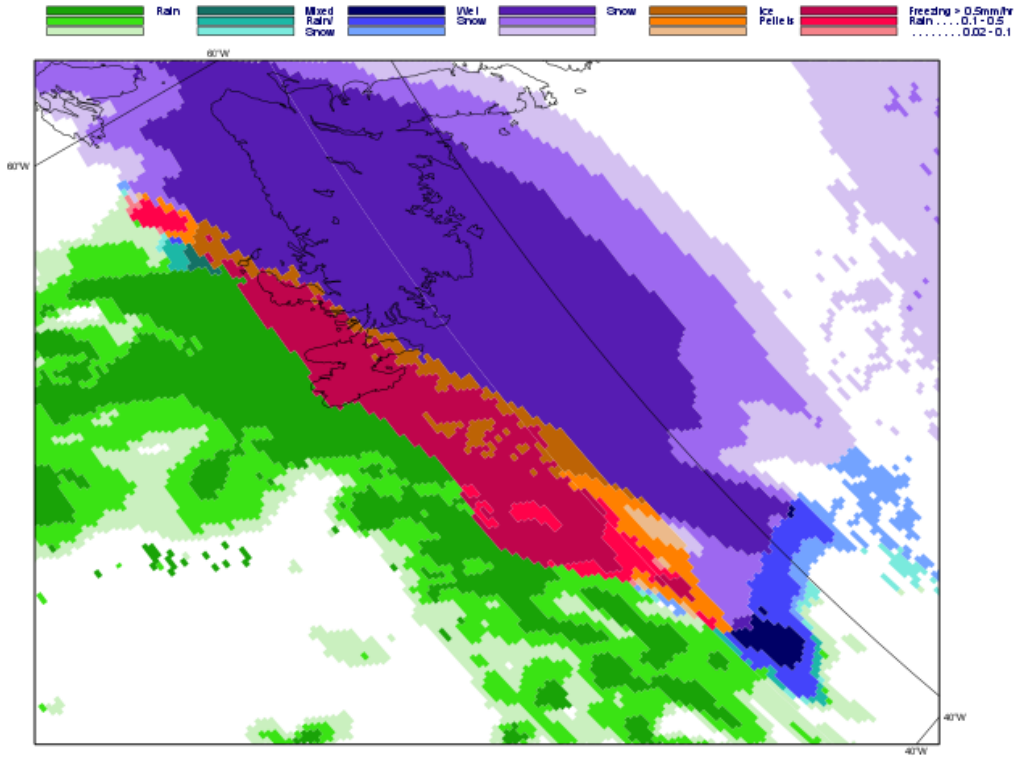
More consistent diagnosis of ice pellets/freezing rain in 47r3

Example: Freezing rain case over Newfoundland 2018-01-16
Less noisy ice pellet diagnosis in regions of freezing rain

Oper TCo1279 reference
20180116 00Z T+12



47r3 TCo1279
20180116 00Z T+12



rain / mix rain-snow / wet snow / snow / ice pellets / freezing rain

ECMWF

Case Study: Snowstorm - December 2021

Ikea customers and staff sleep in store after snowstorm

2 December 2021

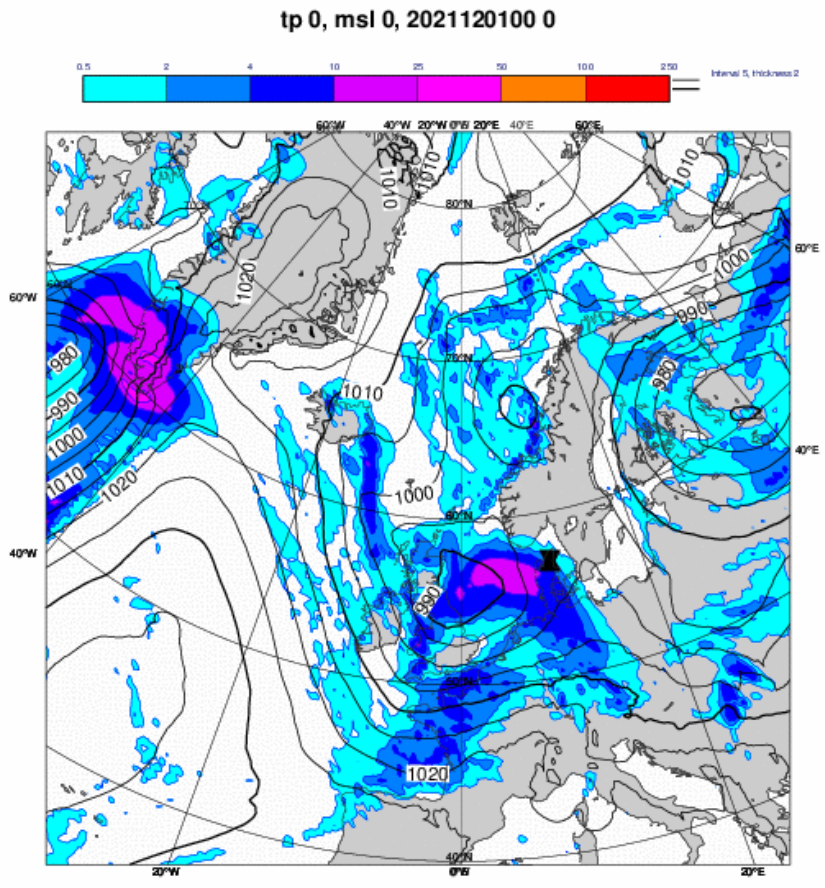
The group slept in the showroom on beds, sofa beds and mattresses

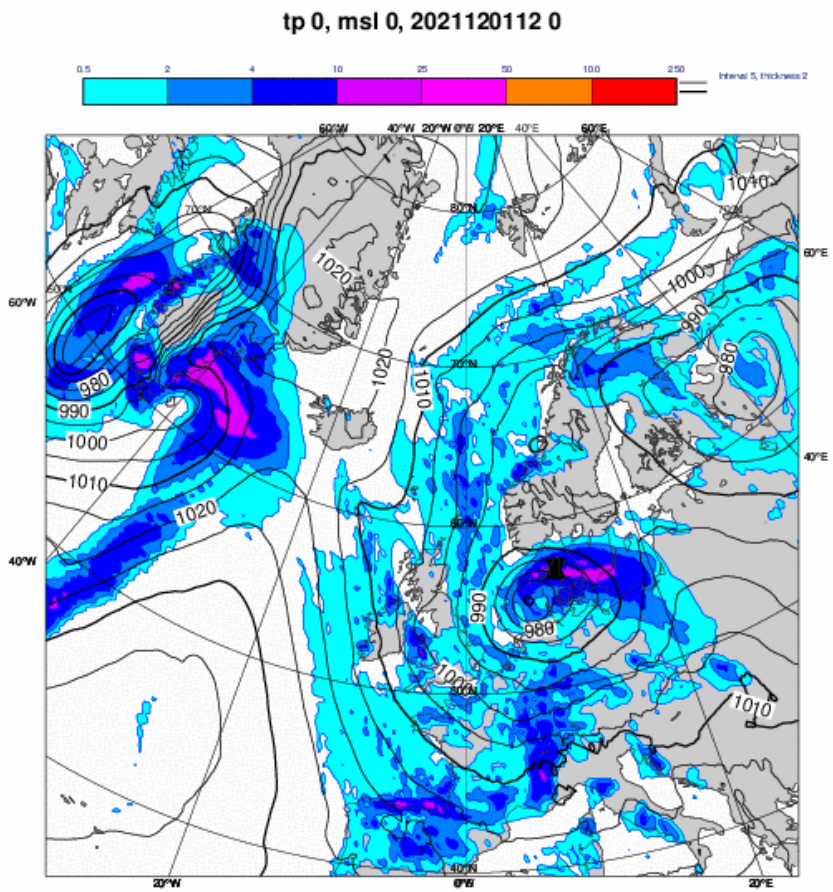
Customers and staff at an Ikea store in Denmark had the ultimate sleepover after getting stranded by a snowstorm.

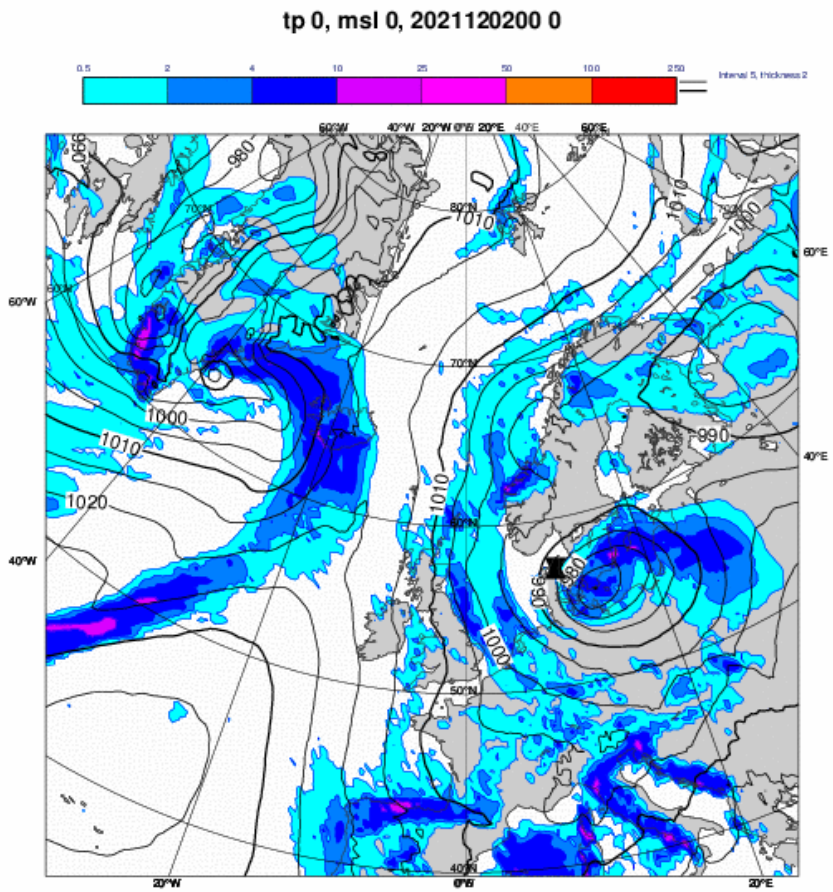
Up to 30cm (12in) of snow fell in the city of Aalborg, leaving at least 25 staff and customers unable to go home.

So the group bedded down in the showroom, dined on the store's food and watched television.

Case Study: Snowstorm - December 2021

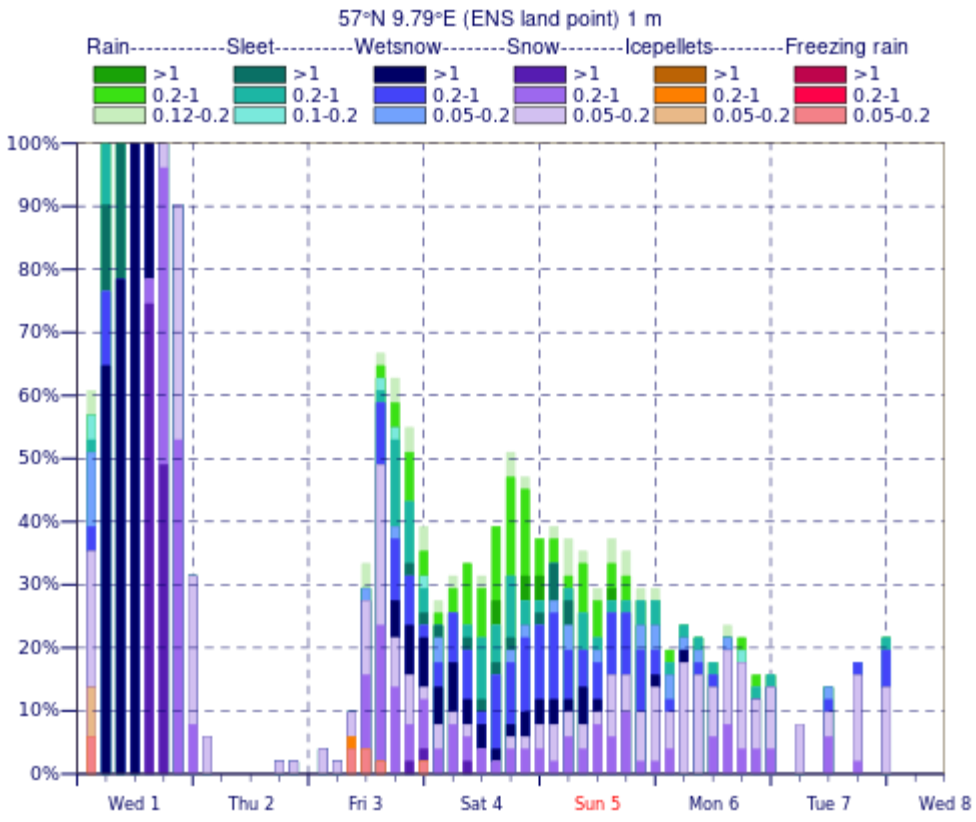




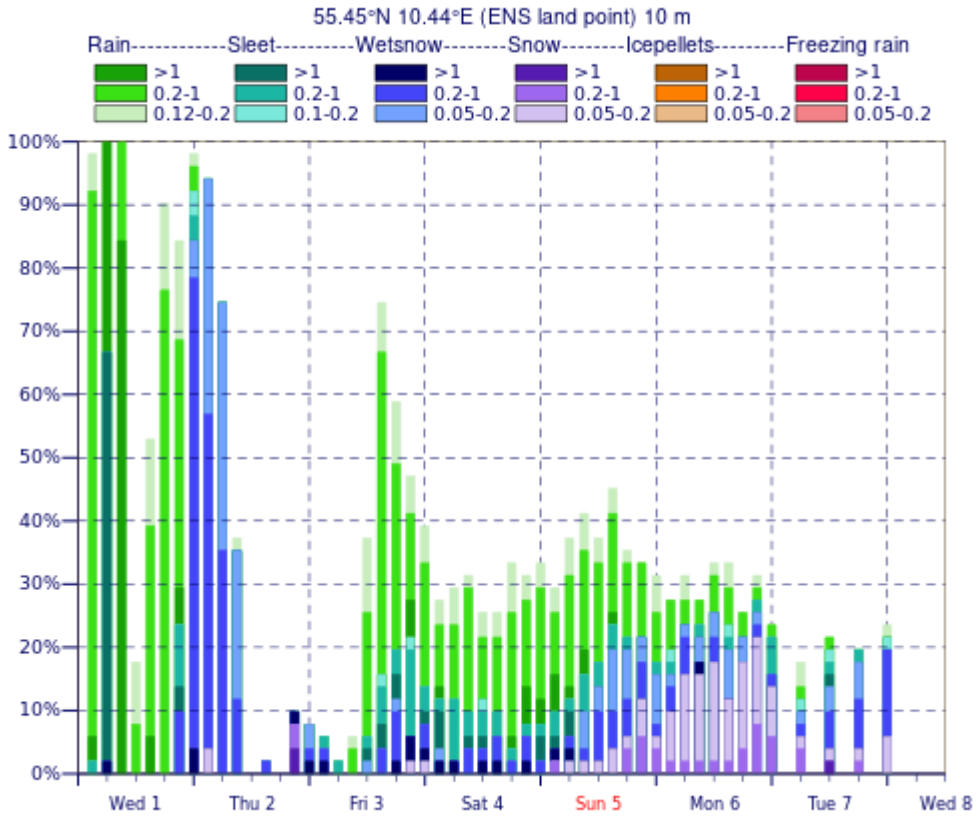


Case Study: Snowstorm - December 2021

1 December 00UTC



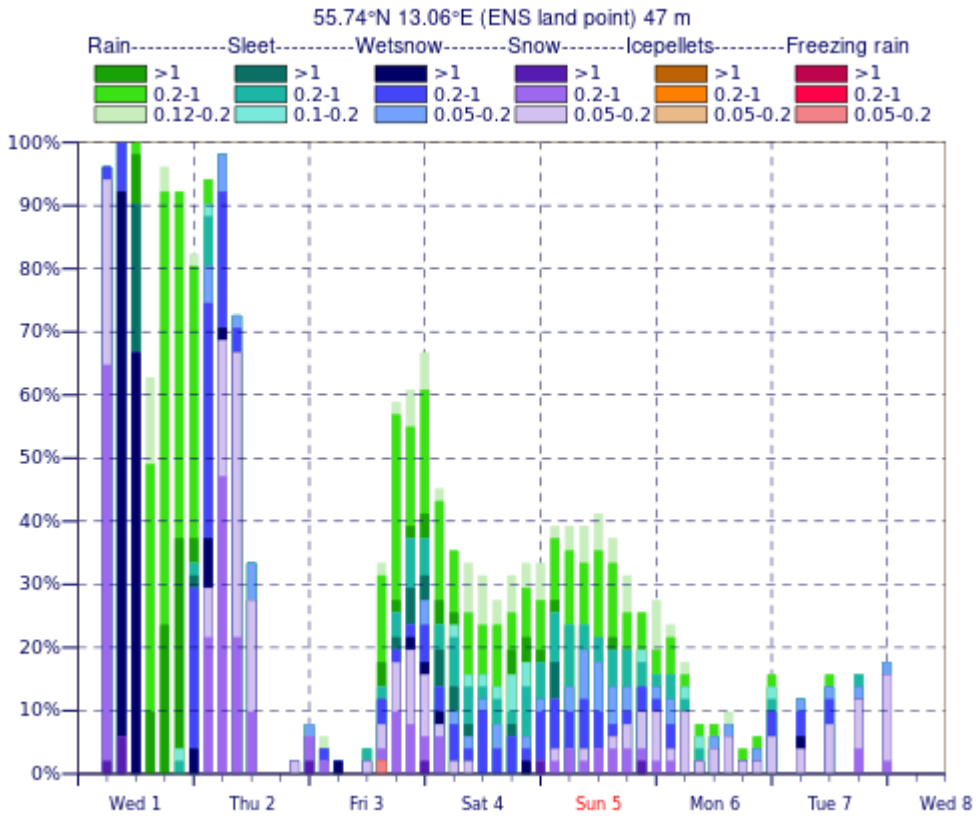
Aalborg - Denmark



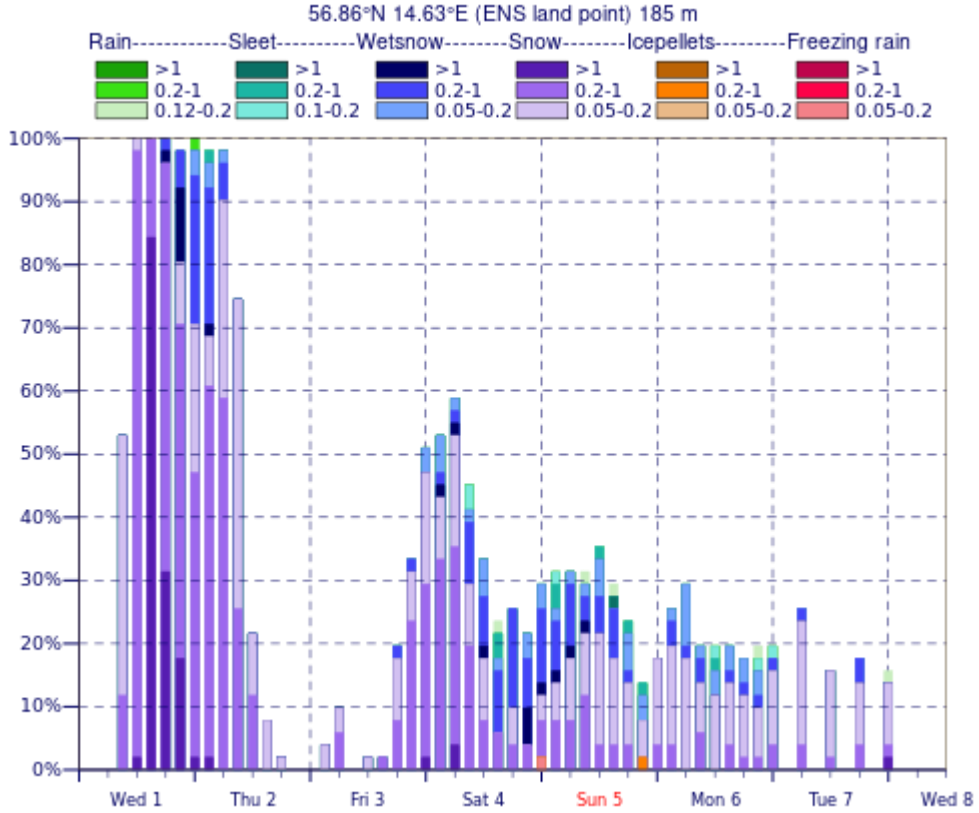
Odense - Denmark

Case Study: Snowstorm - December 2021

1 December 00UTC



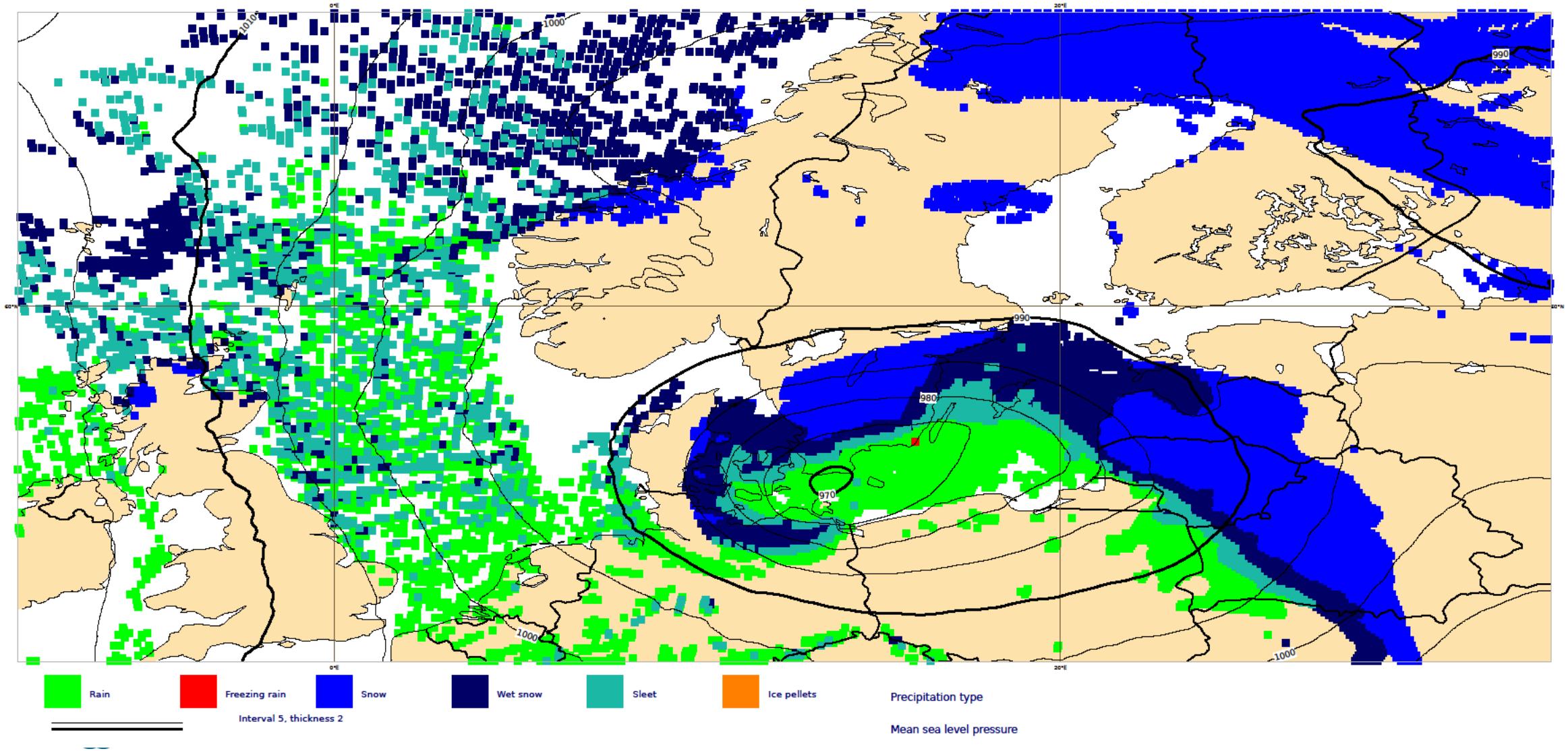
Lund - Sweden



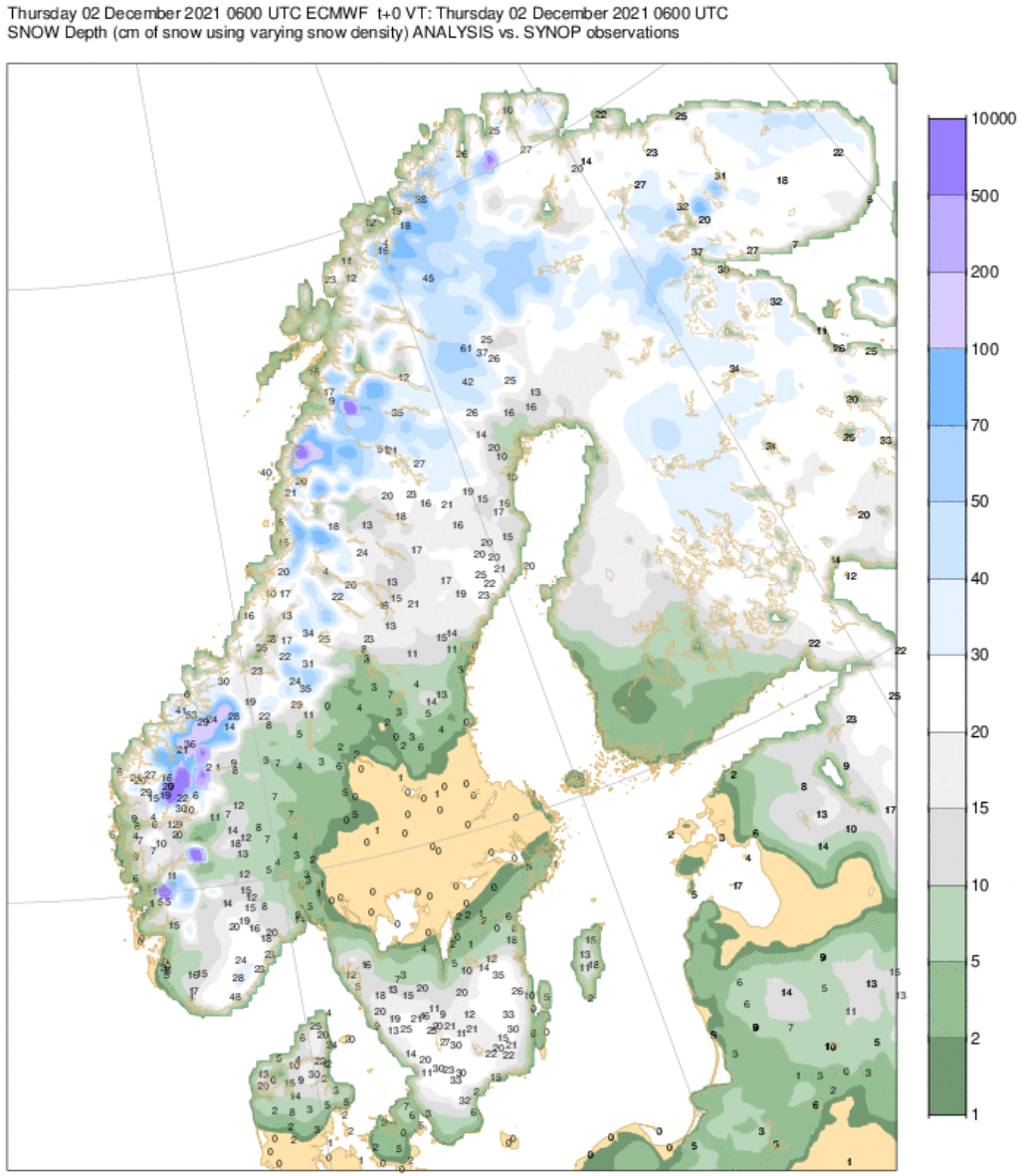
Vaxjo - Sweden

Case Study: Snowstorm - December 2021

1 December 00UTC

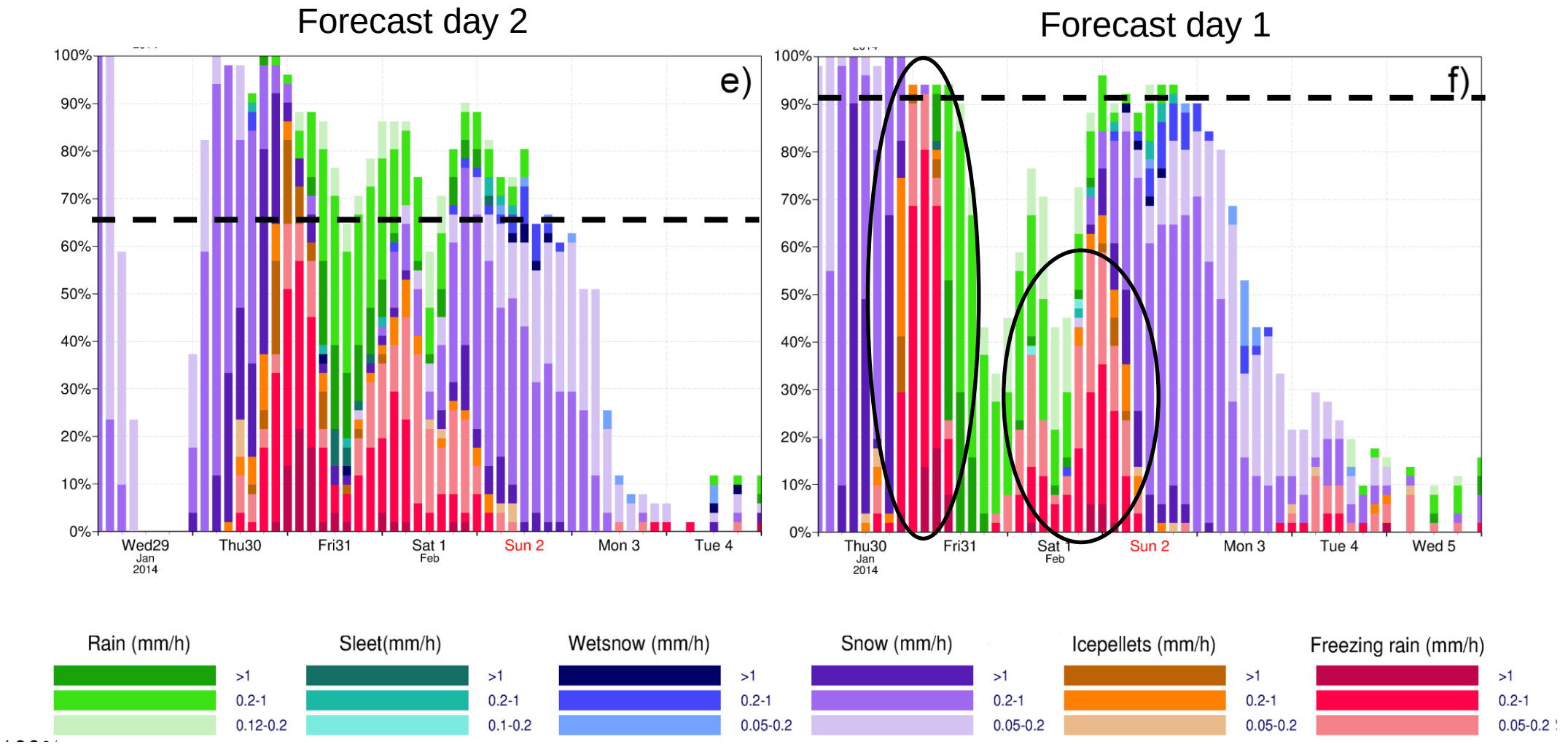


Case Study: Snowstorm - December 2021

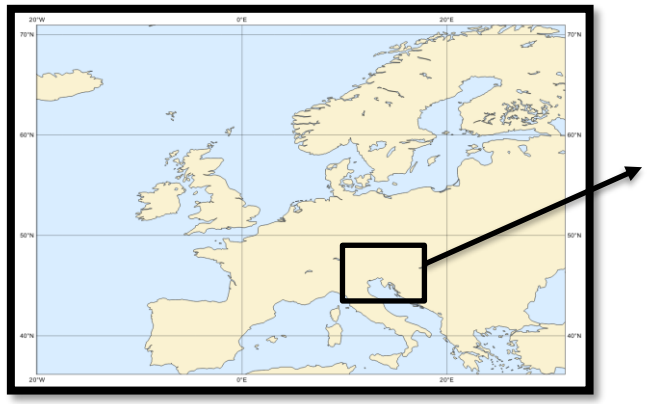


Case Study: Freezing rain in Slovenia 2014 (Jan-Feb)

Case Study: Probabilities, meteogram for Postojna



Case Study: Most probable precipitation type



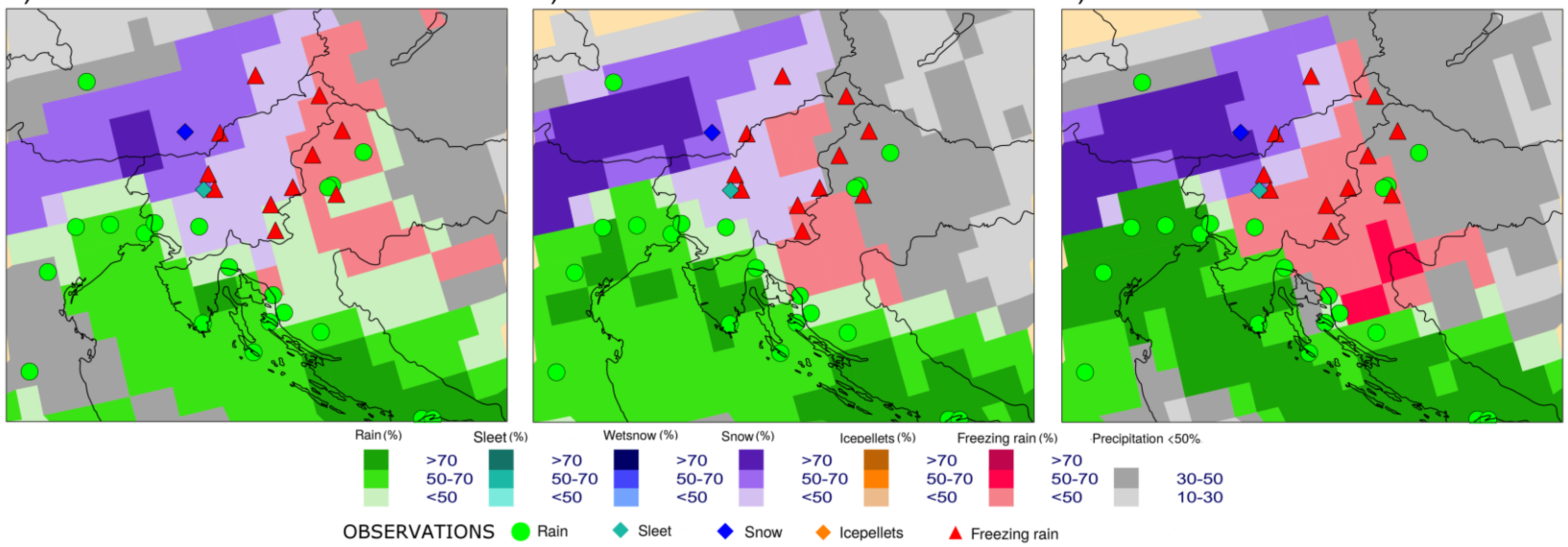
Freezing rain (%)

>70
50-70
<50

a) t+ 150 h

b) t+ 126 h

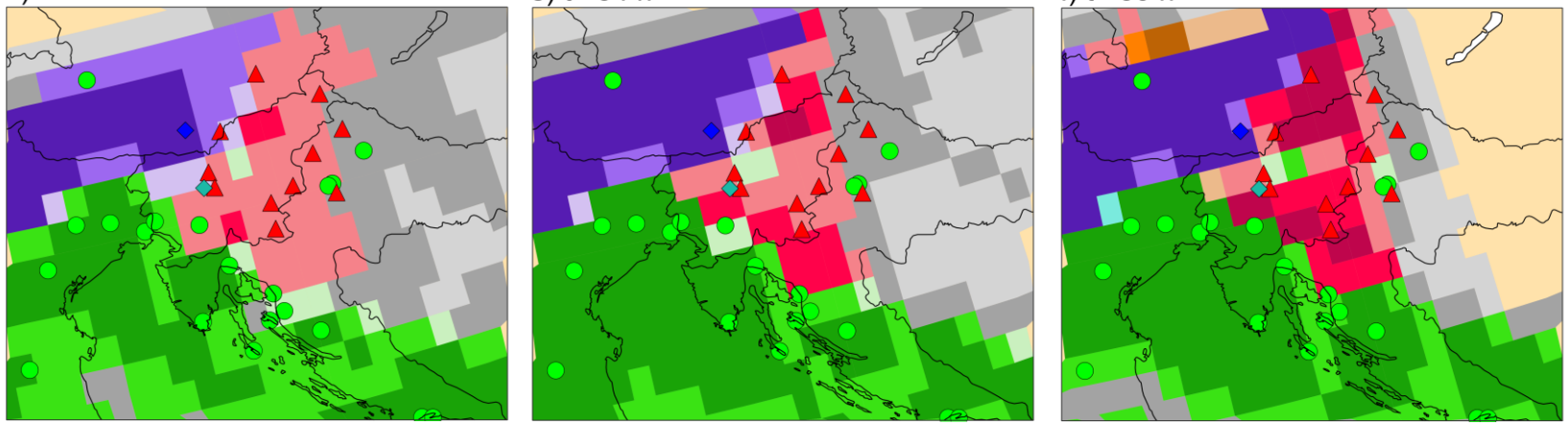
c) t+ 102 h



d) t+ 78 h

e) t+ 54 h

f) t+ 30 h



Tips for how to use Precipitation Type

- Take into account the height of the ENS in your meteogram location (in the title of precipitation type meteogram), because the observation height can be very different, specially in mountainous areas

- In the meteogram, the bars are stacked in such a way that the nominally most hazardous type (freezing rain in the high intensity category) is shown at the bottom, and the least hazardous (low intensity rain) at the top

- Whenever the lightest shade, of a given colour (except grey) appears on the map, the user immediately knows that more than one precipitation type has been predicted at that time, which can serve as an initial alarm bell for “uncertainty”

Summary – Precipitation Type

- The most probable precipitation type provides a first guess of the precipitation type while the probability of precipitation type analyses all the probabilities in a specific location and help to make better decisions about a particular event
- Different precipitation rates thresholds have been applied to each precipitation type enforce bias=1
- Both products are very skilful in forecasting rain and snow but it is only moderately skilful for freezing rain and sleet and unskilful for icepellets (but with 47r3 that may have improved!)
- The advantage of use ENS forecast is that it consistently produces a better spread of its (FAR, POD) pairs. This provides information for a wider range of FAR scores and thus may be useful for users with different levels of false alarm tolerance
- Further Reading:
  - Gascón, E., T. Hewson, and T. Haiden, 2018: Improving Predictions of Precipitation Type at the Surface: Description and Verification of Two New Products from the ECMWF Ensemble. Wea. Forecasting, 33, 89–108
  - ECMWF 2017-2018 winter Newsletter article: “New products for precipitation type probabilities”

Extreme Forecast Index (EFI) and Shift Of Tails (SOT)

Ivan Tsonevsky

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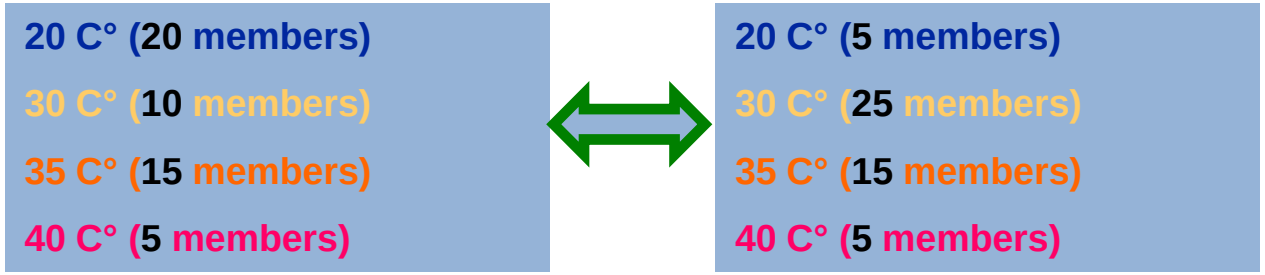
Extreme Forecast Index (EFI)

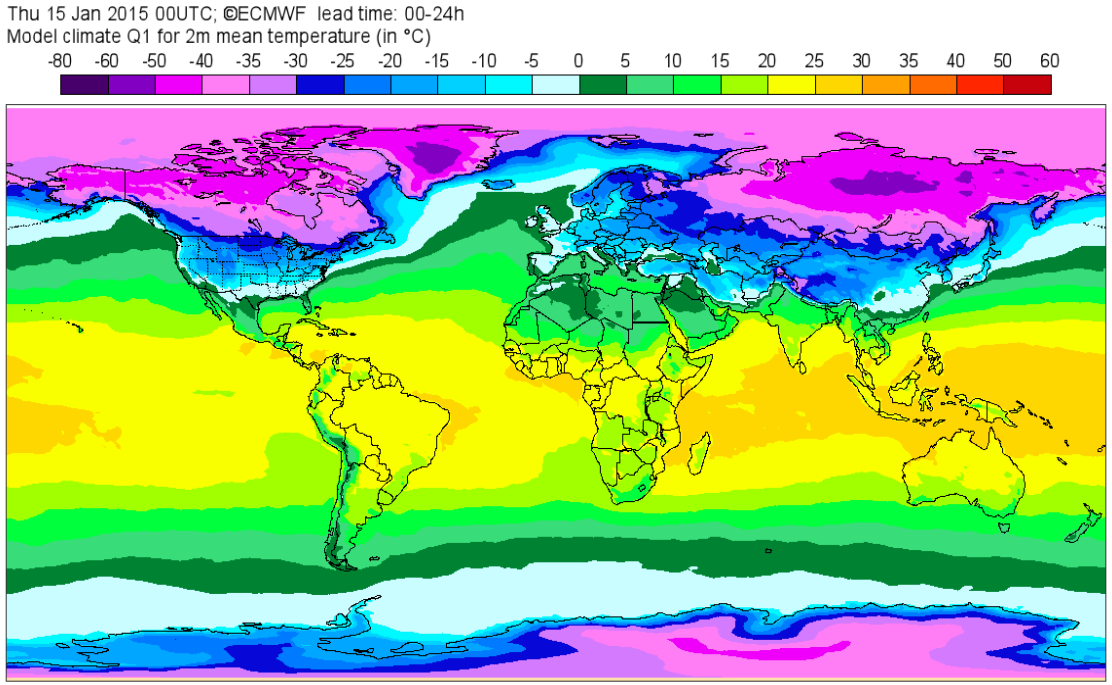
- **Extreme Forecast Index (EFI)** is designed to measure how extreme a given ensemble forecast is.
- EFI is a measure of the difference between the ensemble forecast distribution and a reference distribution - **model climate (M-climate)**.
- EFI delivers model-climate-related information, therefore it can be used as an “alarm bell” for extreme weather situations over any area without defining different space- and time-dependent thresholds.
- Simple probabilities (e.g. > 32°C) will not highlight the differences in the distributions below. EFI will, by accounting for the distribution of all the ensemble members



The Model climate (M-climate)

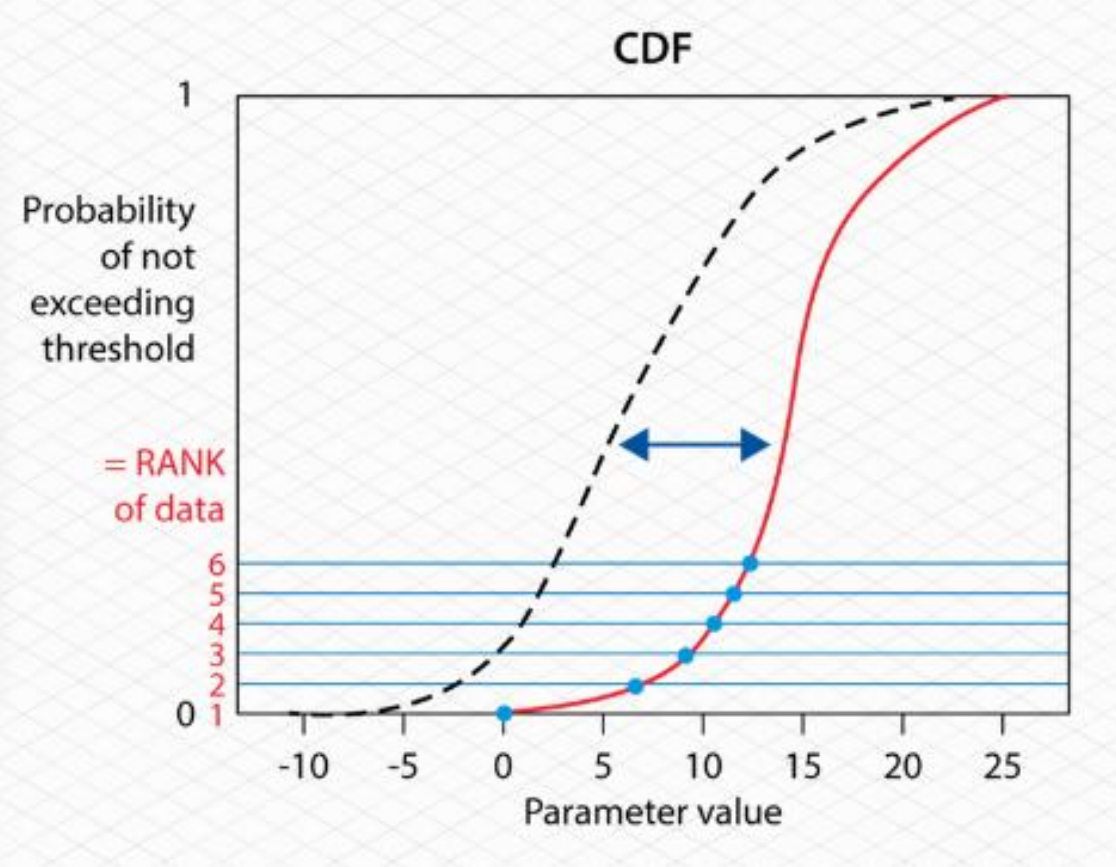
- For climate related products like the EFI a reliable model climate is essential.
- *Ideally* the model climate (M-Climate) is a large set of ensemble re-forecasts with the latest model configuration (used operationally) for a long enough period (e.g. 30 years).
- The current M-climate:
  - Running an ensemble re-forecast suite with 10 perturbed ensemble members and the Control
  - Always for the most recent 20 years with initial conditions taken from the ECMWF global atmospheric reanalysis **ERA5**
  - Re-forecast runs every Monday and every Thursday. Therefore climate files from the closest preceding run are taken.
  - Model run for 46 days, post-processed fields as for ENS (data every 6 hours)
  - Uses the latest model cycle (resolution/ physics / etc.)
  - Allows an immediate adaptation of the EFI and other model climate related products to any upgrade of ENS

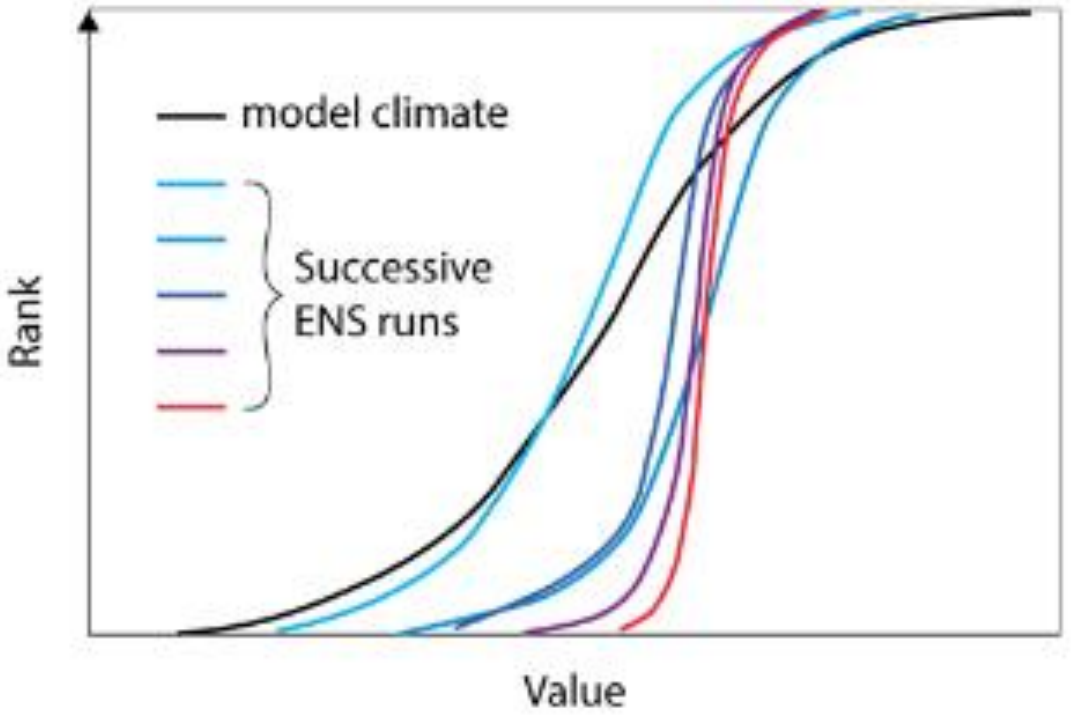
The Model climate (M-climate)



- To provide a robust, less noisy M-Climate, we do not use just one set of re-forecasts, but all nine sets within 5-week period centred on the week in question; extended-range – 3 sets in a week.
- M-climate sample size is: 20 years * 11 ensemble members * 9 re-forecast runs = 1980 re-forecast fields; extended-range: 20 years * 11 ensemble members * 3 re-forecast runs = 660 fields
- Large climate size leads to:
  - Decrease of the noise in the tails of the M-climate distribution and considerable increase of the consistency of SOT forecasts;
  - Decrease of the jumpiness of the EFI forecast due to the seasonal trend.

Cumulative Distribution Functions (CDFs)



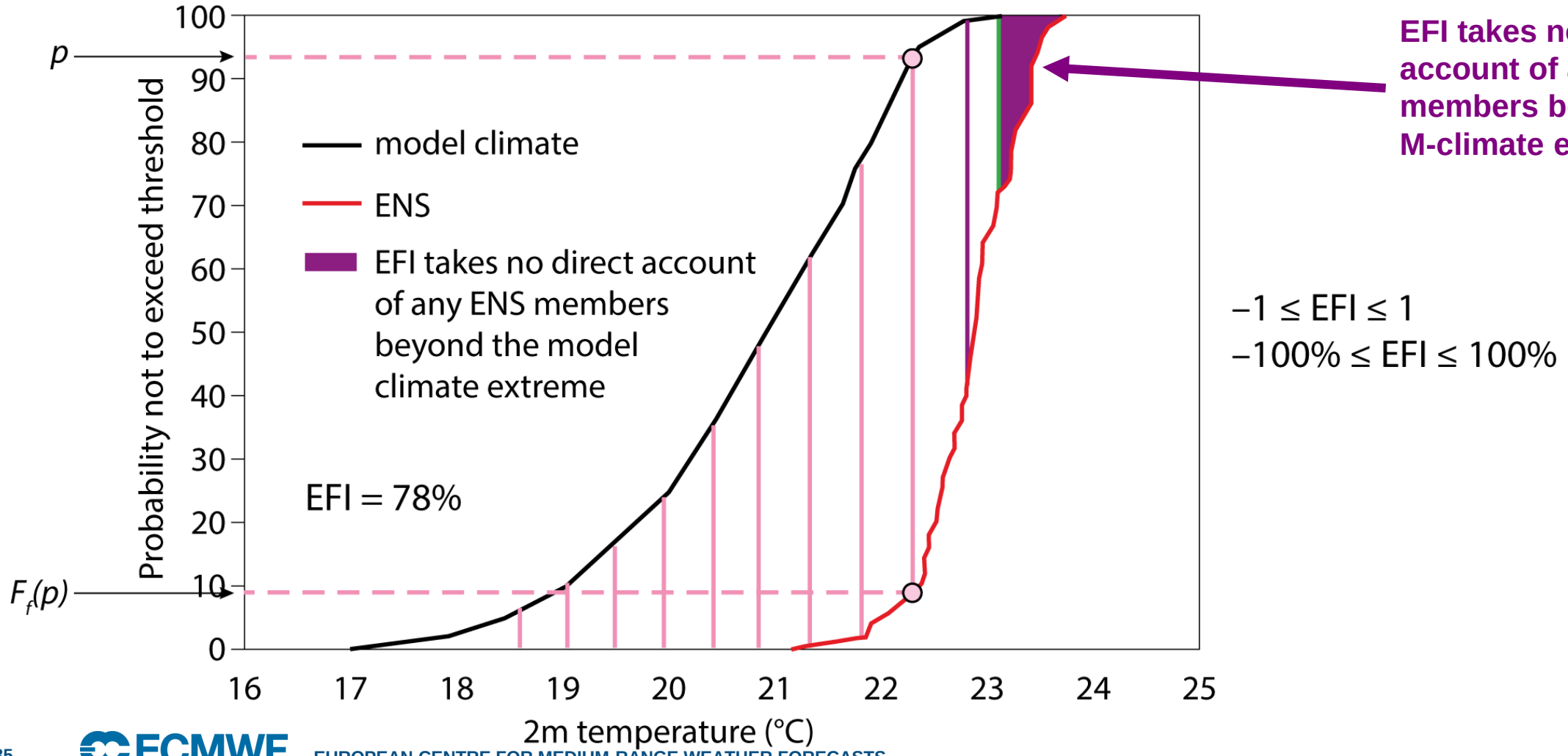


The more vertical the CDF the more the ensembles members agree

$$EFI = \frac{2}{\pi}\int_0^1 \left(\frac{p - F_f(p)}{\sqrt{p(1-p)}}\right) dp$$

Represented by pink lines below

More weight to extremes of M-climate being a quadratic function of p



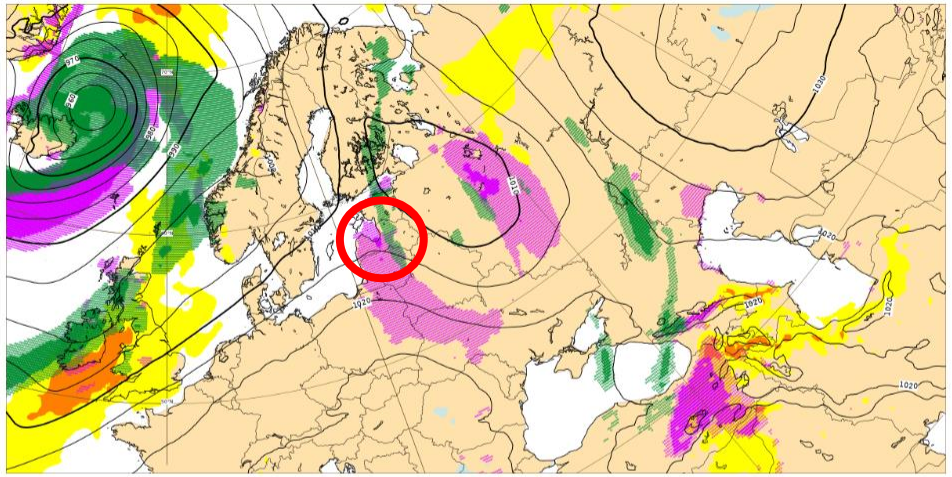
EFI takes no direct account of any ENS members beyond the M-climate extremes

$-1 \le EFI \le 1$

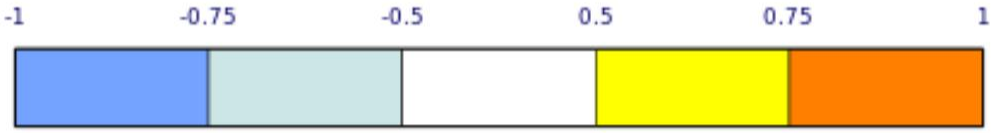
$-100\% \le EFI \le 100\%$

Multi-parameter EFI during last 24 hours

Base time: Tue 04 Oct 2022 00 UTC Valid time: Wed 05 Oct 2022 00 UTC (+24h) Area : North East Europe



2m temperature extreme forecast index



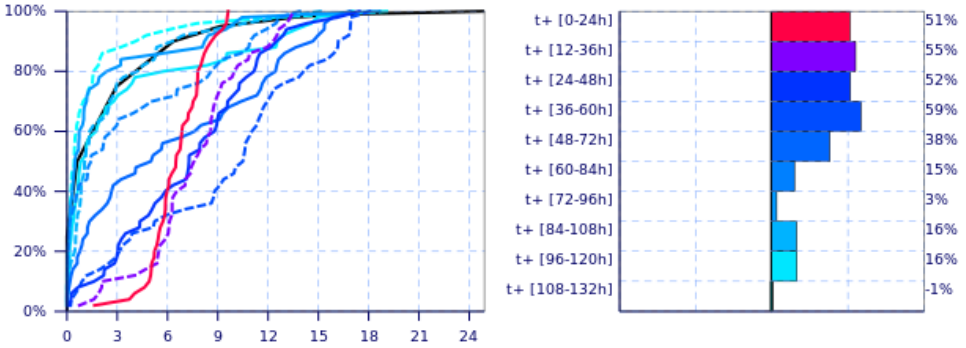
10m wind gust extreme forecast index

Total precipitation extreme forecast index

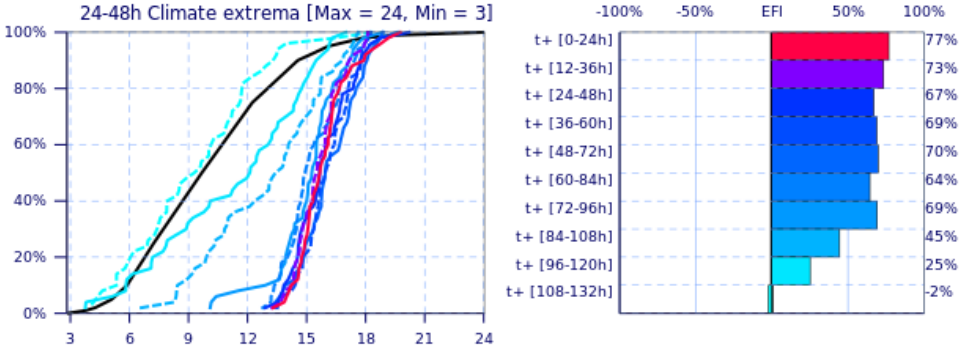
Ensemble mean for mean sea level pressure

Forecast and M-Climate cumulative distribution functions with EFI values
56.86°N 24.38°E
Valid for 24 hours from Tuesday 4 October 2022 00 UTC to Wednesday 5 October 2022 00 UTC

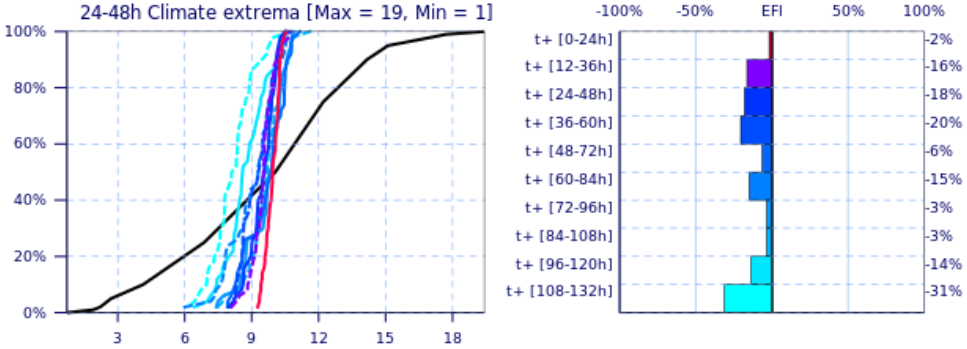
CDF for 24h precipitation (mm)
24-48h Climate extrema [Max = 25, Min = 0]



CDF for 24h maximum wind gust (m/s)
24-48h Climate extrema [Max = 24, Min = 3]



CDF for 24h mean 2m temperature (°C)
24-48h Climate extrema [Max = 19, Min = 1]

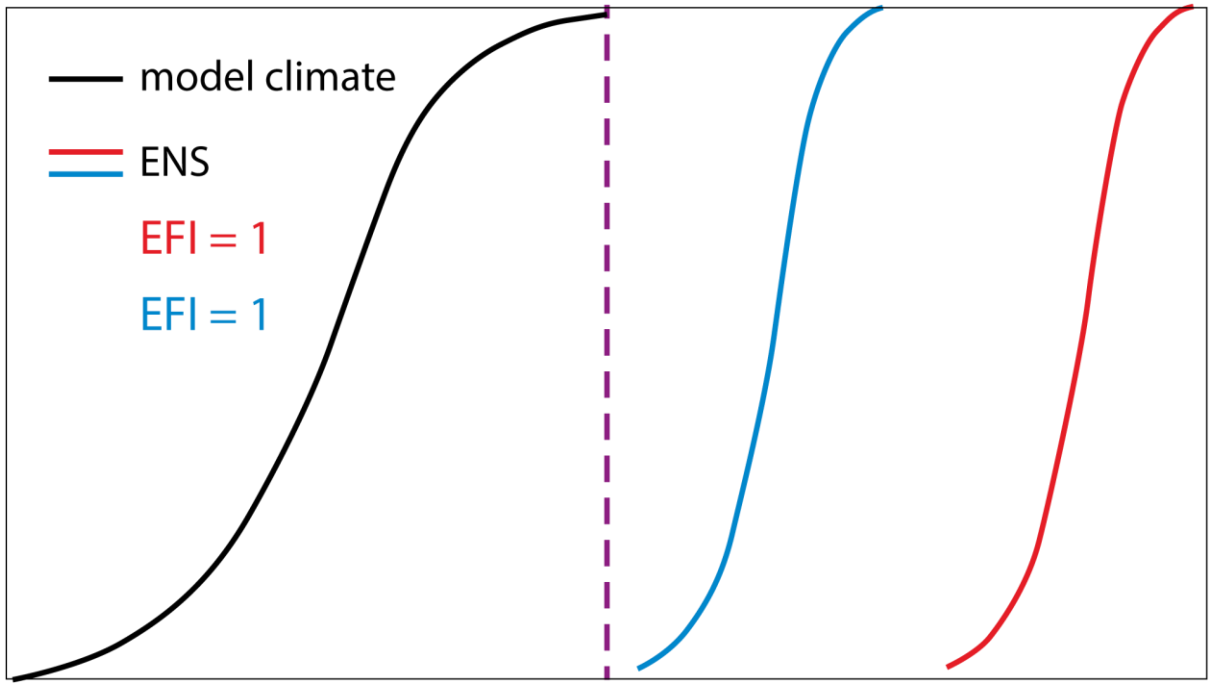


M-Climate: this stands for Model Climate. It is a function of lead time, date (+/-15days), and model version. It is derived by rerunning all member ensemble over the last 20 years twice a week (1980 realisations).
M-Climate is always from the same model version as the displayed ENS data.
On this page only the 24-48 lead M-Climate is displayed.

Some limitations of EFI

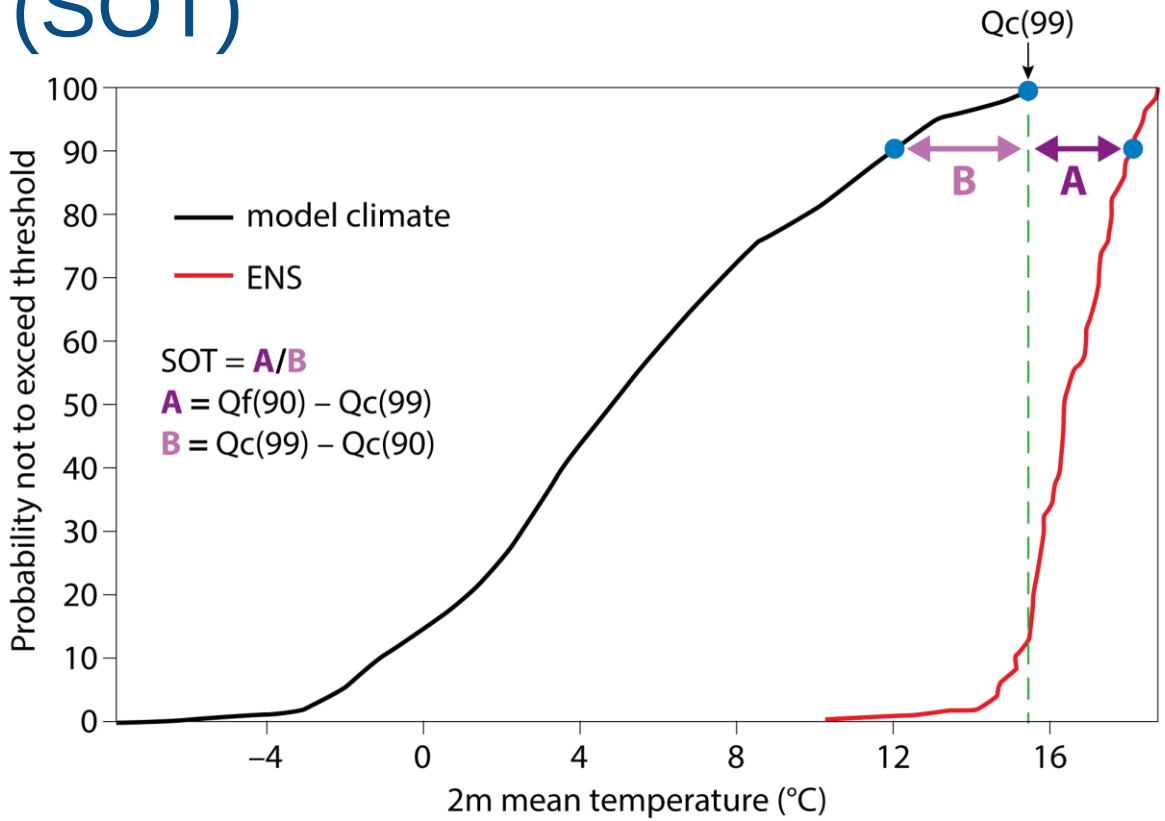
- Extreme does not *necessarily* mean high impact (e.g. 2mm rain in the desert)
- Past history also important but not directly accounted for (e.g. heavy rain when ground saturated)
- Windstorm impact can depend on whether trees are in leaf, whether ground is saturated…
- Products are only as good as the model output, e.g.:
  - Tropical cyclone representation is limited by resolution
  - Threat from intense, *very localised* convection unlikely to be fully captured

Shift of Tails (SOT)



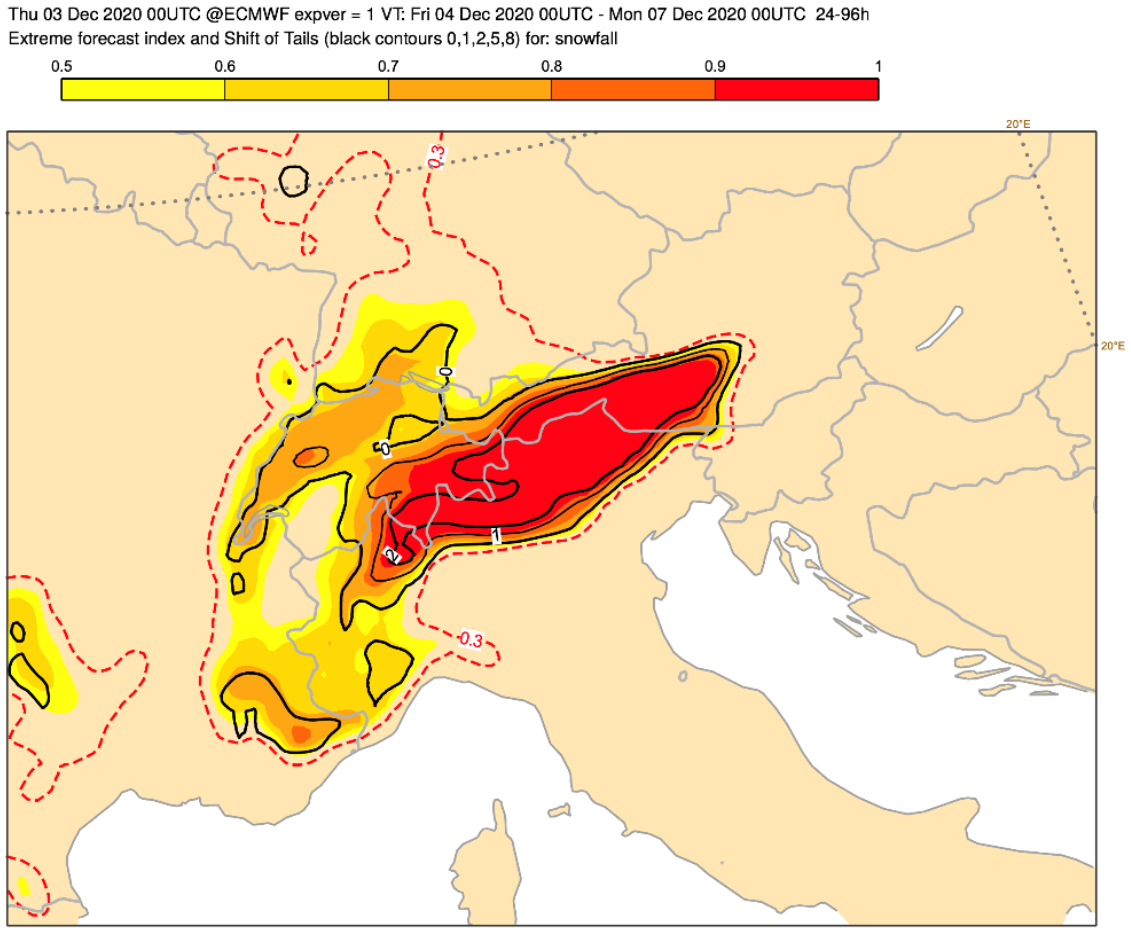
- As EFI does not take direct account for members which are beyond the M-climate, once EFI reaches its maximum value of 1 or minimum value of -1, it does not provide further information about the magnitude of extremity.
- Shift Of Tails (SOT) has been operational since 19 June 2012 to complement EFI by providing information about **how extreme an extreme event might be**.

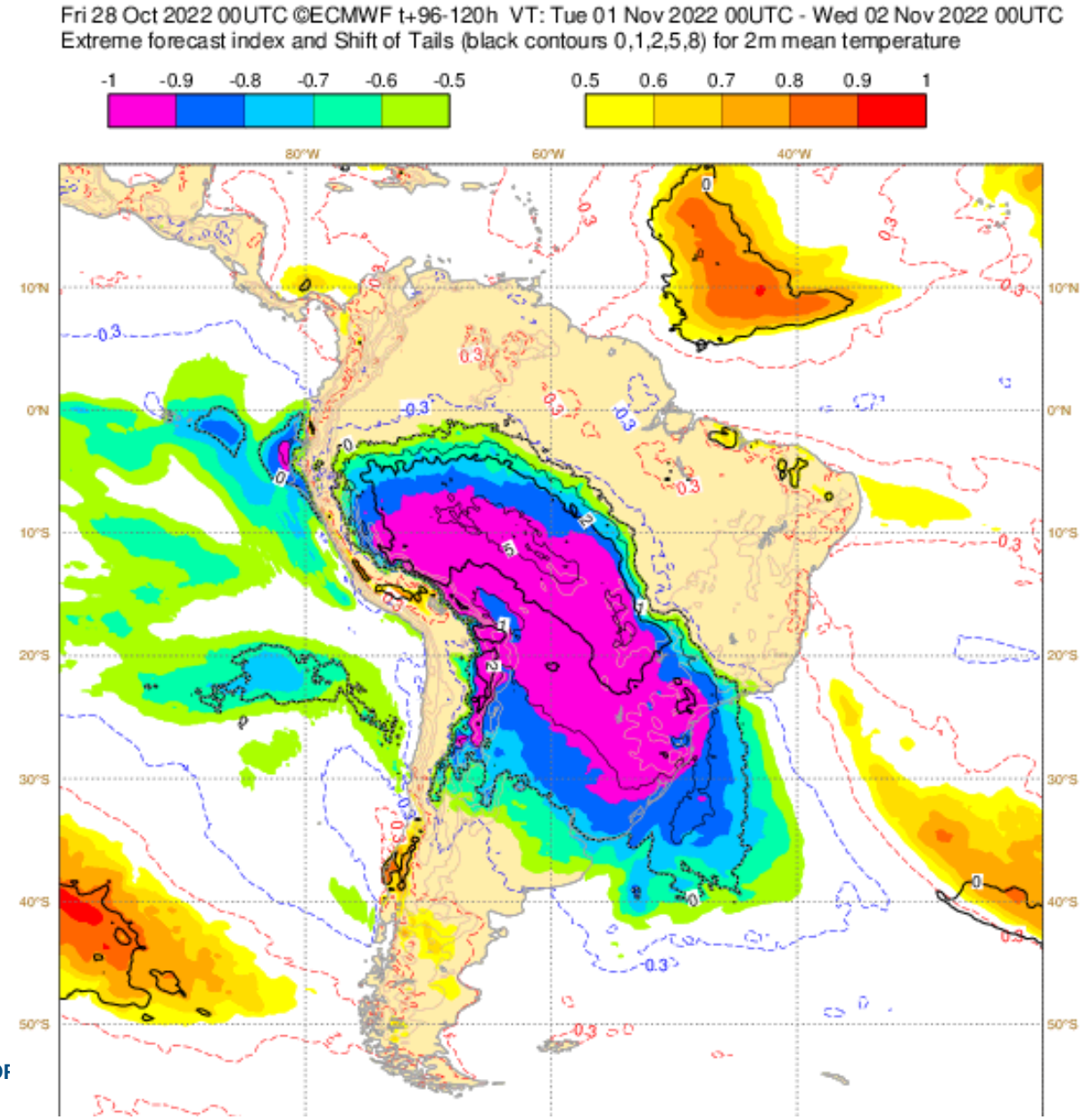
Shift of Tails (SOT)



- SOT compares the tails of both distributions M-climate and ENS.
- SOT is based on 90th and 99th (upper tail) and 1st and 10th (lower tail for temperature only) percentiles
- **Positive** SOT values indicate that at least 10% of the ensemble is forecasting an extreme event; the higher the SOT the more extreme that top 10% is.

SOT in Open Charts – denoted by black/blue contouring

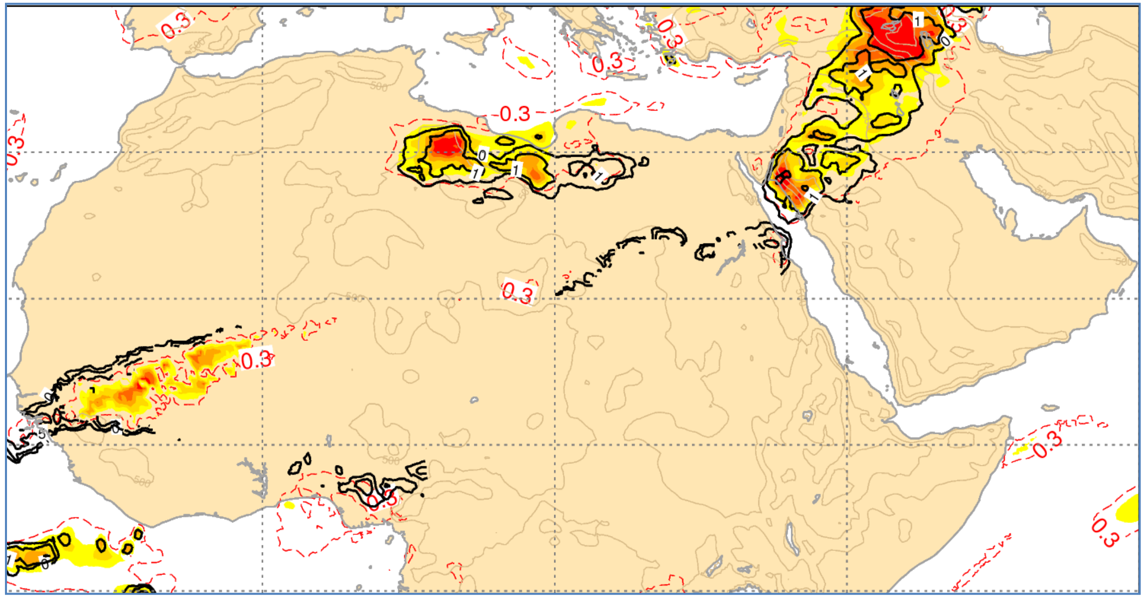




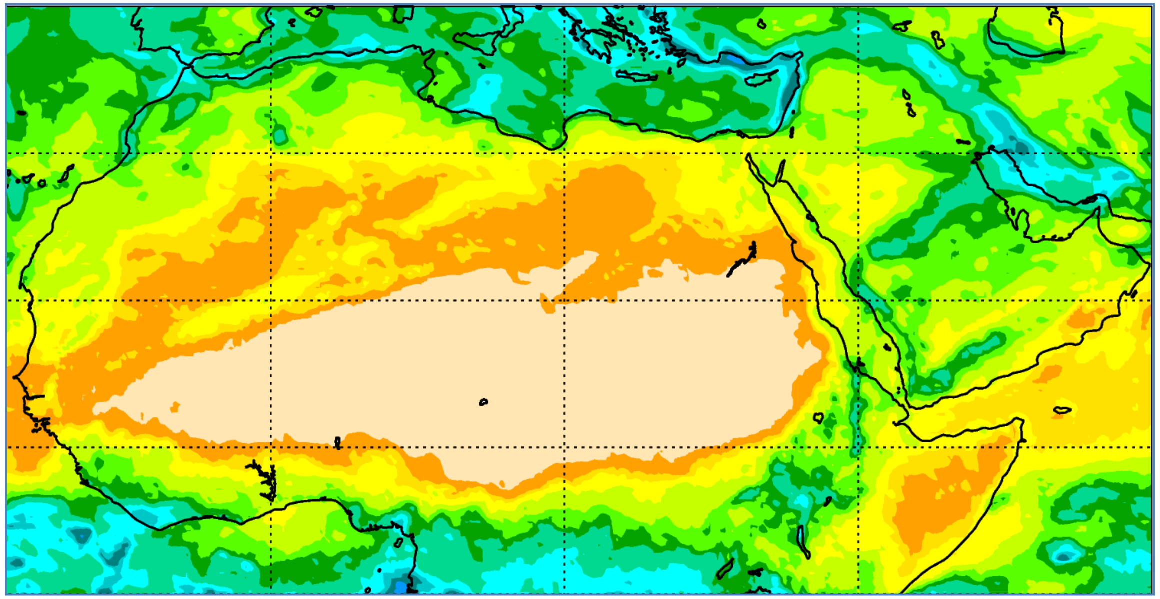
ECMWF EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FOR

Shift of Tails (SOT) - Limitations

EFI & SOT for precipitation



M-climate Q99



SOT is not defined when M-climate Qc(90)= Qc(99) (to avoid division by 0). This leads to some noise on the plots. To avoid this and to close SOT contours for snowfall, SOT is arbitrarily set to -1 where not defined only for plotting purposes.

EFI Verification

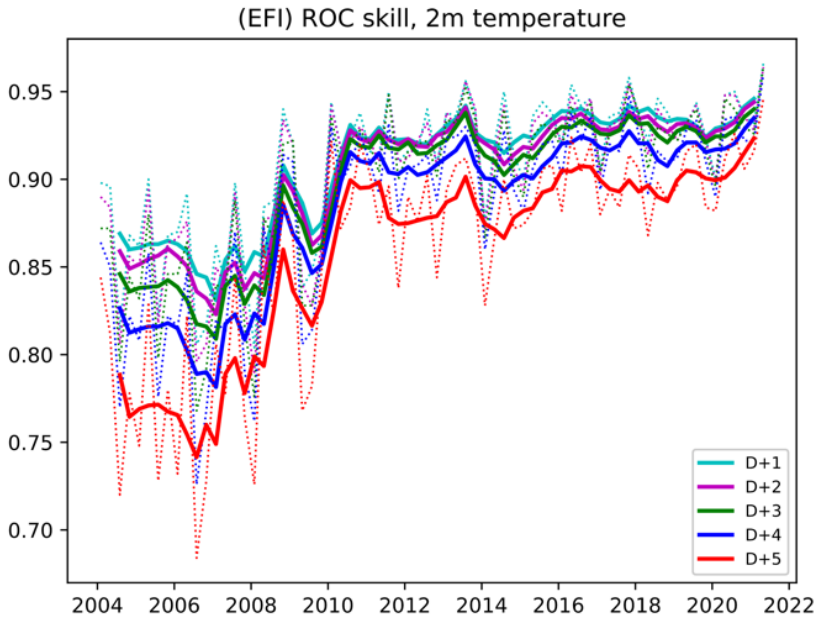
- Verification of the EFI has been done using synoptic observations over Europe available on the GTS.
- An extreme event is defines when the observation exceeds the 95th percentile of the observed climate for that station (calculated from a 15-year sample).
- The ability of the EFI to detect extreme events is assessed using the area under the Relative Operating Characteristic (ROCA). ROCA shows how good the model is at discriminating between severe and non-severe events.

$$EFI\ skill\ score = \frac{score_{forecast} - score_{reference}}{score_{perfect\ forecast} - score_{reference}} = \frac{ROCA_f - 0.5}{1 - 0.5} = 2ROCA_f - 1$$

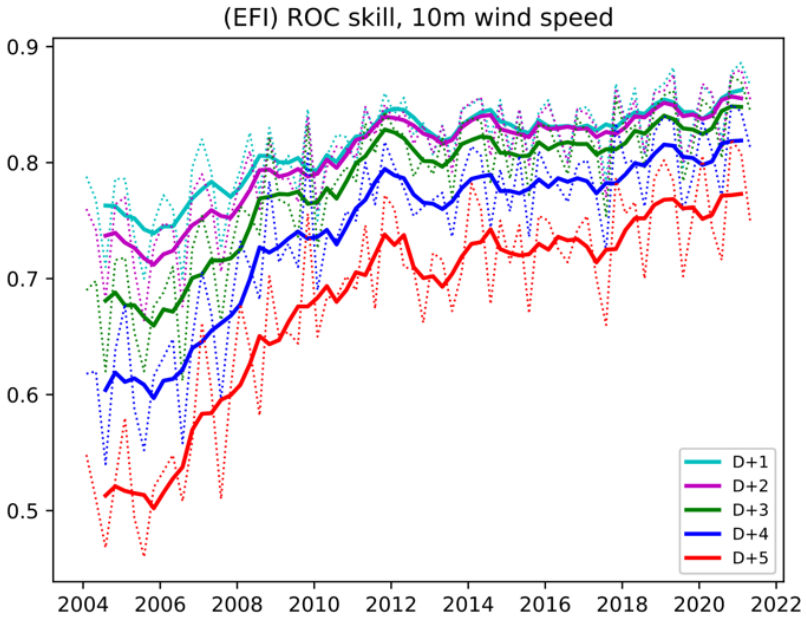
0 →no skill, 1 → perfect score

- The verification is done for 3 parameters: 2m mean temperature, 10m mean wind speed and total precipitation

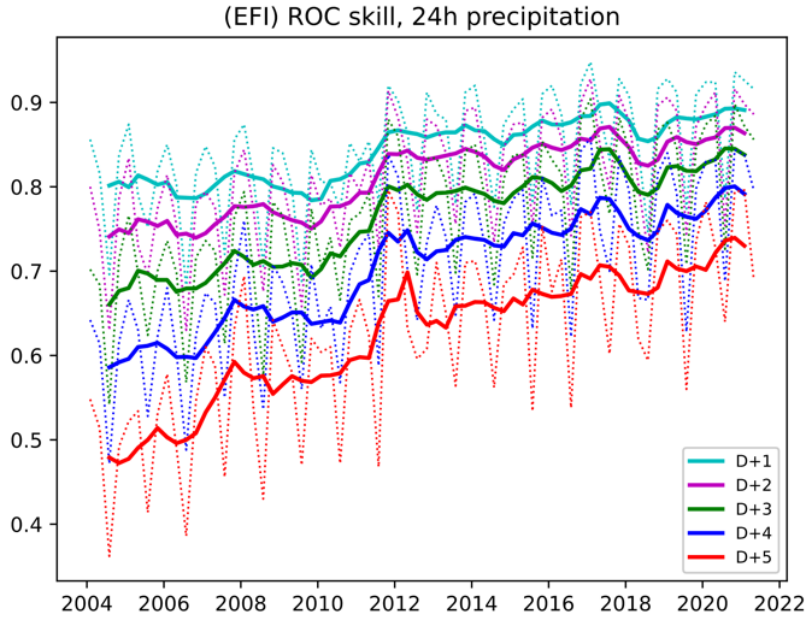
EFI Verification



2m temperature

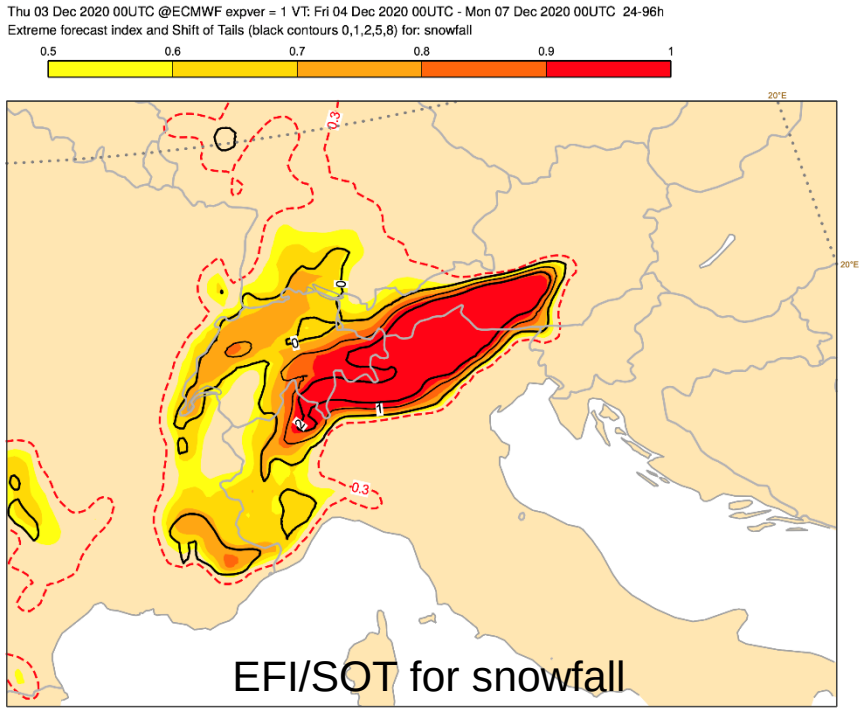


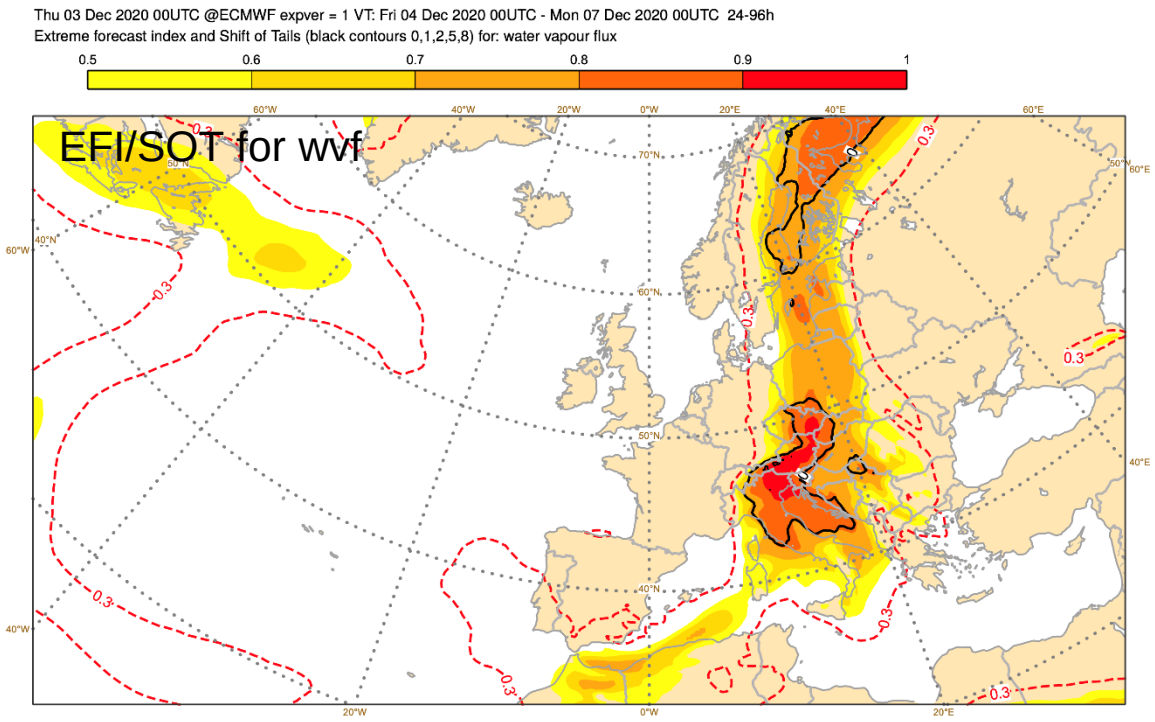
10m wind speed



24h precipitation

Water vapour flux and multiday snowfall EFI/SOT

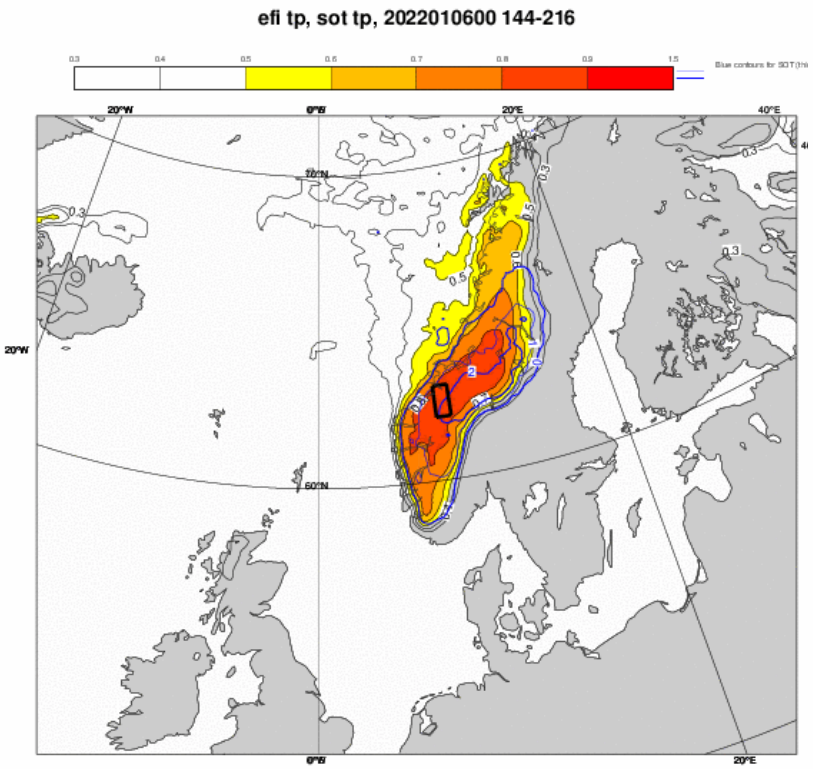




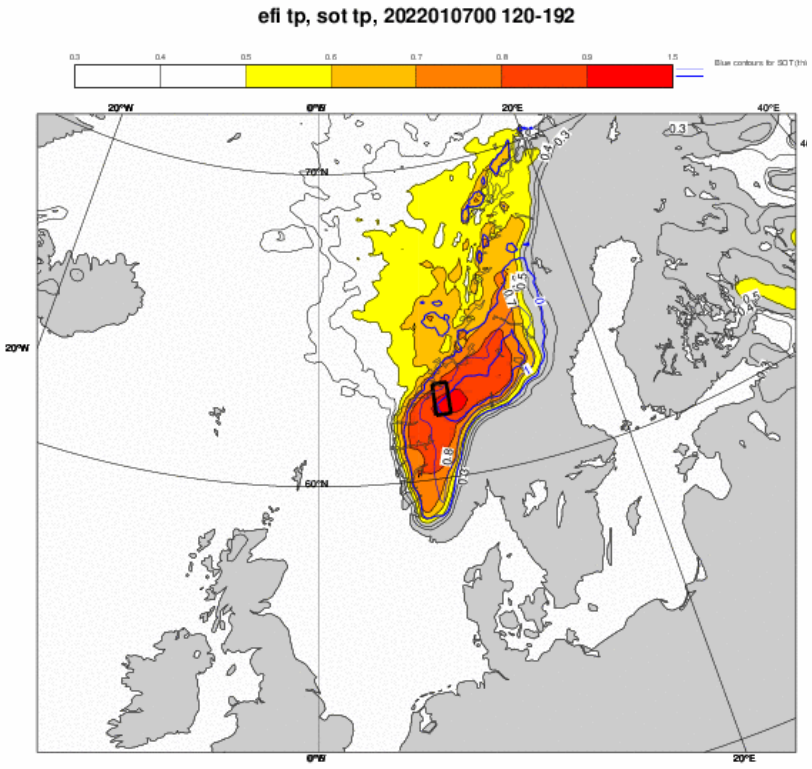
- An extreme snowfall event occurred in the eastern Alps at the beginning of December 2020
- New multiday accumulated snowfall EFI/SOT available operationally matching the same 72h, 120h, 240h and 360h accumulations as for total precipitation

Case Study: Gyda 12-14 January 2022

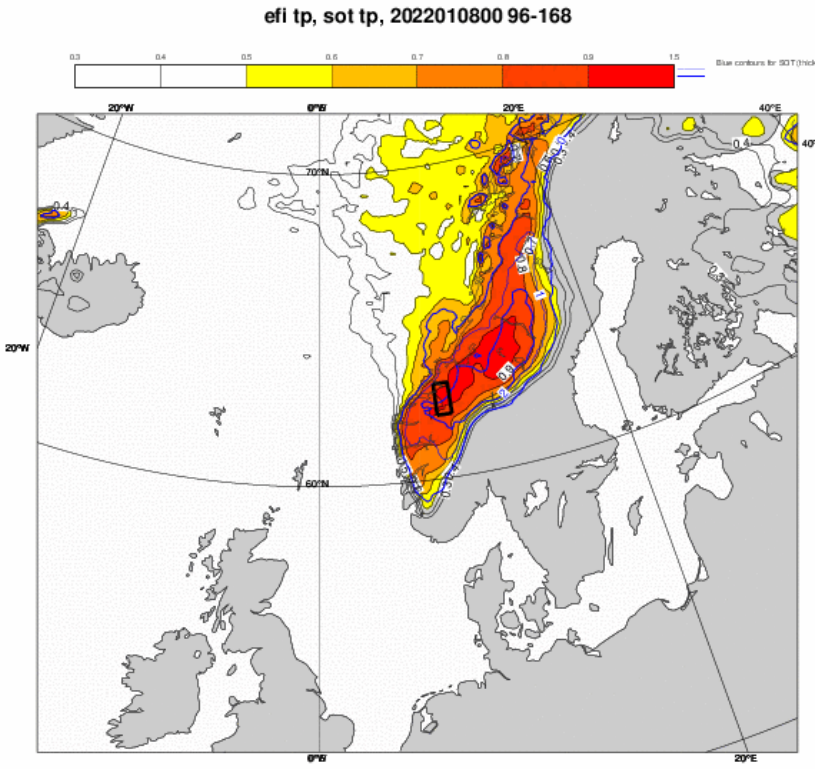
EFI for 3-day precipitation



T+144-216 hours
(6-9 days)



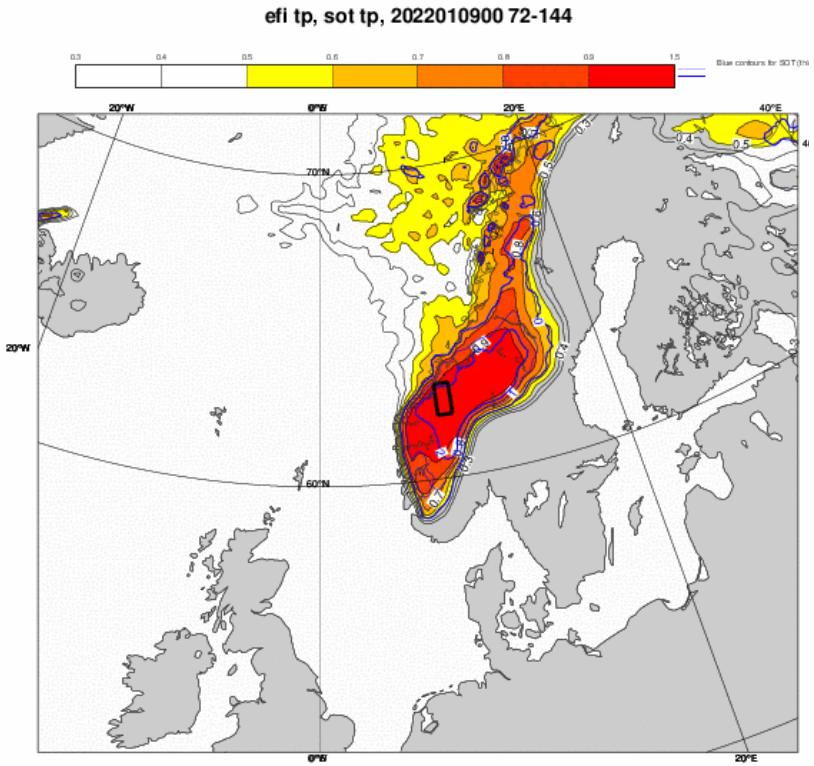
T+120-192 hours
(5-8 days)



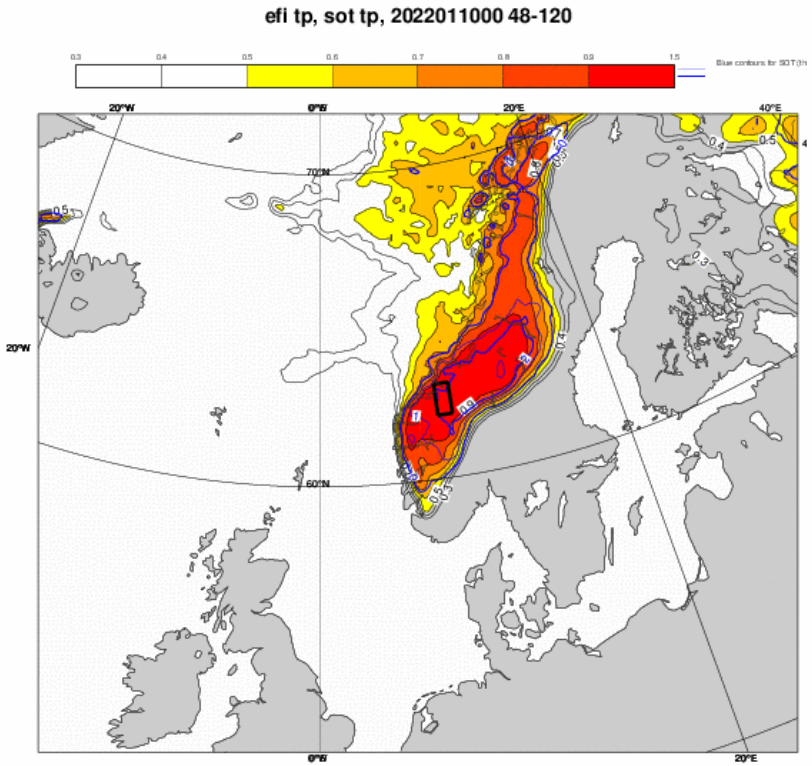
T+96-168 hours
(4-7 days)

Case Study: Gyda 12-14 January 2022

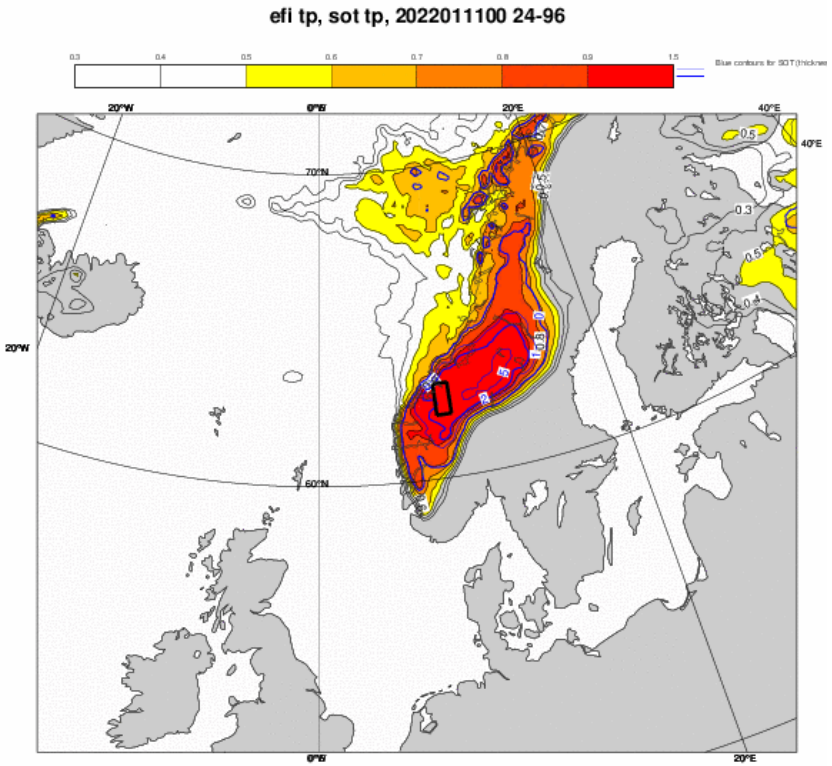
EFI for 3-day precipitation



T+72-144 hours
(3-6 days)

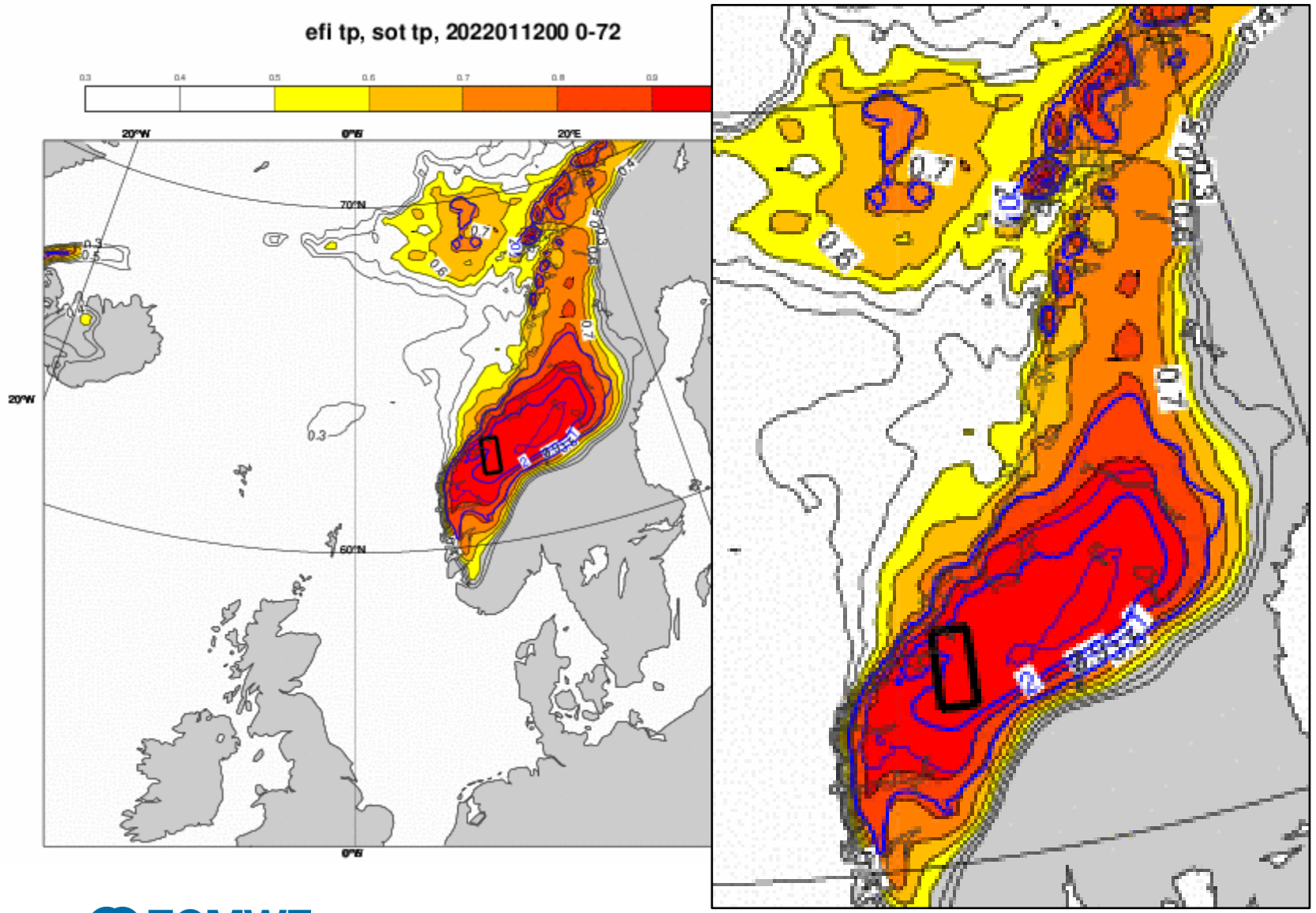


T+48-120 hours
(2-5 days)



T+24-96 hours
(1-4 days)

Case Study: Gyda 12-14 January 2022

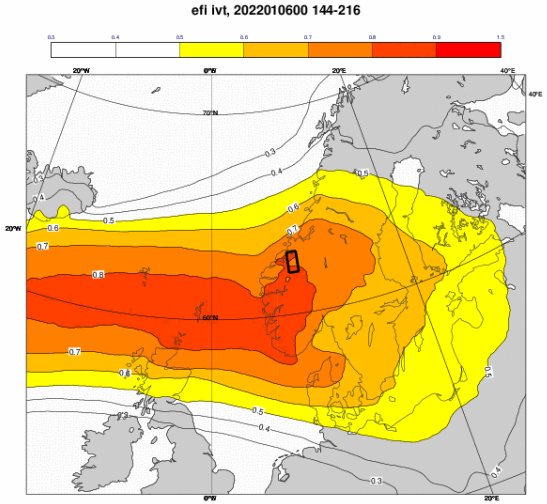


EFI for 3-day precipitation

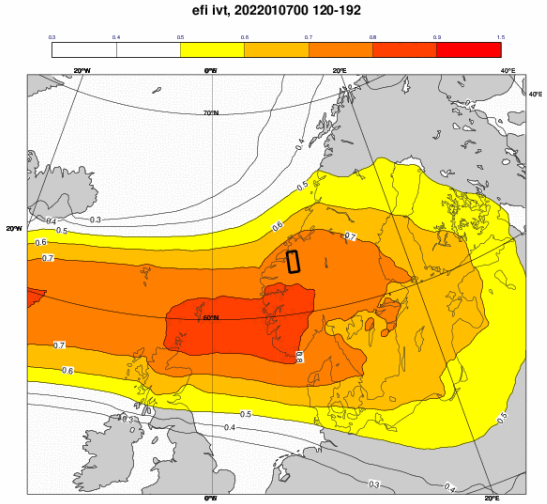
T+0-72 hours
(0-3 days)

Case Study: Gyda 12-14 January 2022

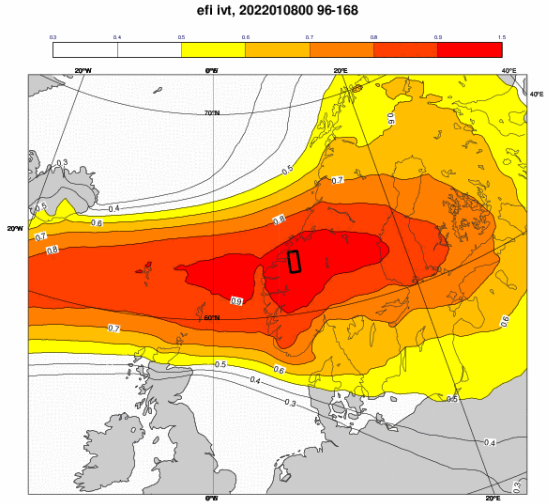
Integrated water-vapor flux as a measure for atmospheric river features



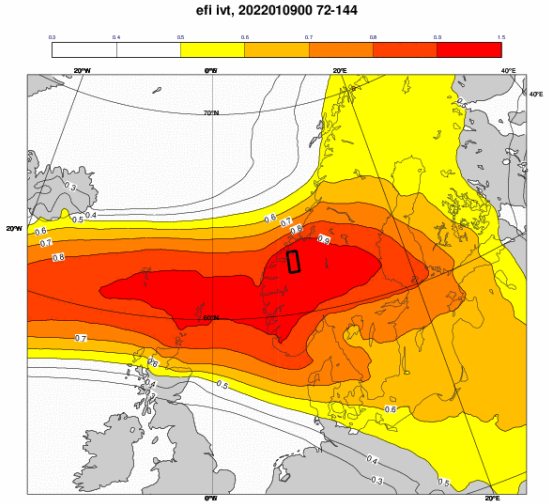
T+144-216 hours



T+120-192 hours

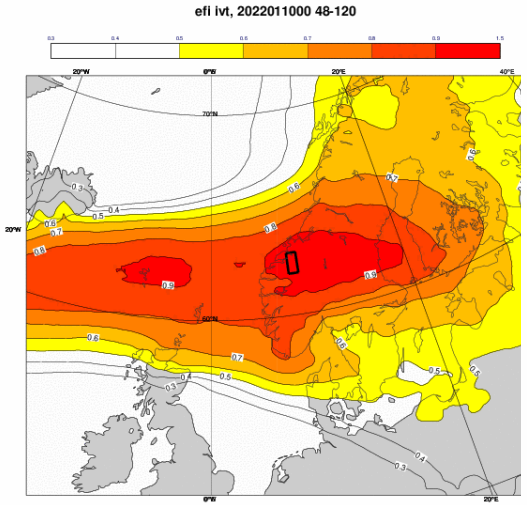


T+96-168 hours

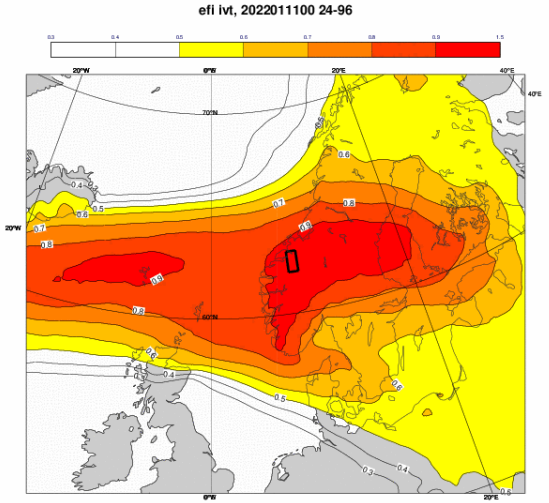


T+72-144 hours

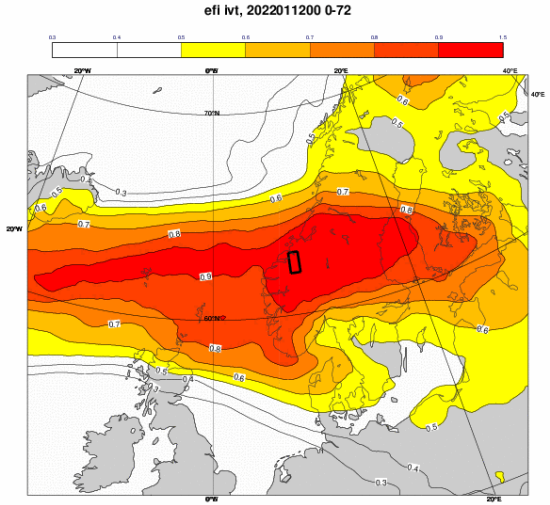
Very good signal in early medium-range. Probably due to the connection to an atmospheric river



T+48-120 hours



T+24-96 hours

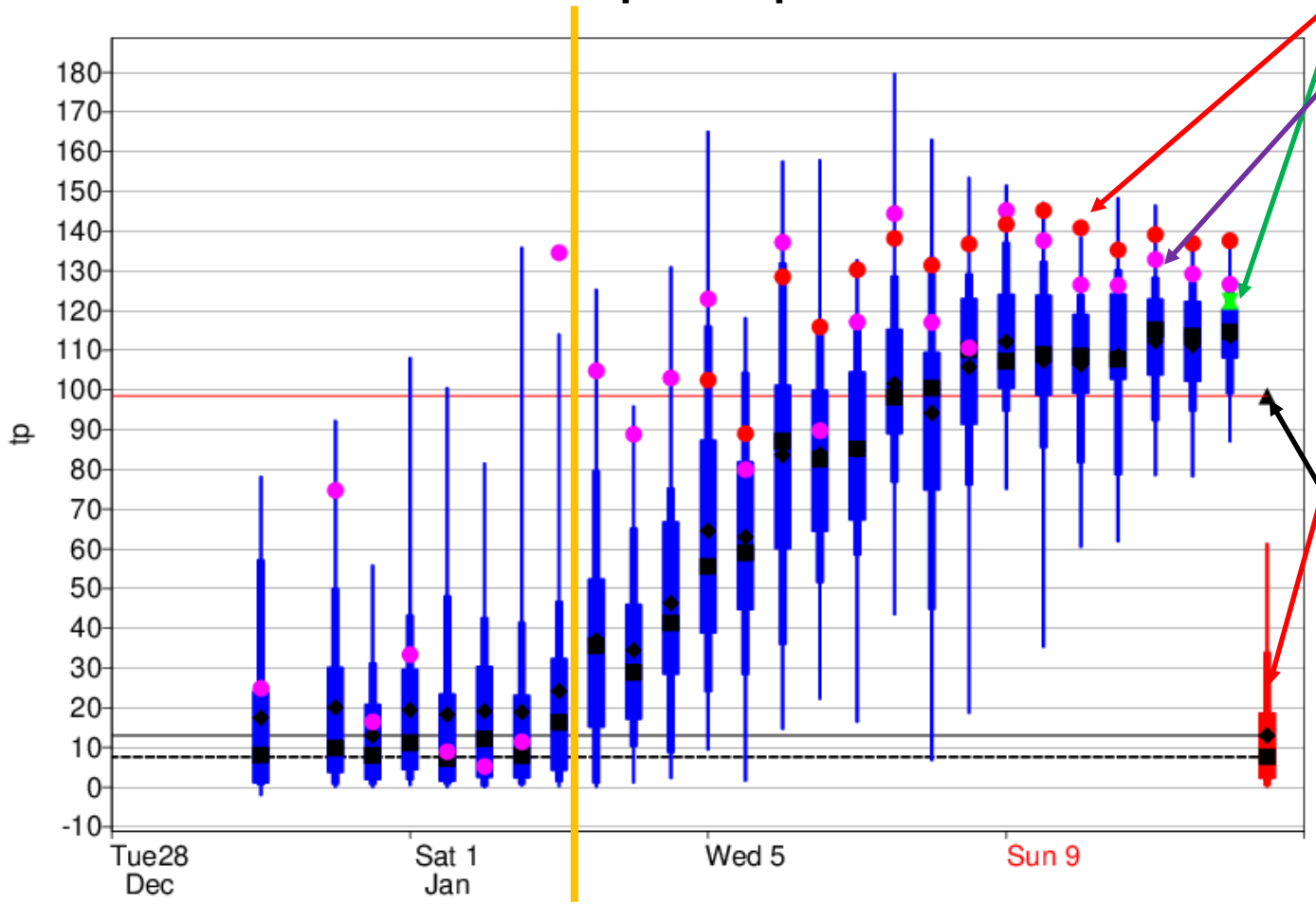


T+0-72 hours

ECMWF

Case Study: Gyda 12-14 January 2022

72-hour precipitation



When EFI started to ramp up

Mean of observations - green
HRES –red
ENS Control Forecast – purple
ENS blue box-and-whisker

Model climate – red box-and-whisker
The black square marks the ensemble/climate median and diamond ensemble/climate mean

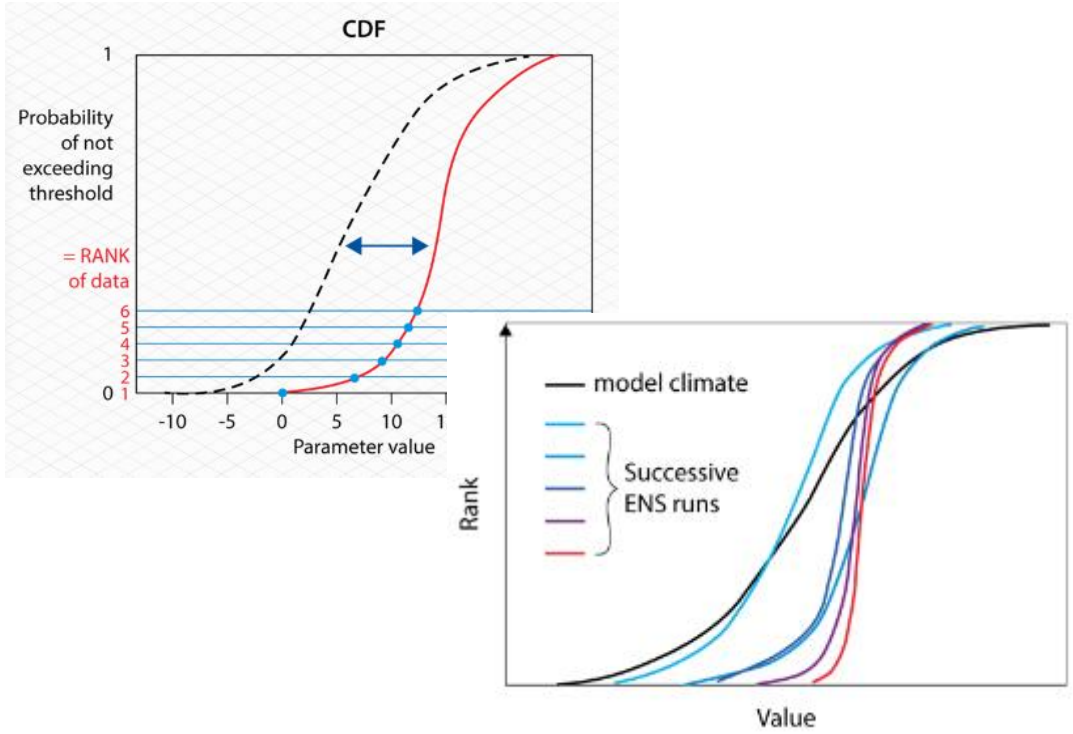
Triangle marks the maximum in the model climate based on 1200 forecasts

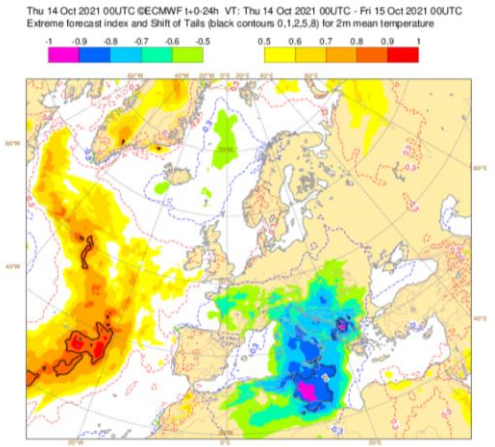
The ensemble started to pick up the event more than 10 days before the end of the accumulation period.

EFI – Key Points

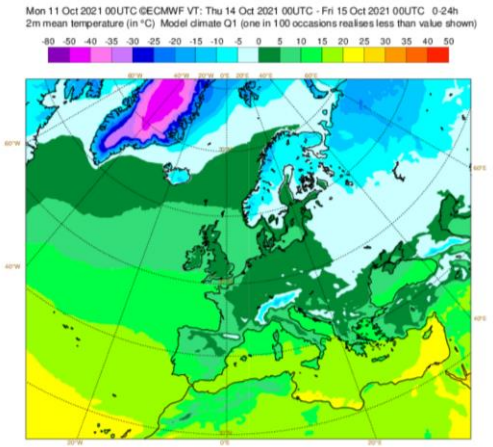
Key Points

- Based on ECMWF Ensemble System (ENS) – 51 members
- Model biases removed as EFI is a calibrated product
- Measure of difference between ENS forecast distribution and reference distribution (m_climate).
- Extremes are relative to model climate but do not necessarily mean high impact (e.g. 2mm rain in the desert)
- Cumulative Distribution Functions (CDFs) are important and facilitate the interpretation of the EFI and SOT
- EFI has limitations / issues
- EFI takes no direct account of ENS members beyond the M-climate extremes -> Shift of Tails (SOT)





EFI

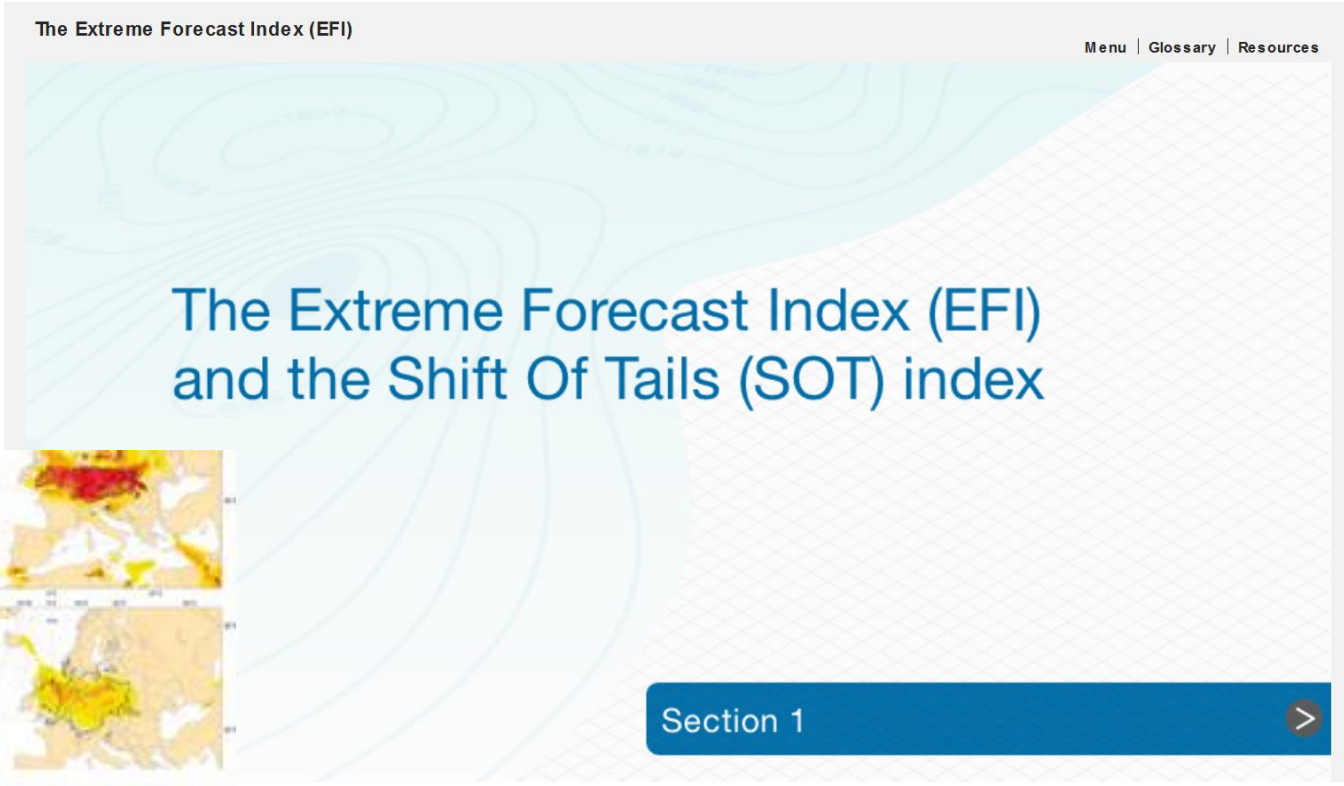


Model Climate

Self-Study Module on learning.ecmwf.int

Learning Objectives

- Explain how EFI, SOT and M-climate are built and their strengths and weaknesses
- Interpret EFI and SOT when used for forecasting real weather events.



IN PROGRESS

The Extreme Forecast Index (EFI) and the Shift Of Tail (SOT) index - updated

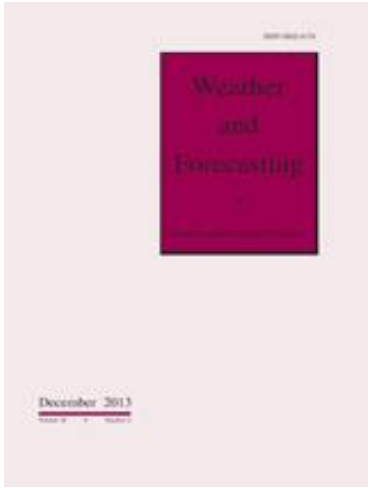
Joonas Korhonen • 09/21/2020

4.69 (16)

Further Reading

- User Guide to ECMWF forecast products: https://confluence.ecmwf.int/display/FUG/Forecast+User+Guide
- **Tsonevsky, I., D., Richardson**, 2012: Application of the new EFI products to a case of early snowfall in Central Europe, *ECMWF Newsletter,* **No. 133**, 4.
- **Tsonevsky, I.**, 2015: New EFI parameters for forecasting severe convection. *ECMWF Newsletter,* **No. 144**, 27-32.
- **Tsonevsky, I.,** C. A. Doswell III, H. E. Brooks, 2018: Early Warnings of Severe Convection Using the ECMWF Extreme Forecast Index, Wea. Forecasting, 33, 857-871. (Open Access)

http://www.ecmwf.int/sites/default/files/NL-144.pdf



https://journals.ametsoc.org/doi/pdf/10.1175/WAF-D-18-0030.1

How to access:

- Extreme Forecast Index (EFI) and Shift of Tails (SOT)
- Precipitation Type

OpenCharts / ecCharts

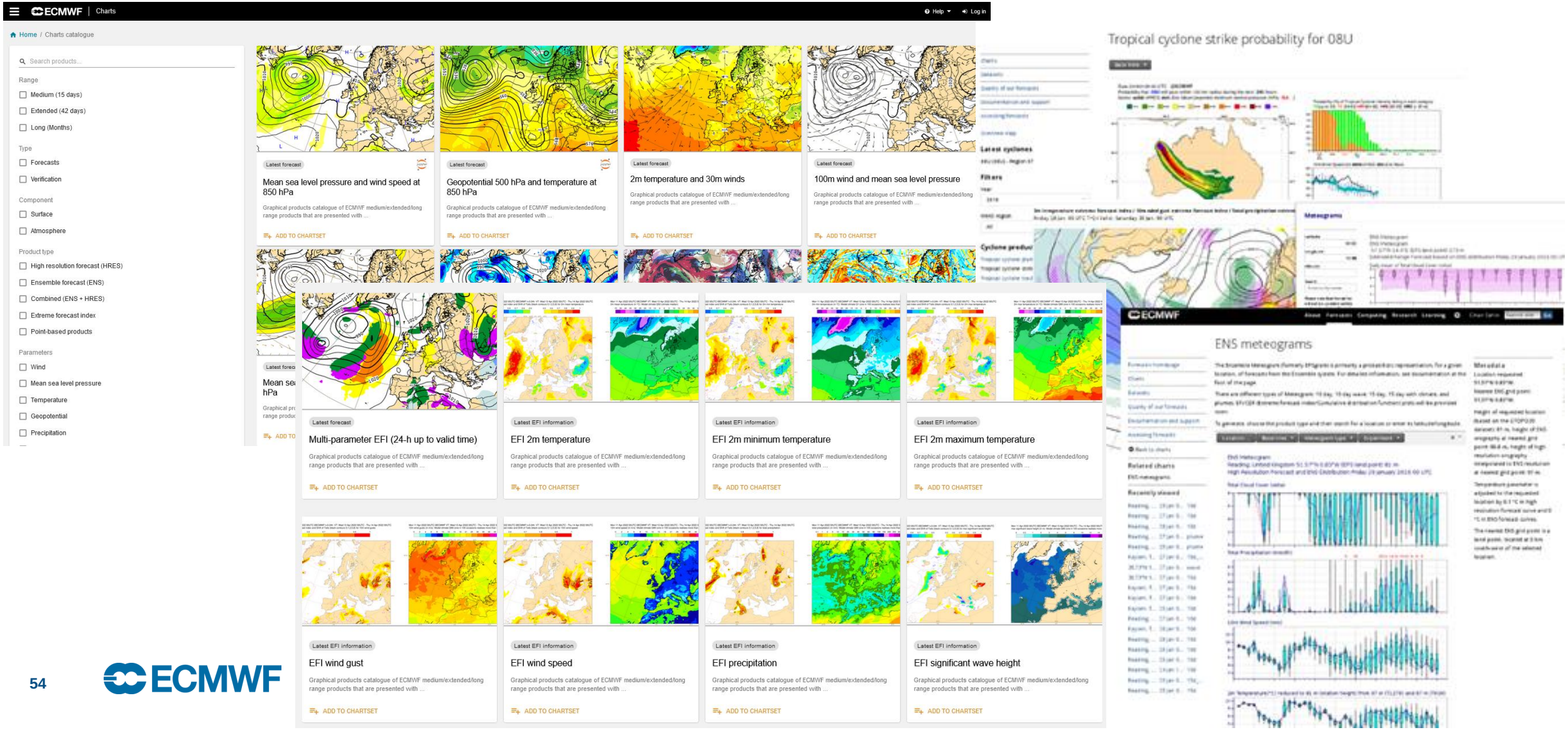
ECMWF’s web charts applications

ECMWF

OpenCharts – free to access

https://charts.ecmwf.int/

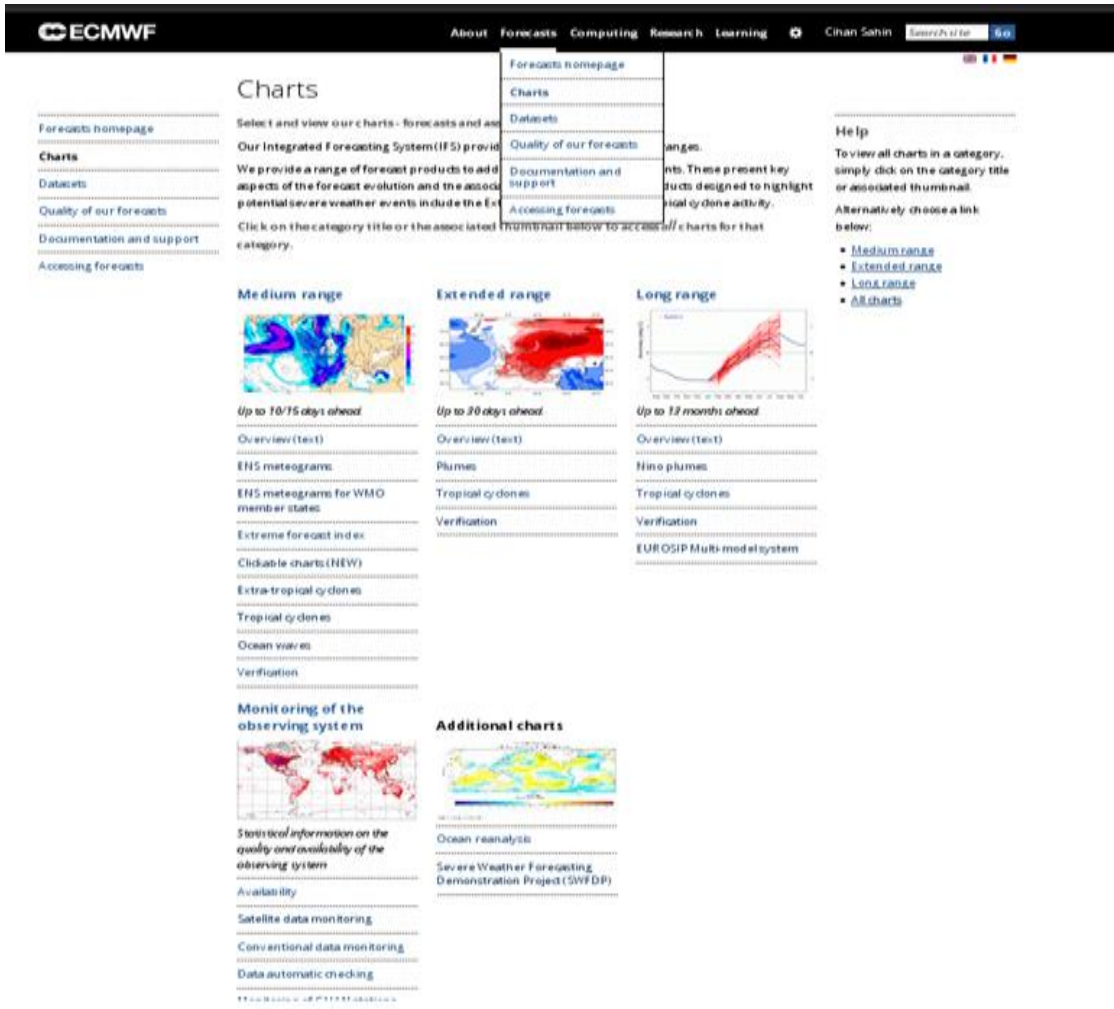
Info on forecasts and charts:
https://www.ecmwf.int/en/forecasts



ECMWF

OpenCharts

- High resolution (HRES) forecast charts (Updated at 06:55 and 18:55)
- Ensemble prediction system (ENS) charts up to 10 days (Updated at 7:20 and 19:20)
- Ensemble prediction system (ENS) charts 10-15 days (Updated at 7:40 and 19:40)
- Point-based time series from Ensemble, so called ENS meteograms/ ENS vertical profiles
- Extended range charts (Every Thursday and Monday)
- Long range (seasonal) charts (once a month)
- Verification charts
- Others (Tropical cyclone tracks, Observation monitoring …)



Precipitation Type in OpenCharts

ECMWF | Charts

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type

Range

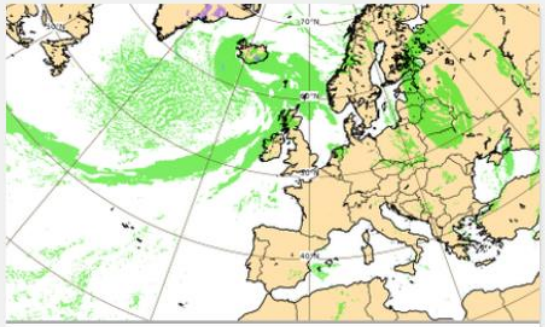
- [ ] Medium (15 days)
- [ ] Extended (42 days)
- [ ] Long (Months)

Type

- [ ] Forecasts
- [ ] Verification

Component

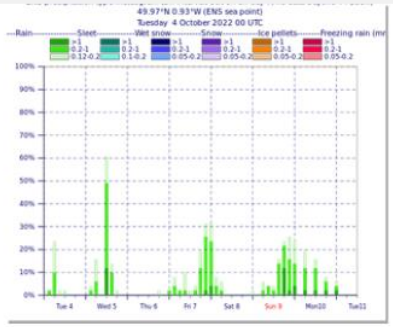
- [ ] Surface



Latest forecast

Precipitation type

ADD TO CHARTSET



Precipitation type meteogram

Precipitation type meteogram

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EFI in OpenCharts

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Search products...

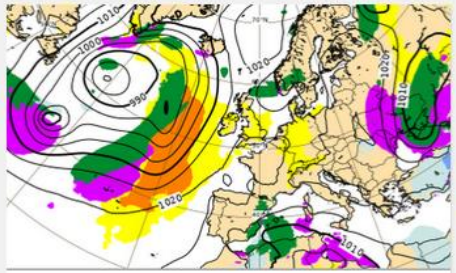
Range
- Medium (15 days)
- Extended (42 days)
- Long (Months)

Type
- Forecasts
- Verification

Component
- Surface
- Atmosphere

Product type
- High resolution forecast (HRES)
- Ensemble forecast (ENS)
- Combined (ENS + HRES)
- Extreme forecast index
- Point-based products

Parameters
- Wind

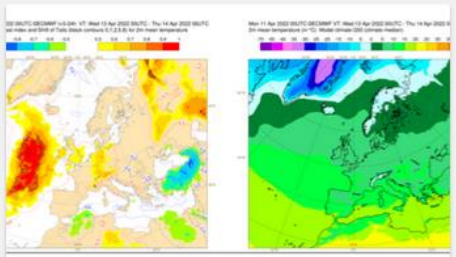


Latest forecast

Multi-parameter EFI (24-h up to valid time)

Graphical products catalogue of ECMWF medium/extended/long range products that are presented with ...

ADD TO CHARTSET

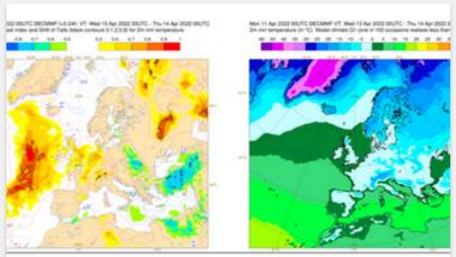


Latest EFI information

EFI 2m temperature

Graphical products catalogue of ECMWF medium/extended/long range products that are presented with ...

ADD TO CHARTSET

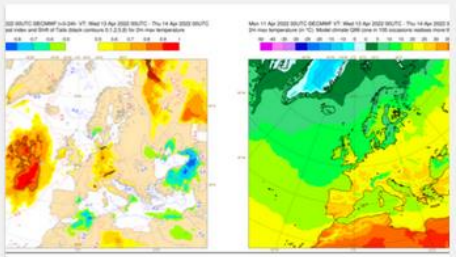


Latest EFI information

EFI 2m minimum temperature

Graphical products catalogue of ECMWF medium/extended/long range products that are presented with ...

ADD TO CHARTSET

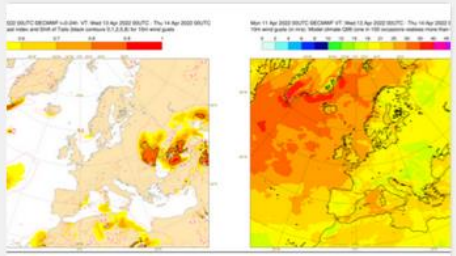


Latest EFI information

EFI 2m maximum temperature

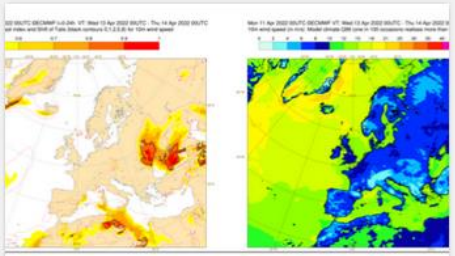
Graphical products catalogue of ECMWF medium/extended/long range products that are presented with ...

ADD TO CHARTSET



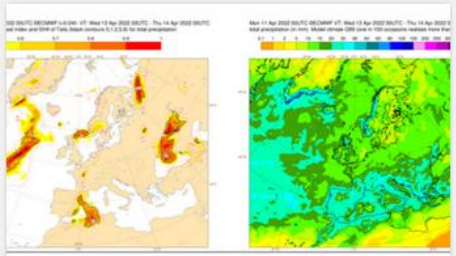
Latest EFI information

EFI wind gust



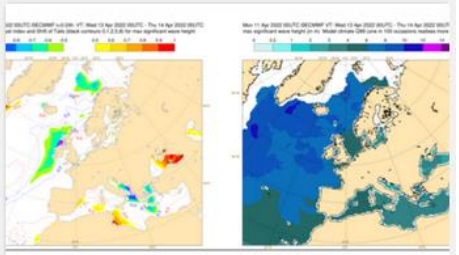
Latest EFI information

EFI wind speed



Latest EFI information

EFI precipitation



Latest EFI information

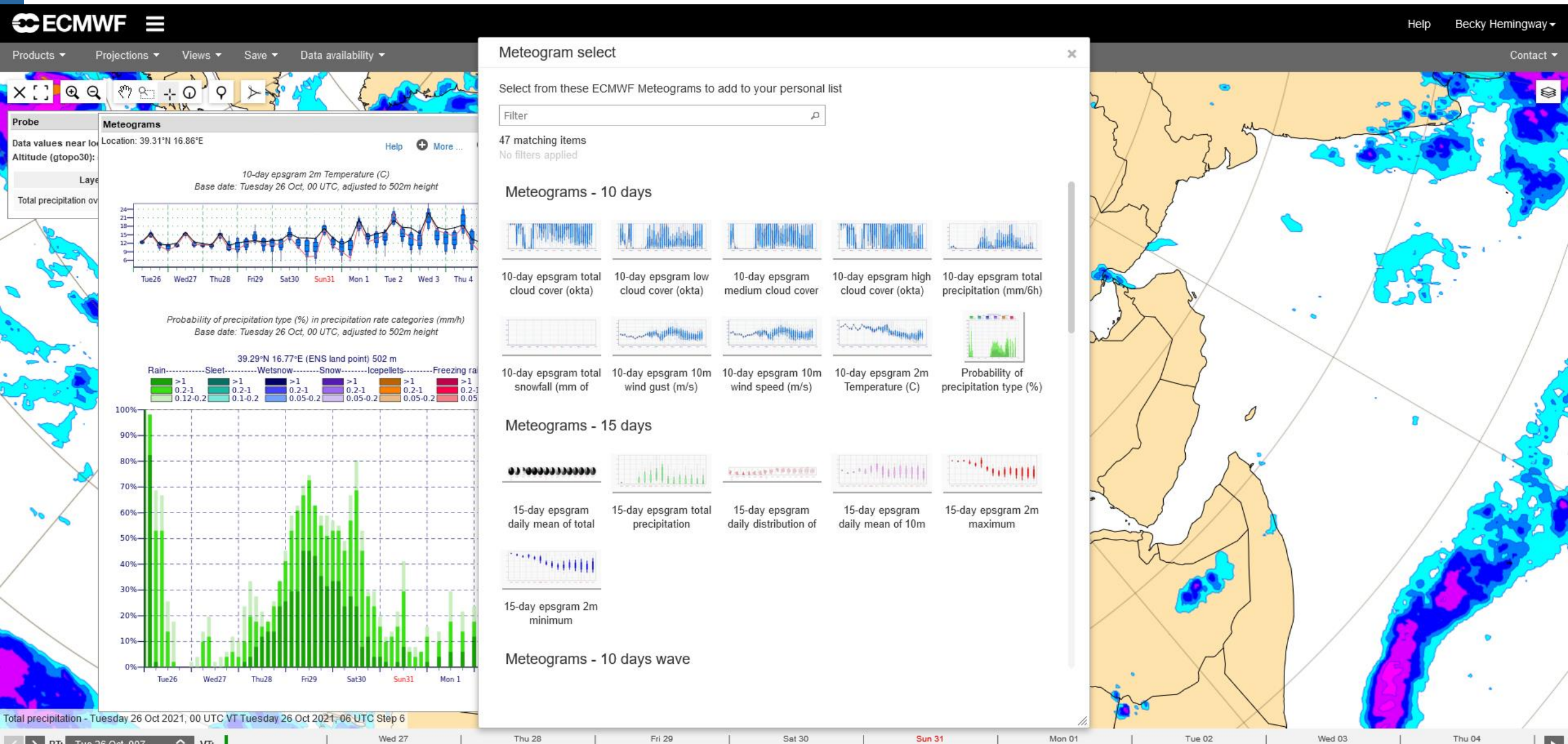
EFI significant wave height

EFI in OpenCharts

Extreme Forecast Index products:

- Multi-parameter – 2m temperature, 10m wind gusts, total precipitation
- 2m temperature
- 2m minimum temperature
- 2m maximum temperature
- Wind gust
- Wind speed
- Precipitation
- Significant Wave Height
- Snow fall
- CAPE
- CAPE shear
- Water Vapour Flux
- 2m temperature over Extended Range – weekly EFI values for 6 weeks
- Precipitation over Extended Range – weekly EFI values for 6 weeks

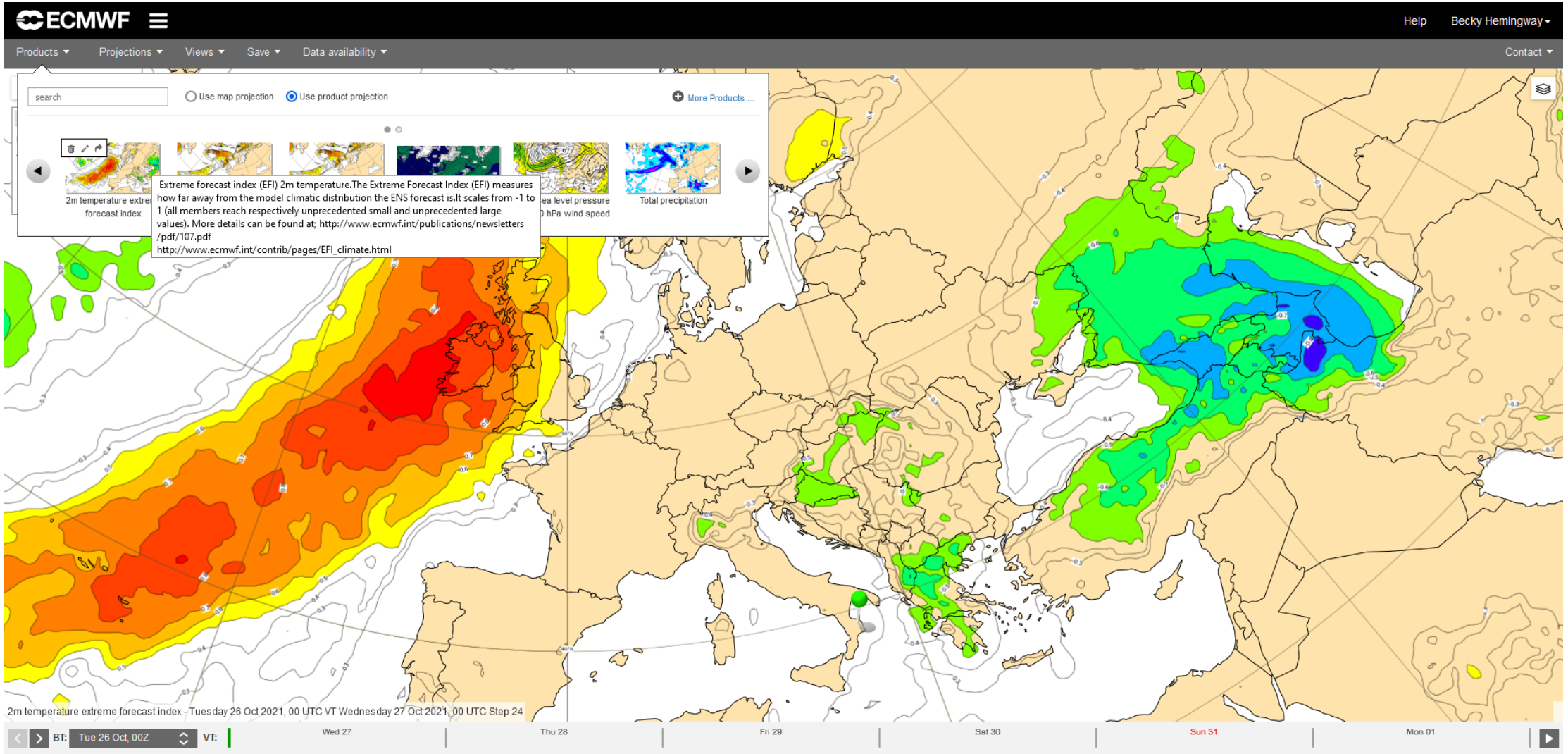
Precipitation Type in ecCharts



EFI in ecCharts

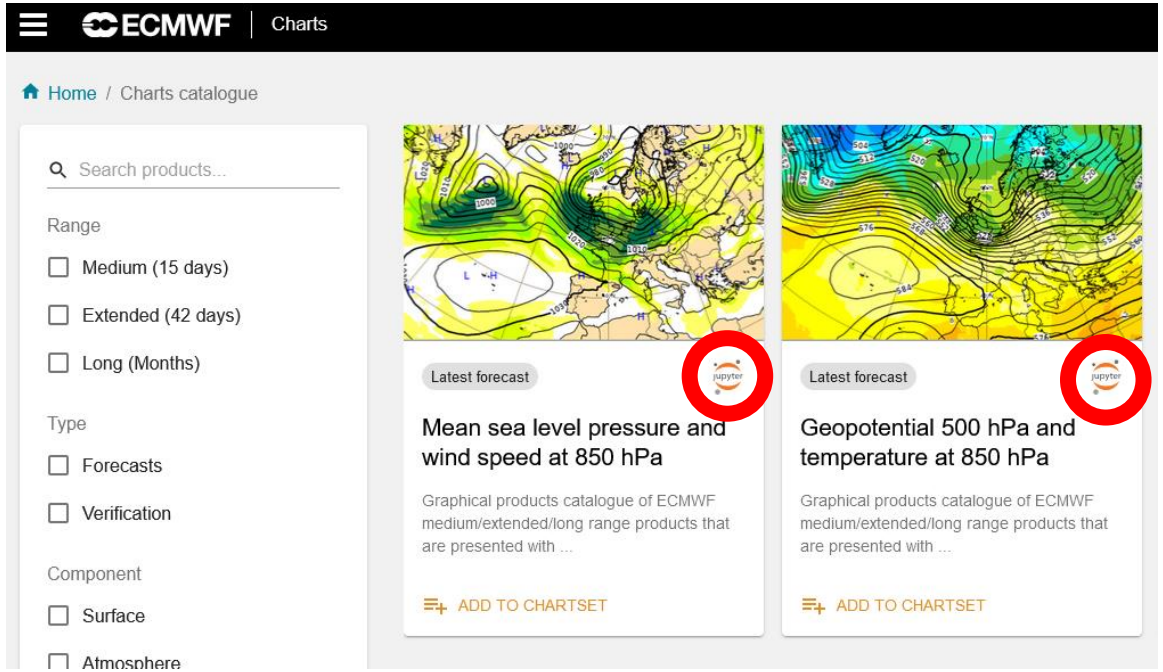
Extreme Forecast Index products:

- Total precipitation
- 2m temperature
- 10m wind speed
- 10m wind gust



OpenData – ECMWF data free to access

- From 25 January 2022 a wide range of ECMWF forecast data was made available to anyone
- Prepared Jupyter notebooks to help access and visualise the data – OpenCharts shows which data can be accessed this way



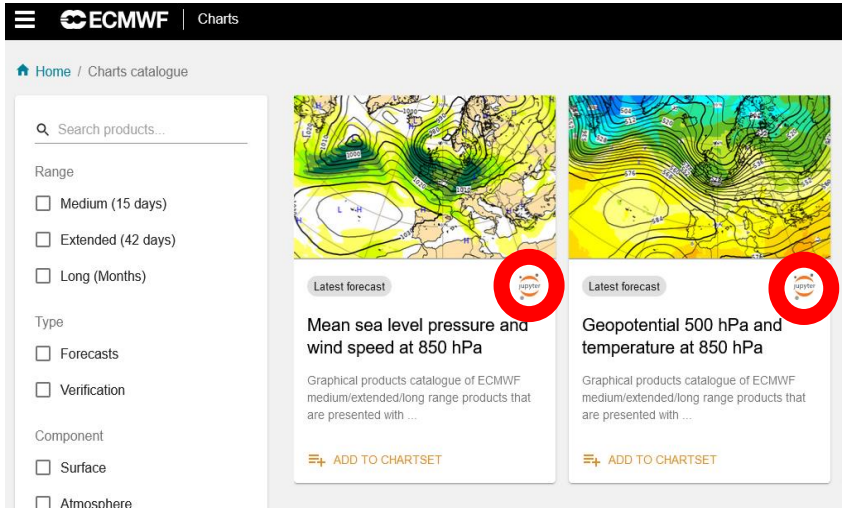
Added Jupyter Notebook functions

The problem

Many users ask us **how to reproduce** the open charts

The solution

Jupyter notebook for each product to reproduce it using archived data



jupyter

Explain

- **Which data** is used
- **Where** to find it
- How to **download** it

Provide

- **Calculations** for the product

Show

- How to **plot** it

Information on ECMWF Forecasts and data

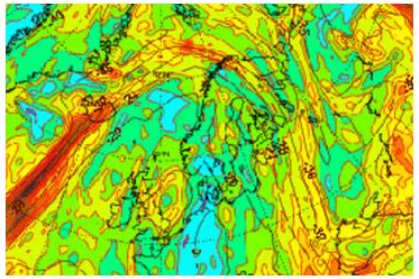
https://www.ecmwf.int/en/forecasts

ECMWF

Search site... Help Becky Hemingway

Home About Forecasts Computing Research Learning Publications

Charts | Datasets | Quality of our forecasts | About our forecasts | Access to forecasts



Charts

Our Integrated Forecasting System (IFS) provides forecasts and associated verification at different resolutions and for multiple time ranges. The verification provides essential feedback on the quality of the forecasting system.

- Medium range
- Extended range
- Long range

Quick access:

Datasets

Real-time and archive forecasts, analyses, climate re-analyses, reforecasts and multi-model datasets.

- Real-time datasets
- Archive datasets
- Open data

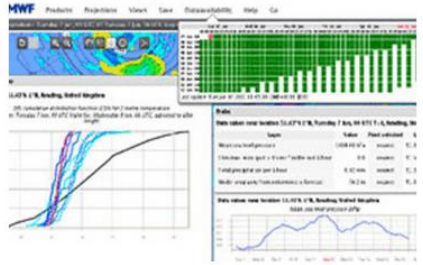
Quick access:

Public Datasets ›

Monitoring of the observing system

We continually monitor the quality and availability of the different components of the global observing system used at ECMWF.

- Availability
- Satellite data monitoring
- Conventional data monitoring
- Ocean observation monitoring



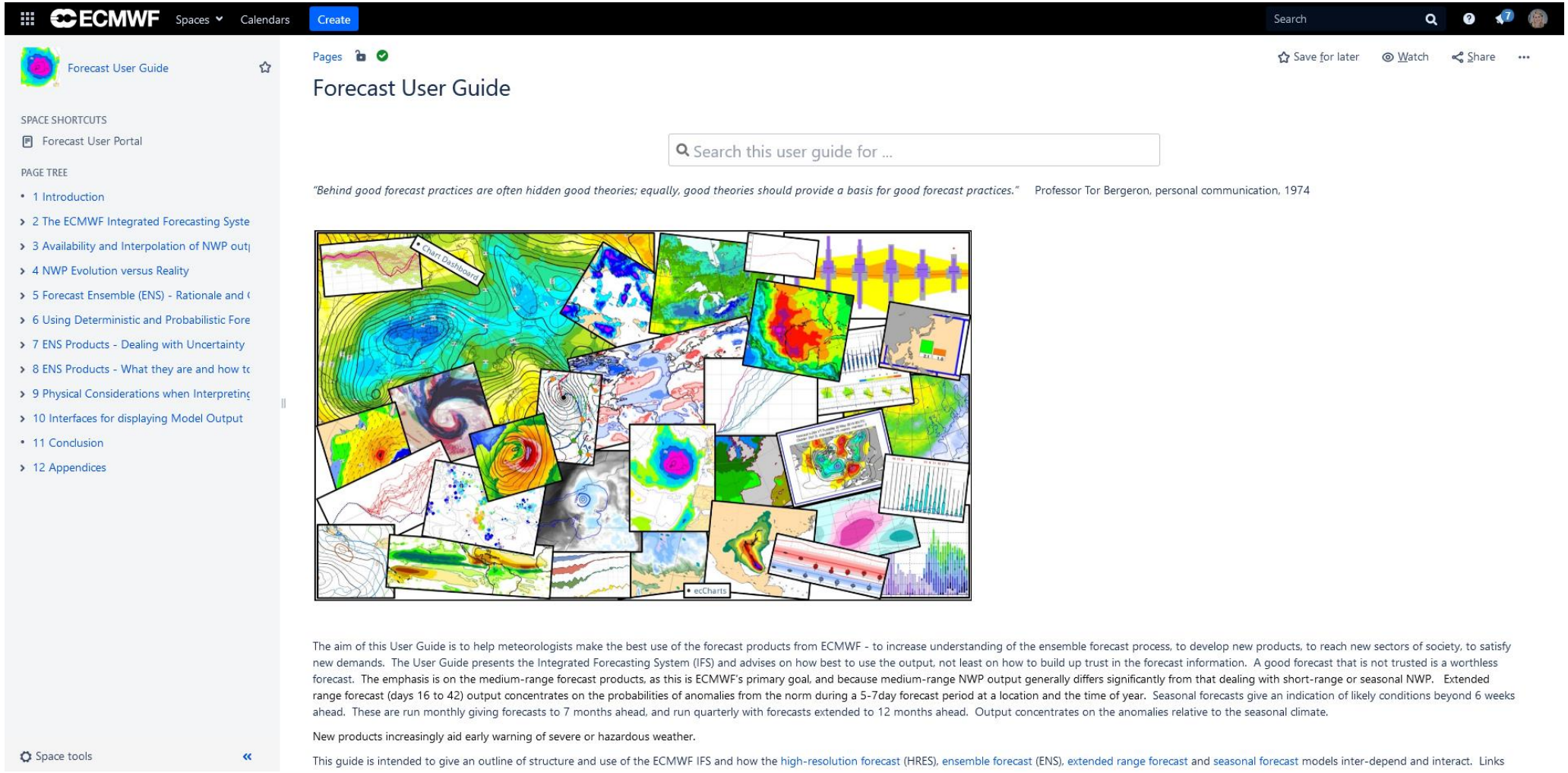
The Integrated Forecasting System

Key characteristics of the Integrated Forecasting System (IFS), documentation on specific areas, and description of our forecasts.

- Medium range overview
- Extended range overview
- Long range overview
- Changes in the IFS

Forecast User Guide

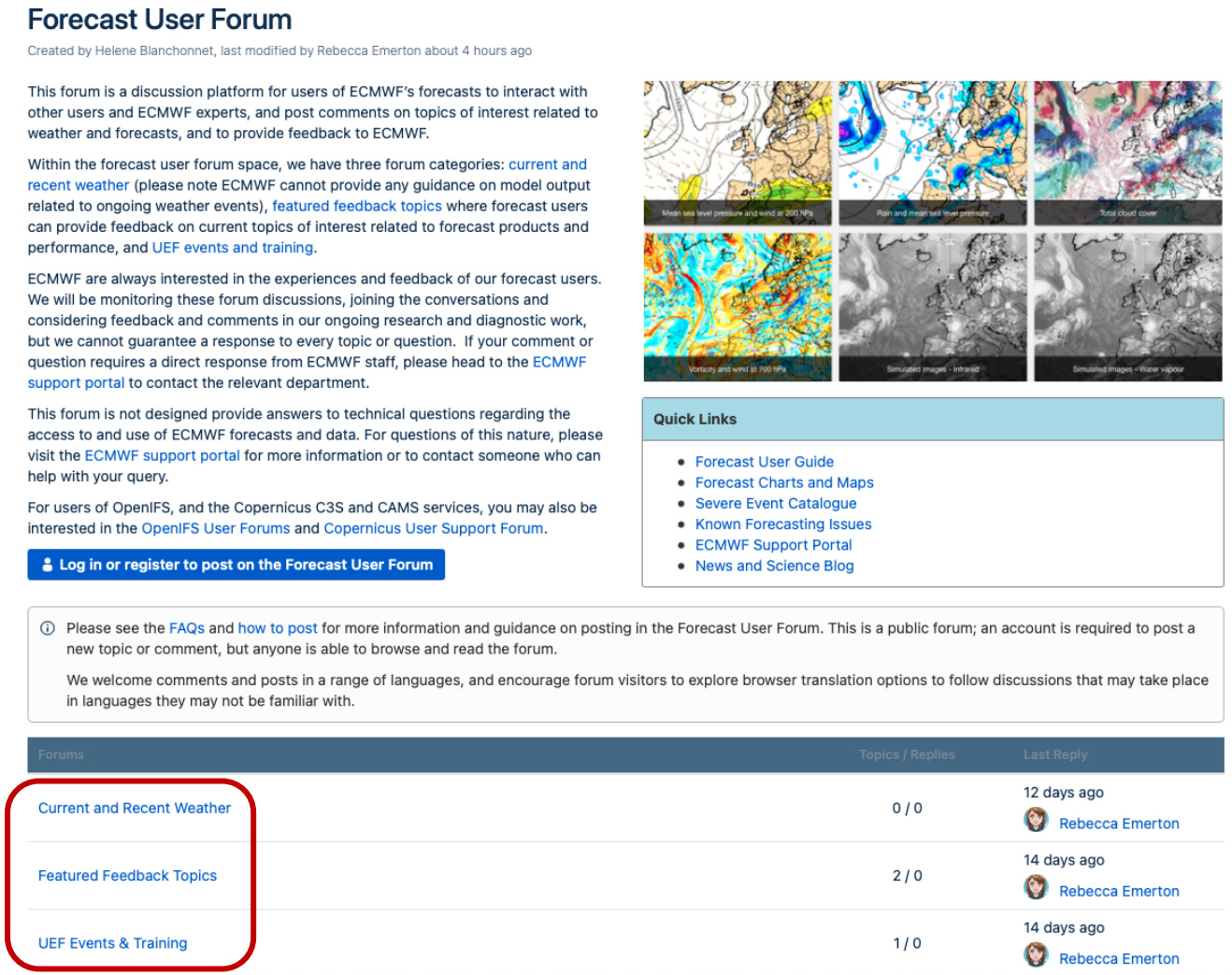
https://confluence.ecmwf.int/display/FUG



Forecast User Forum

confluence.ecmwf.int/display/FUF

- A discussion platform for users of ECMWF forecasts to interact with other users and with ECMWF, on topics related to weather and forecasts, and to provide feedback to ECMWF.
- ECMWF will be monitoring discussions, joining conversations and considering comments and feedback in ongoing research and diagnostic work.
- **3 forum categories:**
  - Current and Recent Weather
  - Featured Feedback Topics
  - UEF Events & Training



Forecast User Forum

Created by Helene Blanchonnet, last modified by Rebecca Emerton about 4 hours ago

This forum is a discussion platform for users of ECMWF's forecasts to interact with other users and ECMWF experts, and post comments on topics of interest related to weather and forecasts, and to provide feedback to ECMWF.

Within the forecast user forum space, we have three forum categories: current and recent weather (please note ECMWF cannot provide any guidance on model output related to ongoing weather events), featured feedback topics where forecast users can provide feedback on current topics of interest related to forecast products and performance, and UEF events and training.

ECMWF are always interested in the experiences and feedback of our forecast users. We will be monitoring these forum discussions, joining the conversations and considering feedback and comments in our ongoing research and diagnostic work, but we cannot guarantee a response to every topic or question. If your comment or question requires a direct response from ECMWF staff, please head to the ECMWF support portal to contact the relevant department.

This forum is not designed provide answers to technical questions regarding the access to and use of ECMWF forecasts and data. For questions of this nature, please visit the ECMWF support portal for more information or to contact someone who can help with your query.

For users of OpenIFS, and the Copernicus C3S and CAMS services, you may also be interested in the OpenIFS User Forums and Copernicus User Support Forum.

Log in or register to post on the Forecast User Forum

Quick Links

- Forecast User Guide
- Forecast Charts and Maps
- Severe Event Catalogue
- Known Forecasting Issues
- ECMWF Support Portal
- News and Science Blog

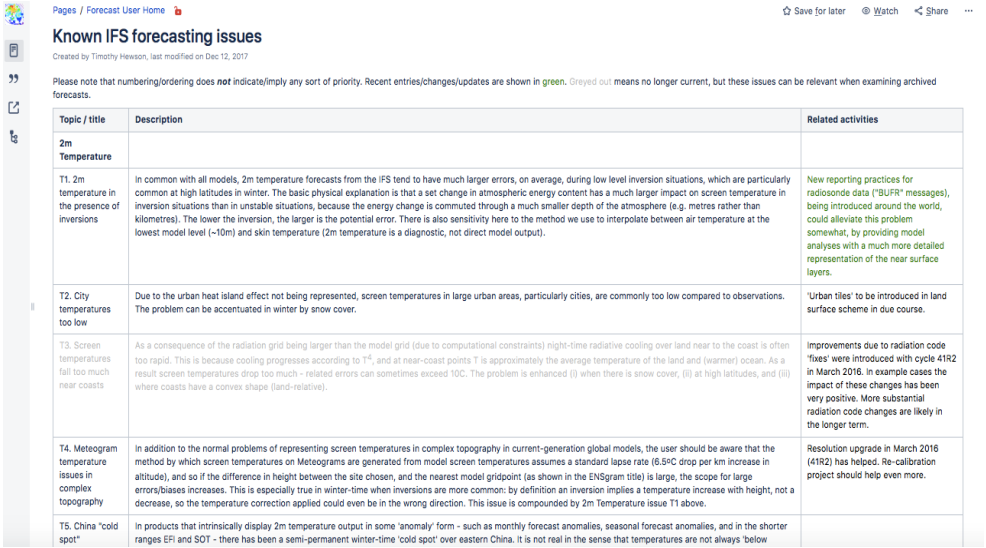
Please see the FAQs and how to post for more information and guidance on posting in the Forecast User Forum. This is a public forum; an account is required to post a new topic or comment, but anyone is able to browse and read the forum.

We welcome comments and posts in a range of languages, and encourage forum visitors to explore browser translation options to follow discussions that may take place in languages they may not be familiar with.

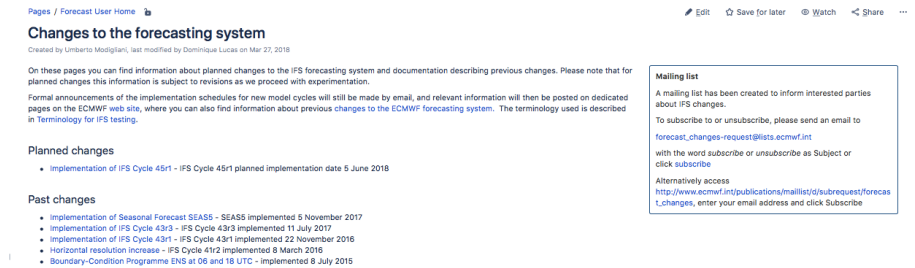
Forums	Topics / Replies	Last Reply
Current and Recent Weather	0 / 0	12 days ago Rebecca Emerton
Featured Feedback Topics	2 / 0	14 days ago Rebecca Emerton
UEF Events & Training	1 / 0	14 days ago Rebecca Emerton

Severe Event Catalogue

Forecasting Issues



Changes to forecasting system



Forecast User Home:
https://software.ecmwf.int/wiki/display/FCST/Forecast+User+Home

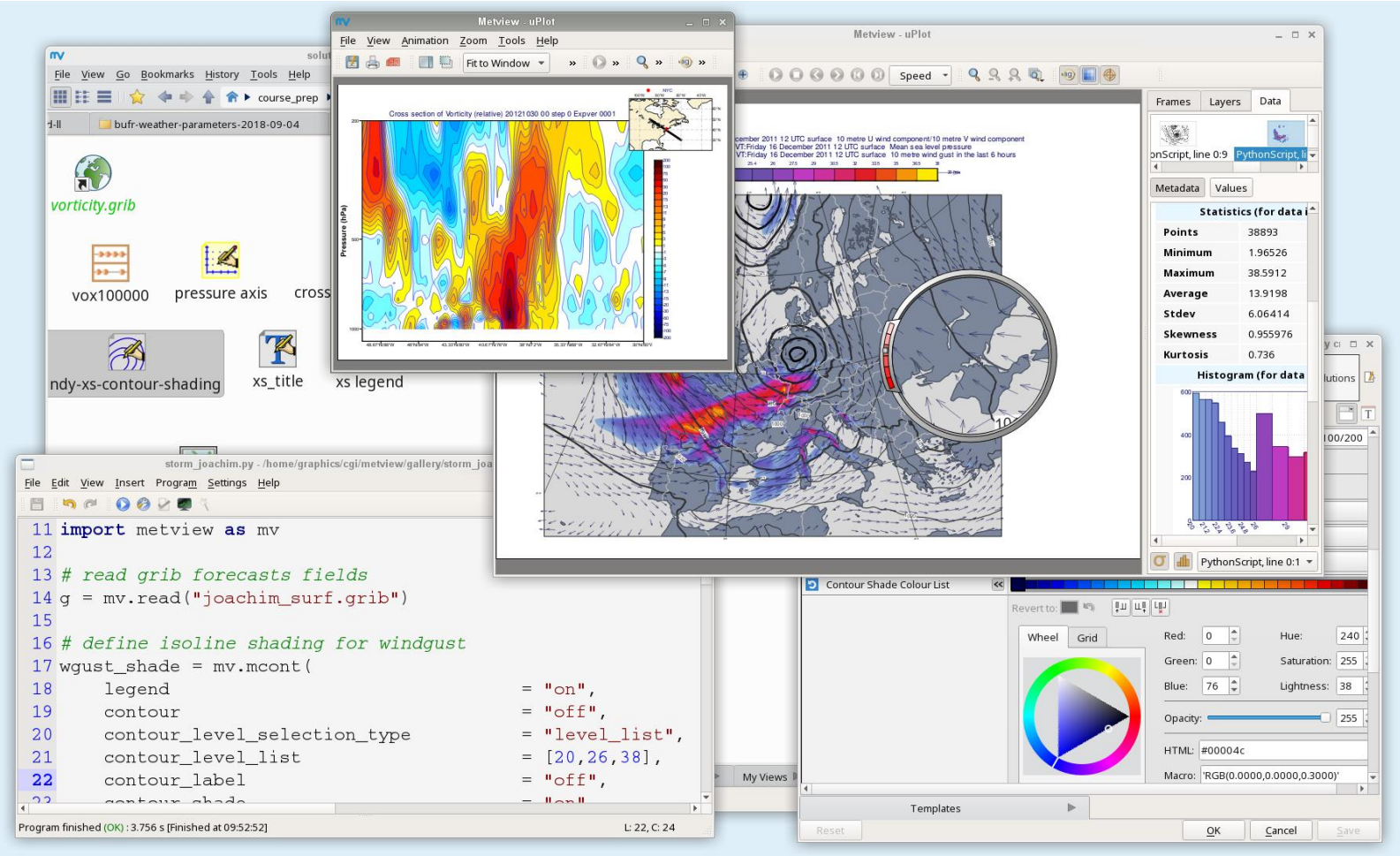
Twitter handle: #newfcsystem @ECMWF

Metview

Metview is a meteorological workstation application designed to be a complete working environment for both the operational and research meteorologist.

Its capabilities include powerful data access, processing and visualisation.

It features both a powerful **icon-based user interface** for interactive work and a **Python** interface for batch processing.

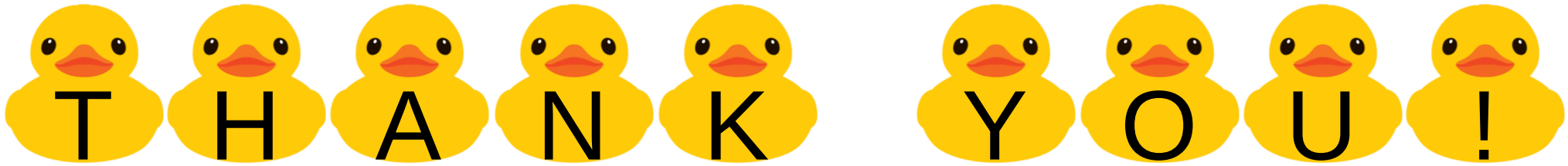


More information:
https://metview.readthedocs.io/en/latest/

ECMWF has lots of Software and Applications for meteorological, hydrological and climate data. Please ask you've like to know more!

Useful Links

- Open Charts: https://apps.ecmwf.int/webapps/opencharts/
- Forecast User Guide: https://confluence.ecmwf.int/display/FUG/Forecast+User+Guide
- Forecast User Forum: https://confluence.ecmwf.int/display/FUF/Forecast+User+Forum
- Severe Event Catalogue: https://confluence.ecmwf.int/display/FCST/Severe+Event+Catalogue
- Forecast System Changes: https://confluence.ecmwf.int/display/FCST/Changes+to+the+forecasting+system
- Forecasting Issues: https://confluence.ecmwf.int/display/FCST/Known+IFS+forecasting+issues
- Newsletters: https://www.ecmwf.int/en/publications/newsletters
- Learning Resources: https://learning.ecmwf.int/en-US/web/guest/public-channel
- MetView: https://metview.readthedocs.io/en/latest/



Any Questions?