

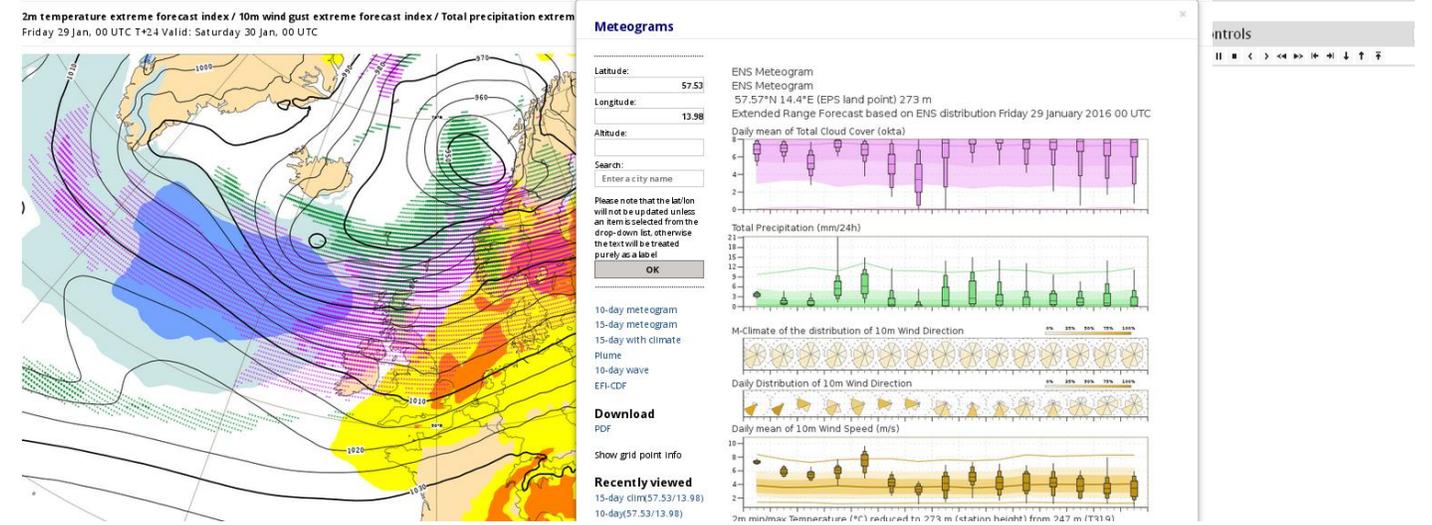
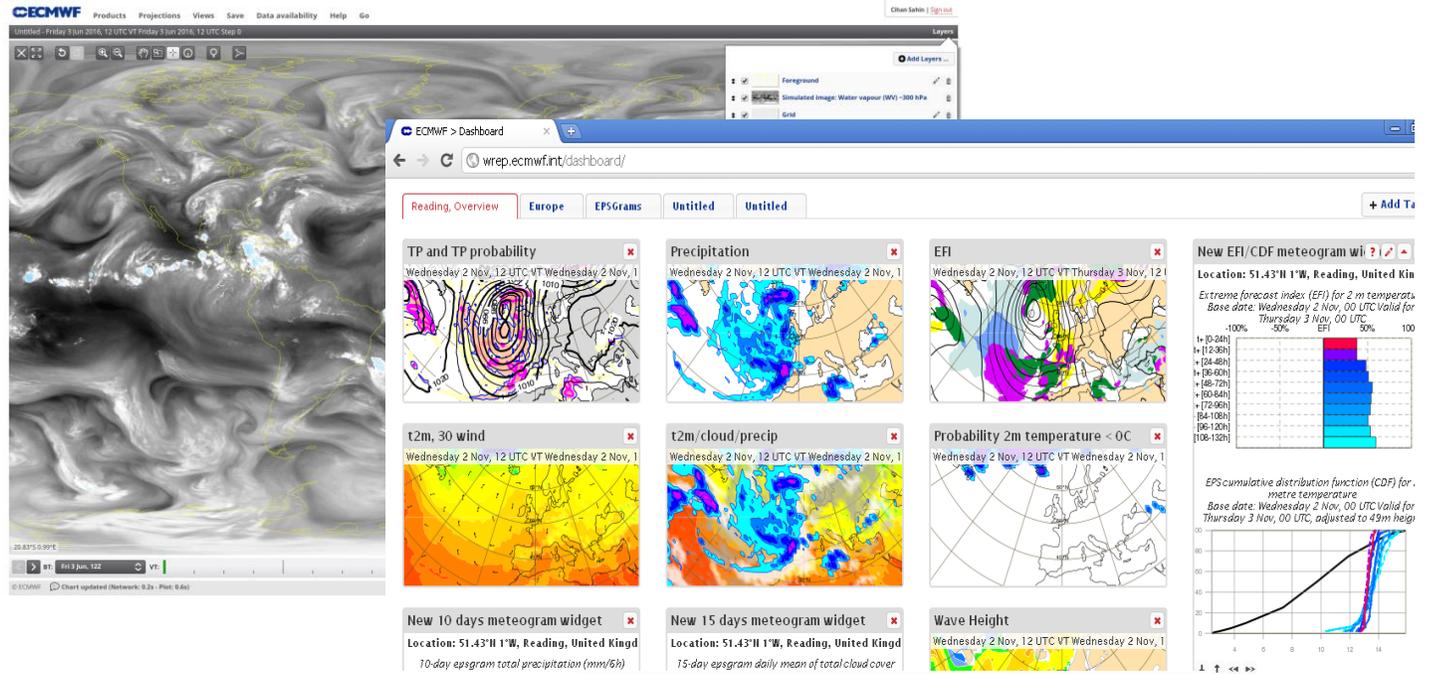
ecCharts and web services update

Cihan Sahin
on behalf of Web development team

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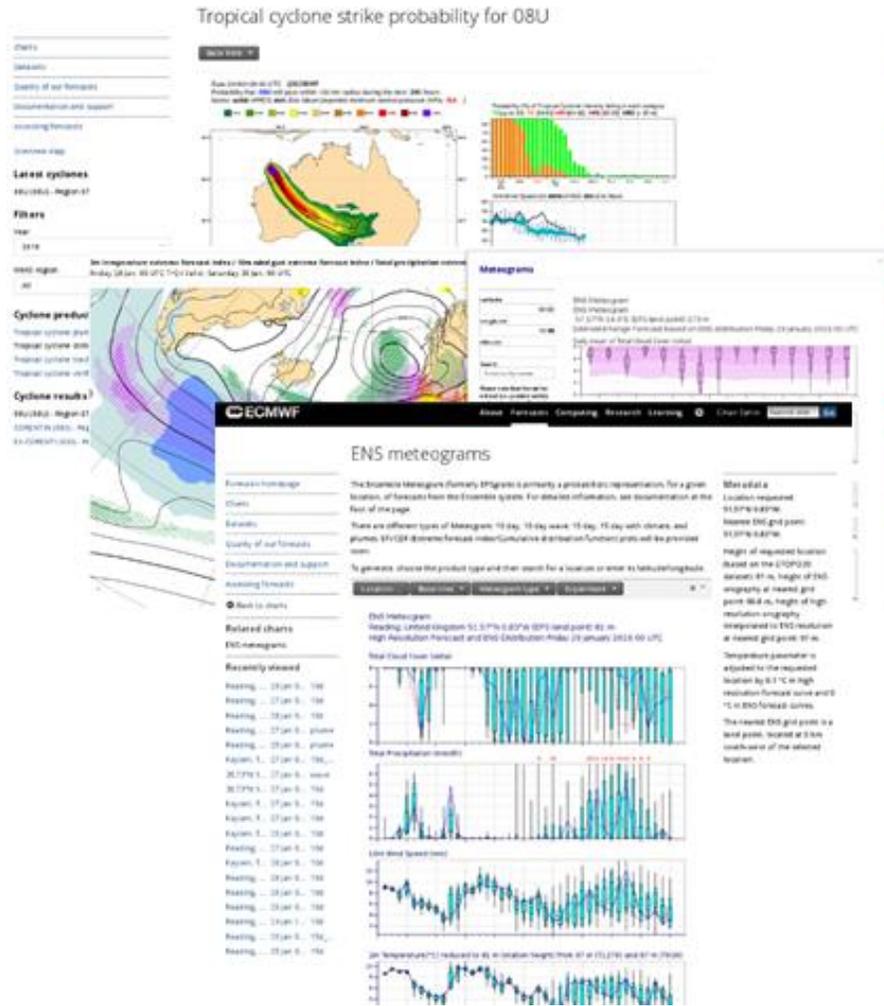
Content

- New web charts and catalogue
- ecCharts – introduction
- ecCharts – new products
- Web map service (WMS)
- Upcoming updates
- Web API
- Meteogram data from Web API

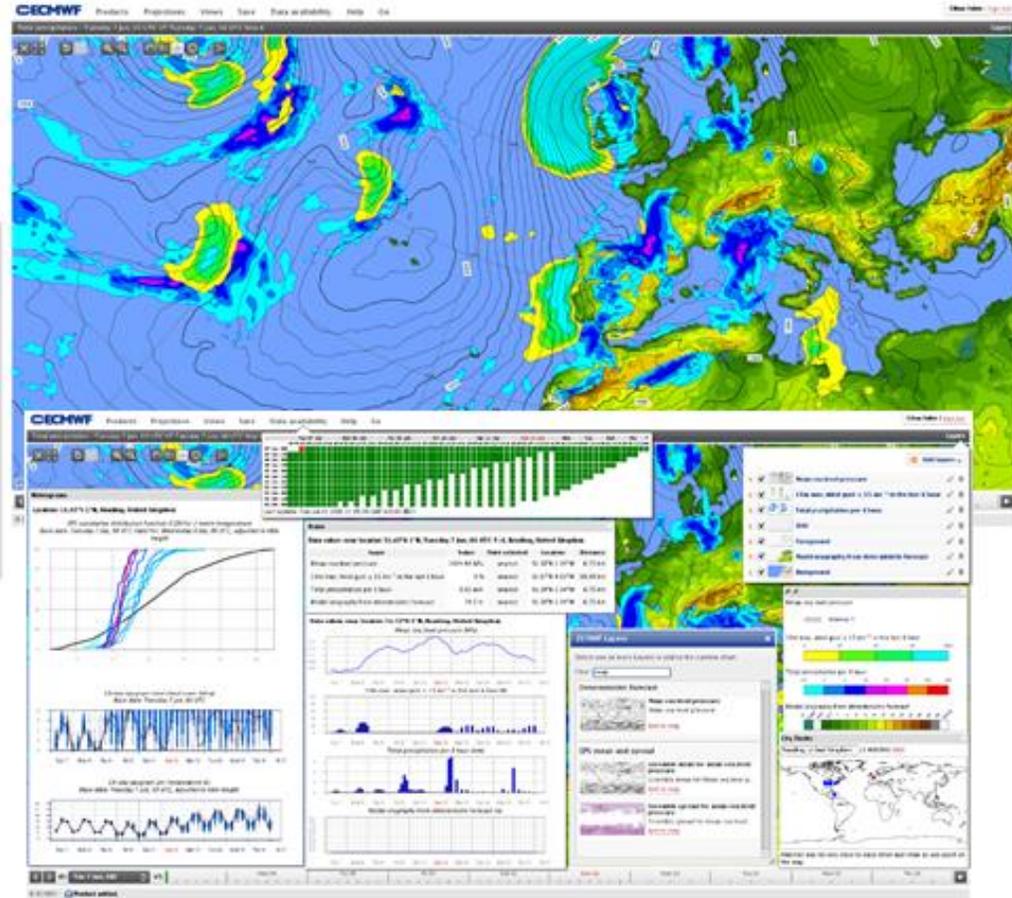


ECMWF graphical products

Charts on www



ecCharts



WWW Charts: updates

New catalogue

- Access all charts in one location.
- Search through forecast range, parameter, forecast type by using facets

New medium range charts

- Most of medium range charts are now produced dynamically.
- From highest available resolution
- Larger charts, more geographical areas
- Provided as soon as they are available for dissemination (First steps about an hour earlier for high resolution forecast)
- MS/CS charts are all clickable displaying available Meteograms.

The screenshot displays the ECMWF Charts website interface. At the top, there are navigation tabs for 'About', 'Forecasts', 'Computing', 'Research', 'Learning', and 'Library'. The main content area is titled 'Charts' and shows 214 matching items. A filter sidebar on the left allows users to refine results by Range (Medium (15 days)), Type (Forecasts (186), Verification (28)), Component (Atmosphere (16), Surface (174)), Product type (Combined (3), ENS (76), Extreme forecast index (28), HRES (114), Meteograms (1)), and Parameters. The main display area is organized into sections: 'High resolution forecast' (with 8 items like Mean sea level pressure and wind, Geopotential 500 hPa and, etc.), 'Surface parameters' (with 5 items like Albedo, Orography and sea depth, etc.), and a '2m temperature' section. The '2m temperature' section features a large map of Europe and the Mediterranean region with color-coded temperature contours and a '2m temperature Friday 29 Jan. 0' label. To the right of the map, there are several meteorological charts: 'Total Precipitation (mm/24h)', 'M-Climate of the distribution of 10m Wind Direction', 'Daily Distribution of 10m Wind Direction', 'Daily mean of 10m Wind Speed (m/s)', and '2m min/max Temperature (°C) reduced to 275 m (station height) from 247 m (T314)'. A 'Download PDF' button and a 'Recently viewed' list are also visible.

Chart dashboard

Organise multiple charts and meteograms in the same "page".

Access to chart dashboard

The screenshot shows the 'ENS meteograms' page with a sidebar on the left containing links like 'Forecasts homepage', 'Charts', 'Databases', and 'Accessing forecasts'. The main content area includes an introduction to the Ensemble Meteogram, a metadata section for a location in Izmir, Turkey, and several charts: 'Daily mean of Total Cloud Cover (okta)', 'Total Precipitation (mm/24h)', and 'McClimate of the distribution of 1.0m Wind Direction'. A blue arrow points from the text 'Add chart to dashboard' to a button labeled 'Add to dashboard' in the metadata section.

The screenshot shows the website header with navigation links: 'About', 'Forecasts', 'Computing', 'Research', 'Learning', 'Cihan Sahin', 'Search site', and 'Go'. A dropdown menu is open over the 'Chart dashboard' link, showing options for 'Log out', 'Autumn newsletter published', and 'Forecasters'.

The screenshot shows the 'Chart dashboard' interface with a top navigation bar containing 'Extreme weather', 'Reading EPSGRAMS', 'Precipitation', 'Epsgrams', 'New epsgrams', 'Reading temperature and cloud', and '+ Add Tab'. Below the navigation bar, several weather charts are displayed in a grid, including 'Rainfall and MSLP', 'Cloud cover', 'New chart widget', 'ENS meteograms', 'All sky radiances from AMSR2 (Hovmoeller Latit...)', 'Weekly probability anomaly', 'Probabilities, 2m temperature', and 'MJO index'.

<https://software.ecmwf.int/wiki/display/FCST/Chart+dashboard>

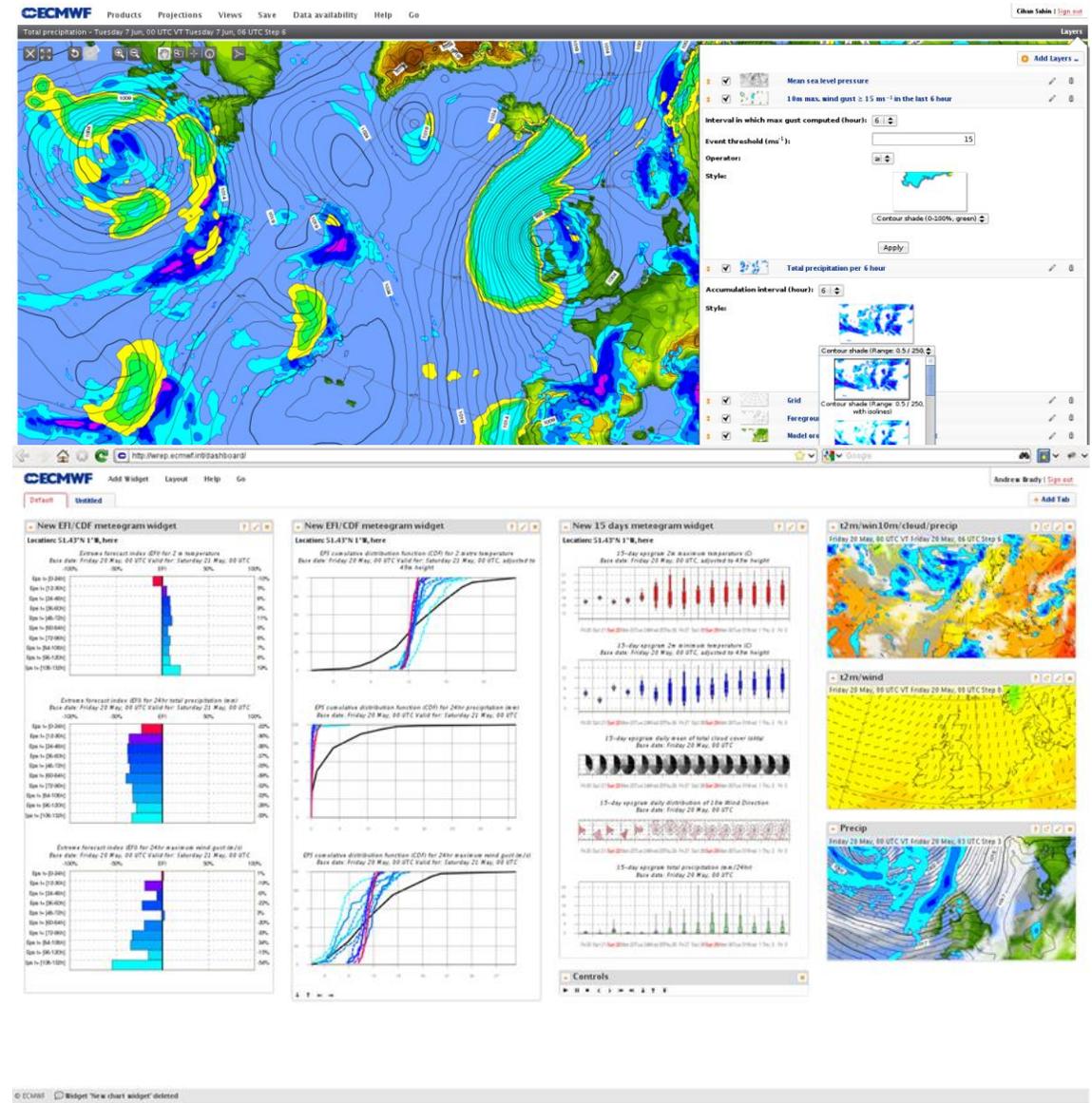
ecCharts

Web based application to visualize and inspect ECMWF medium-range data (up to 15 days)

Soon up to 4 weeks

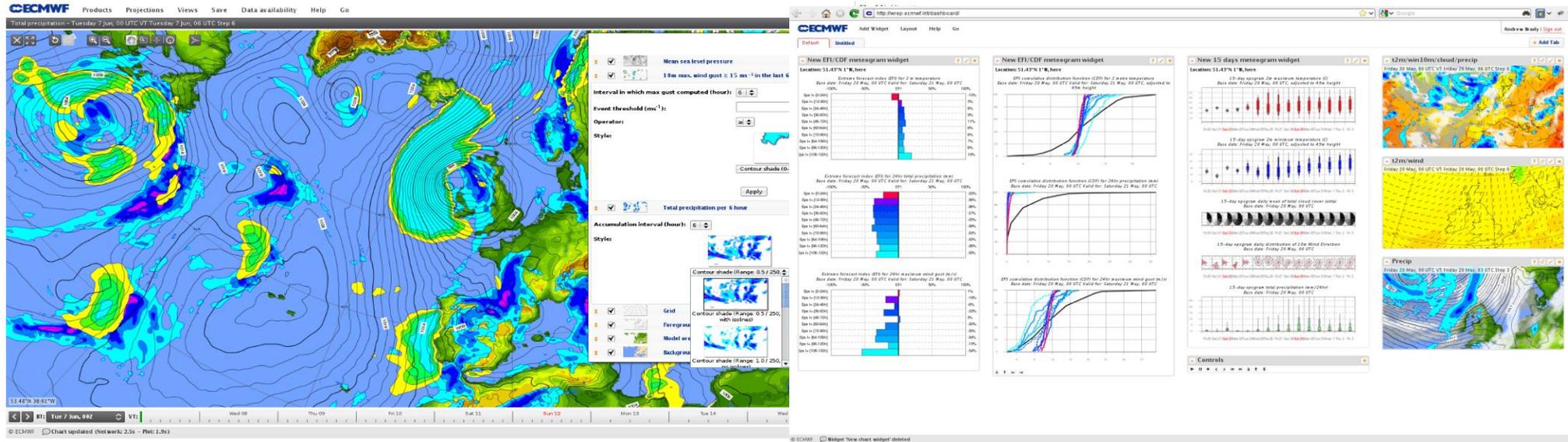
- Web based
- Immediate access
- Native data resolution, global fields
- Interactive features (zoom, pan, click, inspect data, ...)
- Rich content (over 200 layers, point-data)
- User controlled visualization
- Customisable parameters
- Create your own products
- Parallel run if applicable
- Download charts (through WMS)
eccharts.ecmwf.int/forecaster/

A complementary service for our users offering greater flexibility

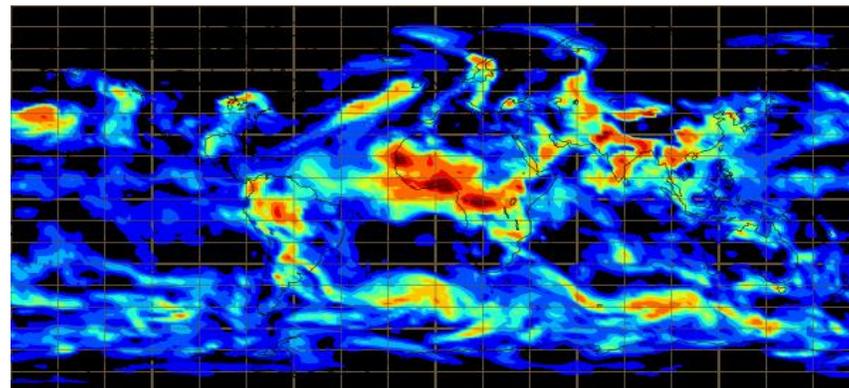


ecCharts user interfaces

Forecaster / Dashboard / WMS



https://apps.ecmwf.int/wms/?token=public&request=GetMap&layers=composition_aod550,grid,foreground&width=600&bbox=-180,-90,180,90



Web Map Service (WMS) – Use case

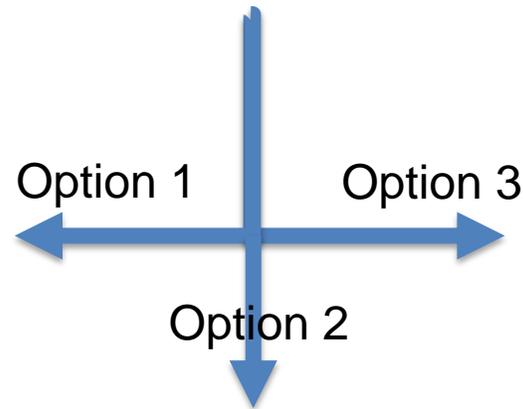
- Automatically download geo-referenced images from ecCharts system.
- Intended to be consumed by other visualisation systems.

Your user wants to be able to see probability product for temperature.

They want to choose any area any zoom level and any threshold.

- Download all ENS data
- Ingest to your visualisation which displays global fields, zoom, and generates any probability ...
- Prepare visualisations (Colours, ranges ...)
- Single parameter GBs

Time cost : ?

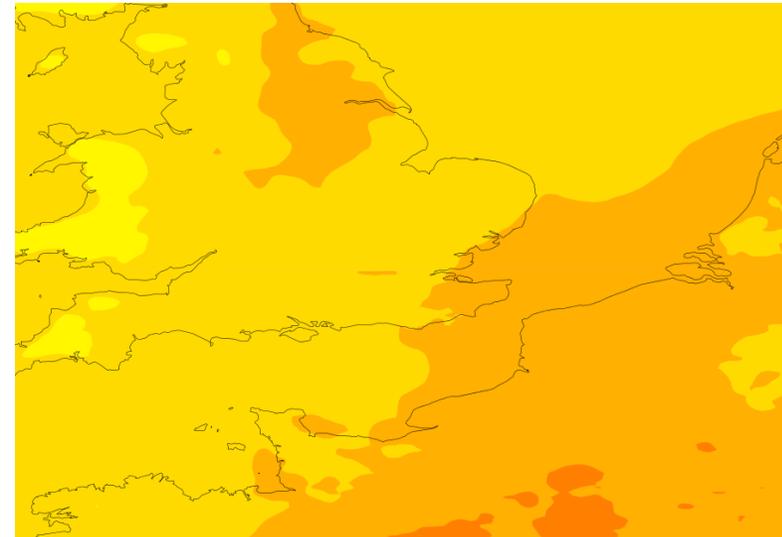
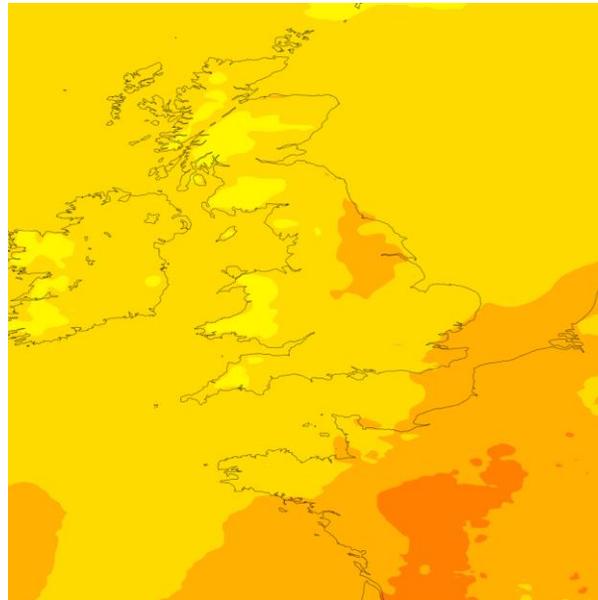
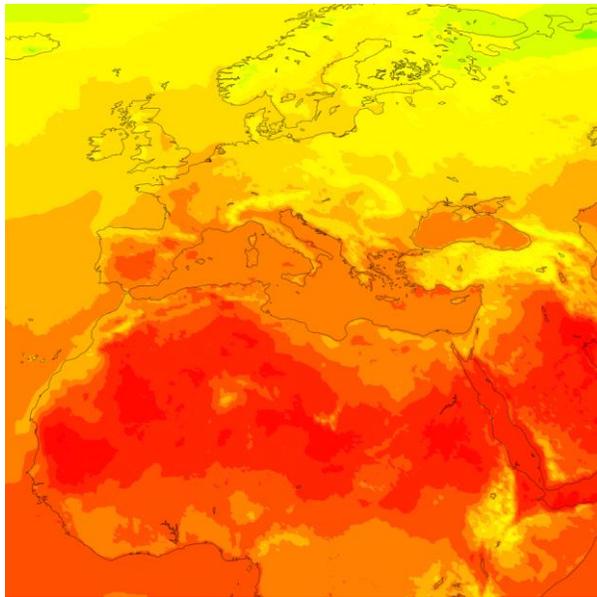


- Have your software (many freely available software can do it too) prepare a request for any bounding box/probability threshold, colour styles ...
- Make request to ECMWF WMS, get the chart
- Display or overlay with your own charts

Time cost : 3-5 seconds

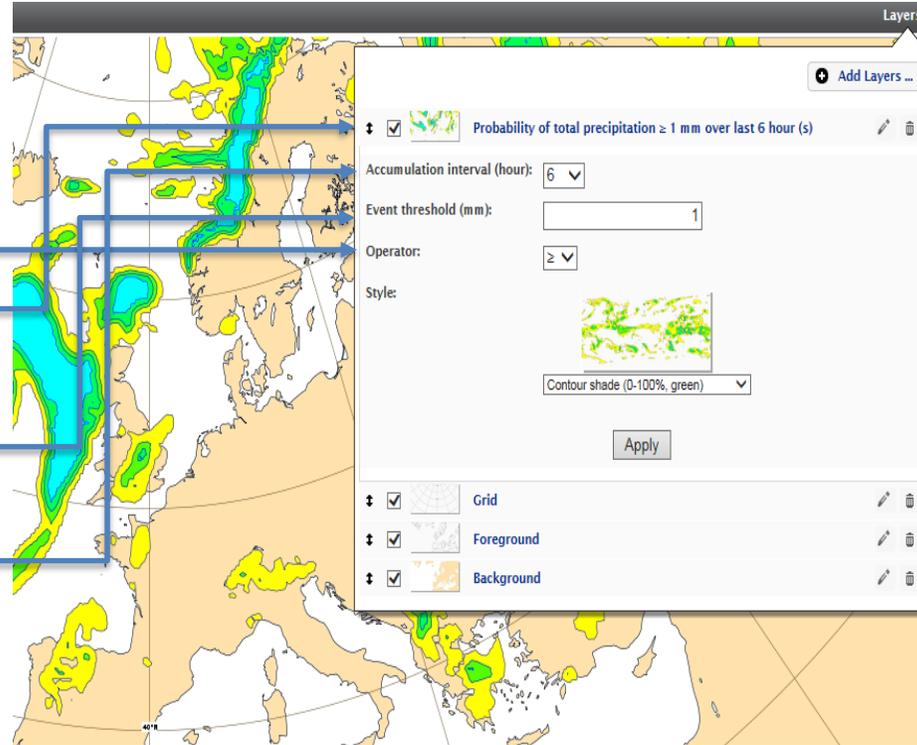
WMS examples

- <https://apps.ecmwf.int/wms/?token=metview&request=GetMap&layers=2t,foreground&width=900&height=900&BBOX=-20,70,50,0>
- <https://apps.ecmwf.int/wms/?token=metview&request=GetMap&layers=2t,foreground&width=900&height=900&BBOX=-10,60,5,45>
- <https://apps.ecmwf.int/wms/?token=metview&request=GetMap&layers=2t,foreground&width=900&height=900&BBOX=-5,55,5,48>



ENS data in ecCharts

What is the probability of precipitation > 5 mm/ 6 hr ?
How about over 24 hr ?



- ENS combined and weighted probabilities
- ENS mean and spread
- EFIs
- SOTs
- Cyclone strike probabilities
- Cyclone tracks
- Model-climate
- Meteograms
- ...

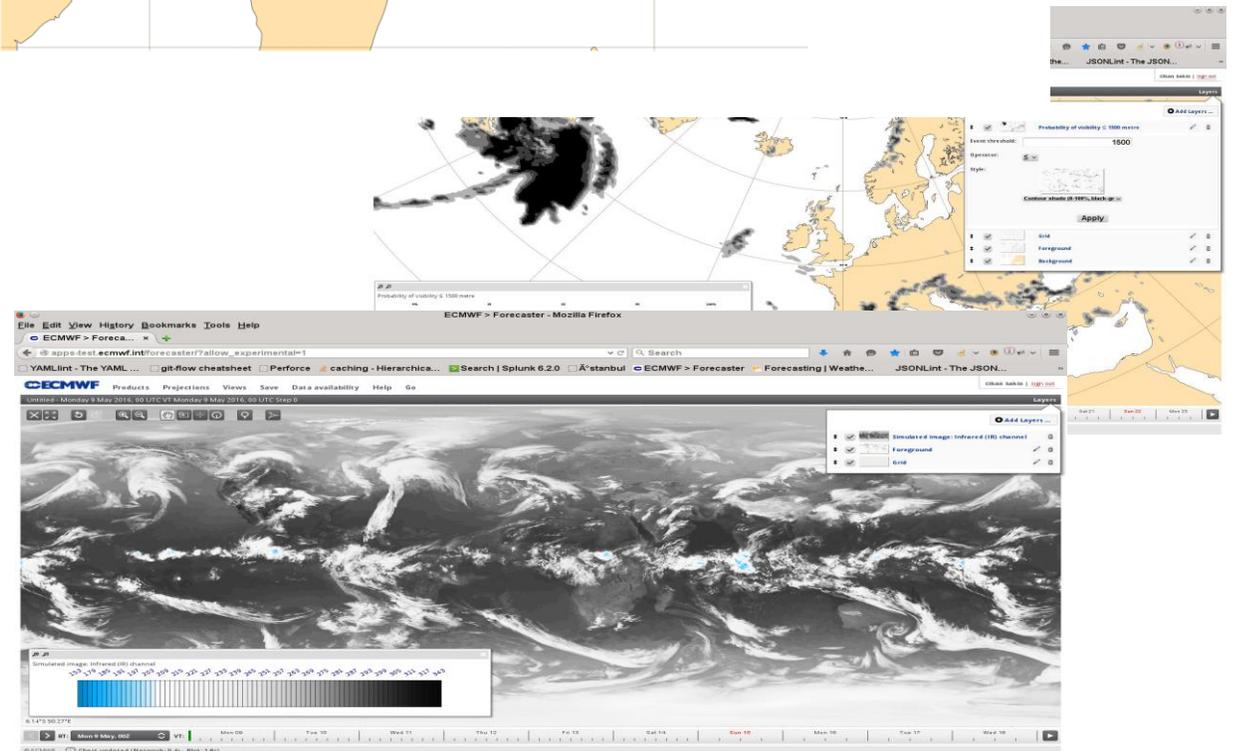
- Similar customisation applies for percentiles and probability of combined events and weighted probabilities ...

ecCharts update (June 2016)

- Implementation of new parameters (~20) as requested by users;
 - Thickness, SST, Visibility, Albedo, Leaf area index
 - Simulated satellite data
 - Probability of precipitation rates, visibility
 - EFI CAPE and CAPE-SHEAR
 - Named tropical cyclone tracks
 - Weighted probabilities
- Some additional CAMS layers

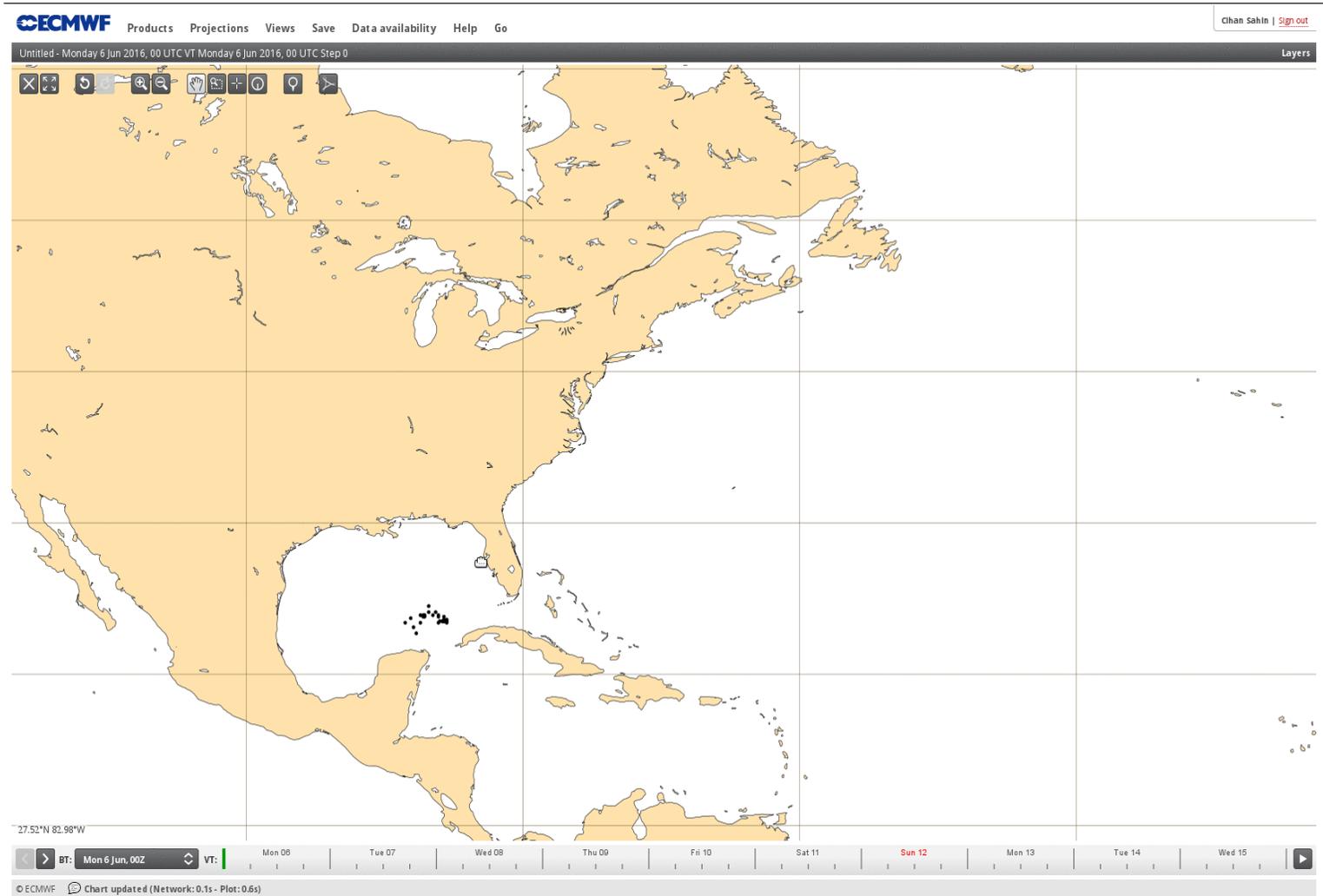
Full list available at;

- <https://software.ecmwf.int/wiki/display/ECCHARTS/ecCharts+updates++2016>



Tropical cyclone tracks

- Tracks are generated for all TCs that have been officially observed.
- 2 layers available
 - Named tropical cyclone (name and positions only)
 - Displays track positions (HRES and ENS members) and name
 - Named tropical cyclone tracks
 - Displays tracks of HRES and ENS members.
- Parameters to track
 - Minimum pressure
 - Maximum wind speed
- Various track visualisations available

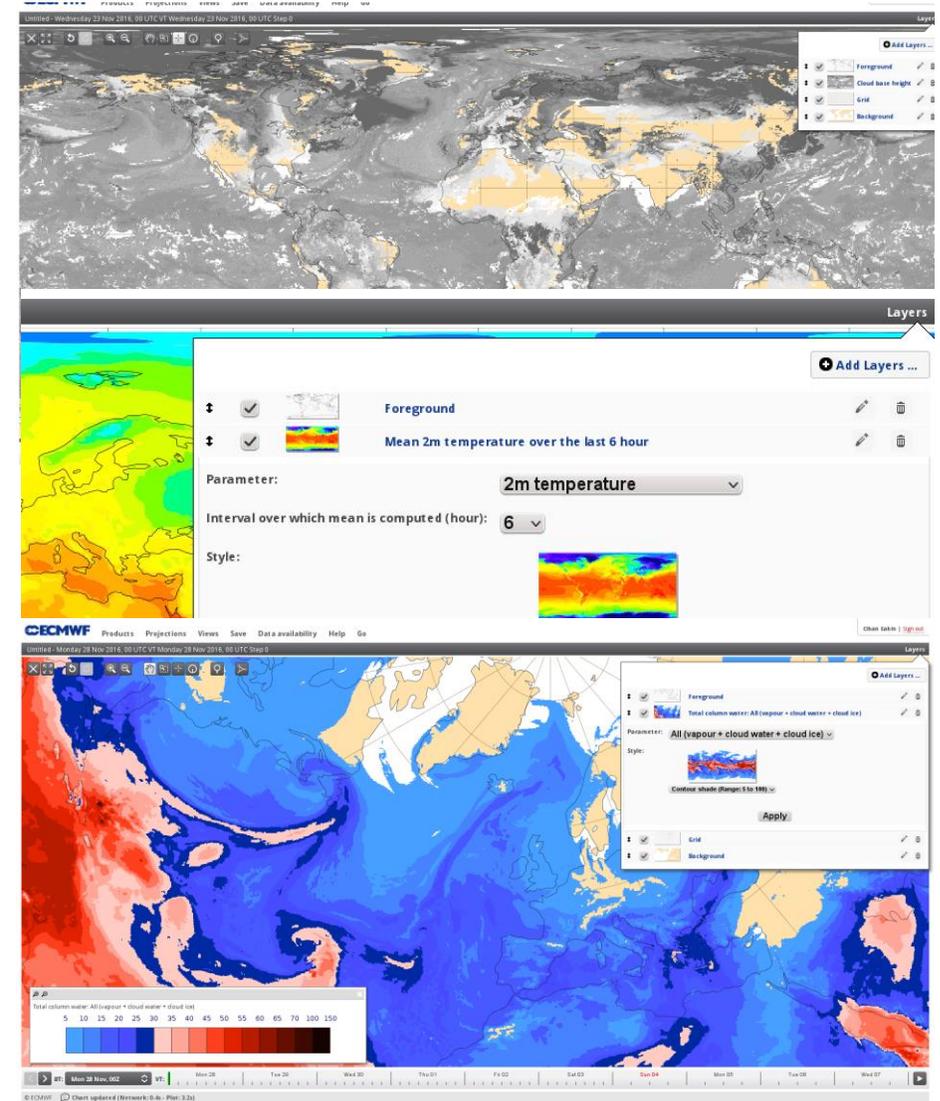


ecCharts update (November 2016)

- Implementation of new parameters (~25) (end of November) as requested by users;
 - Cloud base height, Mean 2T over a period, Total column water vapour, PV at various levels
 - Model climate parameters at various percentiles (2T min/max/mean, wind gust, wind speed, snowfall, total precipitation, wave height)
 - Parameters from new IFS version;
 - Height of zero/one degree Wet bulb temperature, height of convective cloud top, Ceiling, Wave energy flux, significant wave height with various periods
 - Meteograms (CDF plots for 2m min and max)
 - Province borders, style changes/updates

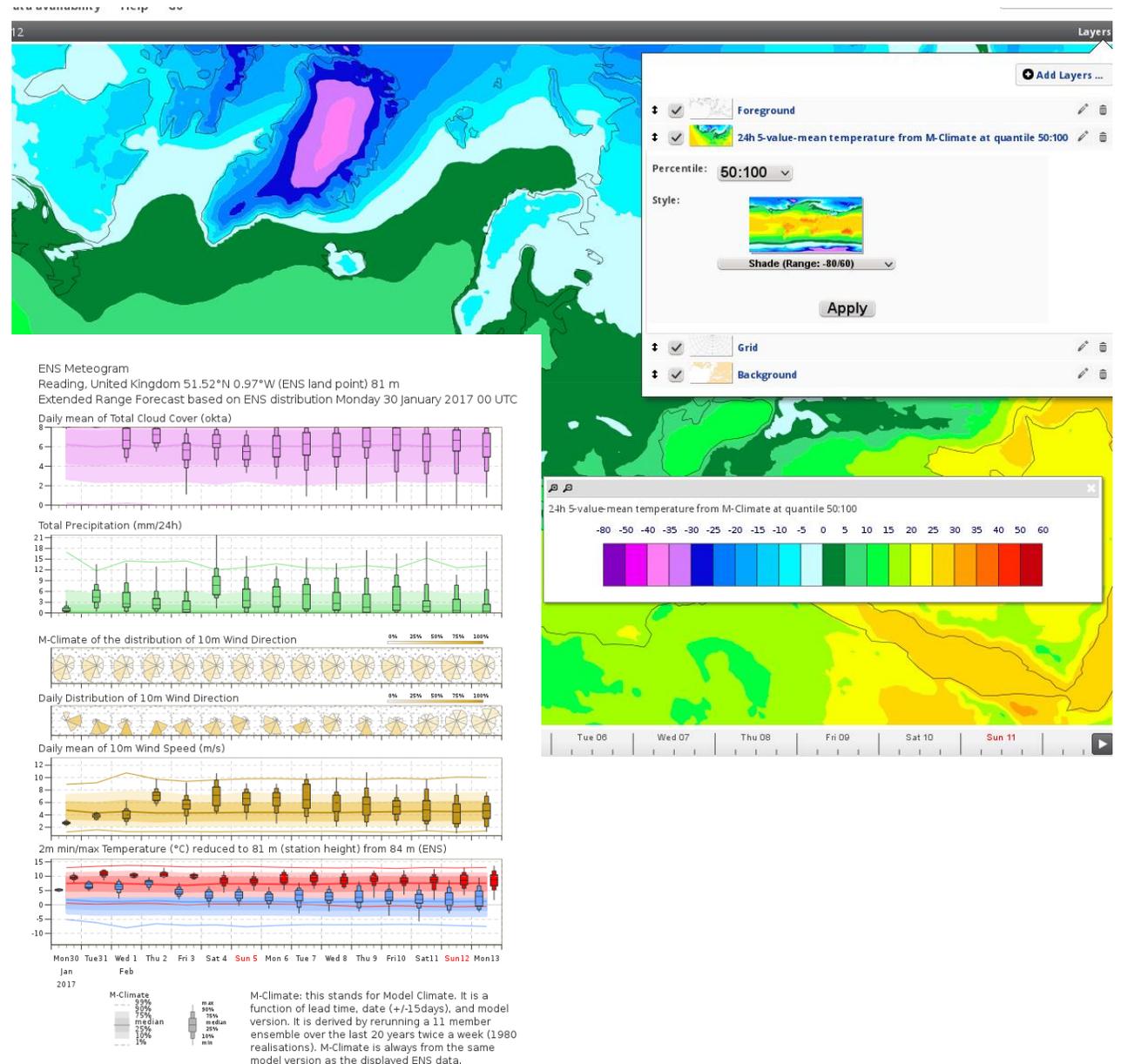
Full list available

<https://software.ecmwf.int/wiki/display/ECCHARTS/ecCharts+updates+--+2016>



Model-climate

- It is derived by rerunning a 11 member ensemble over the last 20 years twice a week (9 forecast * 11 members *20 years = 1980 realisations)
- From the same model version as the ENS forecast fields.
- Used to derive EFI/SOTs
- Produced twice a week (every Monday and Thursday)
- Also available as point forecast charts as Meteograms in ecCharts and www Meteograms.
- Parameters: Max wind gust, 2T (mean, min,max), CAPE, CAPE shear, wind speed, total snowfall, total precipitation, max. swh

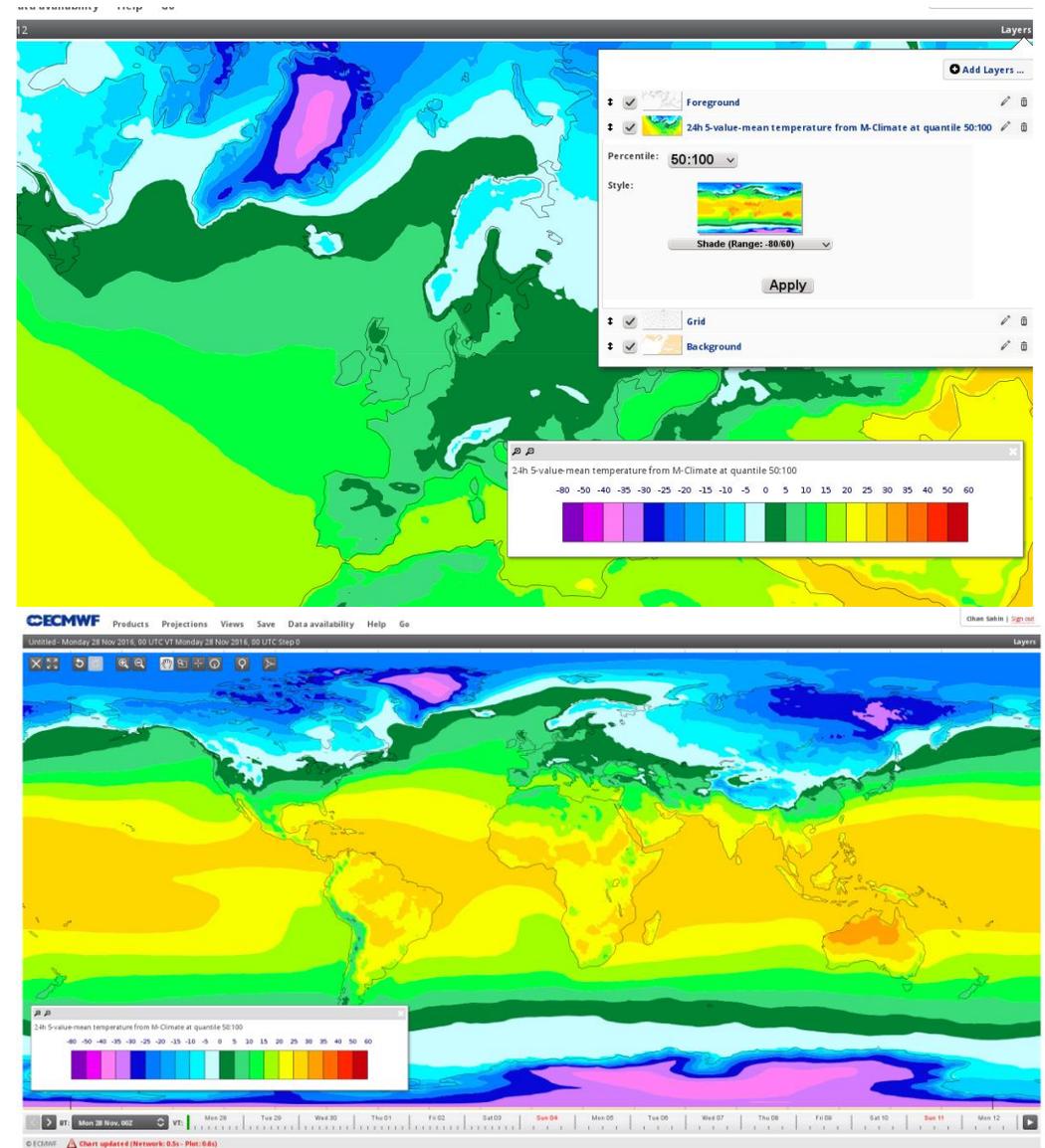


Model-climate in ecCharts

- Produced as “daily” values. In ecCharts, they are provided for all forecast runs and all time steps of a standard ENS field (3 hourly up to day 6 and 6 hourly up to day 15), which each time step of a day shows the same M-climate field to make it possible to overlay M-Climate fields with daily forecast fields.

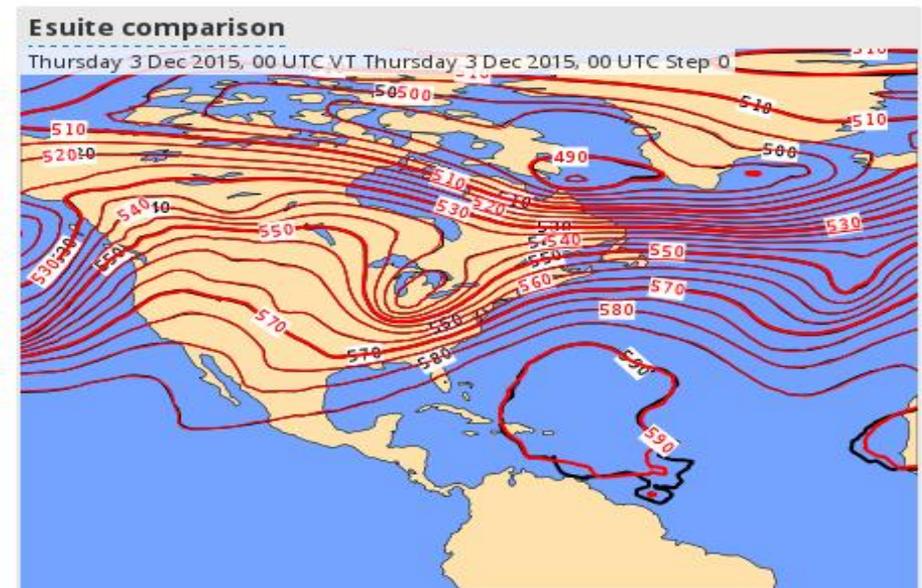
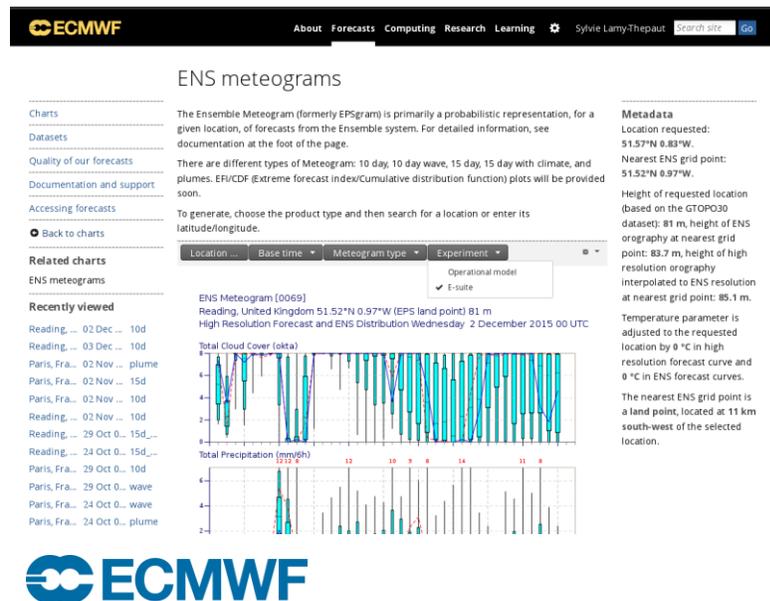
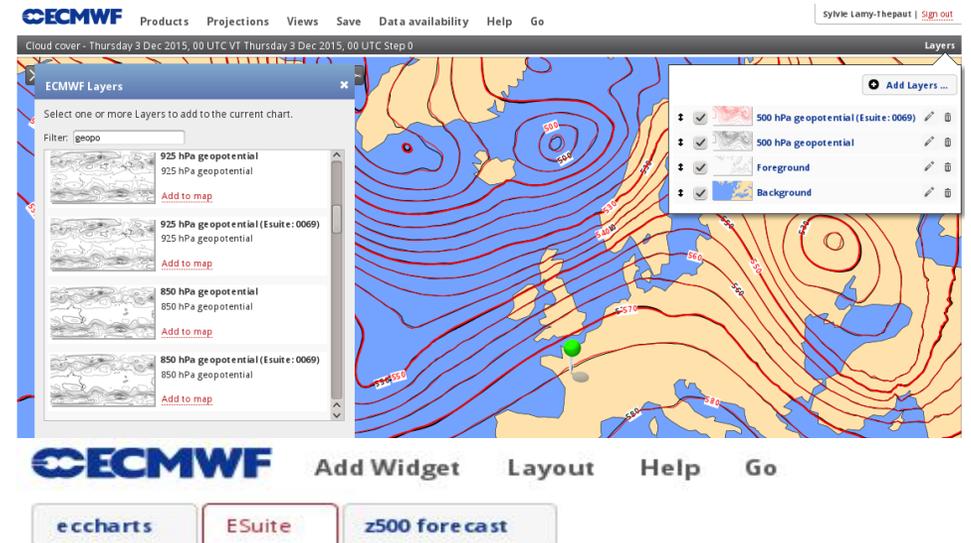
Steps T+0 to T+24 maps to Day 1 M-Climate
Steps T+27 to T+48 maps to Day 2 M-Climate
Steps ...

- Various percentiles are provided for each Model climate layer (0,1,10,25,50,75,90,99,100%)
- In layer list, search for “climate” to list all Model climate layers.



ecCharts updates – IFS cycle updates

- IFS cycle: 43r1 (November 2016)
- IFS cycle: 43r3 (Now until 11th of July)
- All e-suite data/charts made available for a month
- Operational layers were duplicated for e-suite to overlay/compare with operational data.
- Meteograms from e-suite were available on Meteogram page on www.



Upcoming updates (June/July 2017)

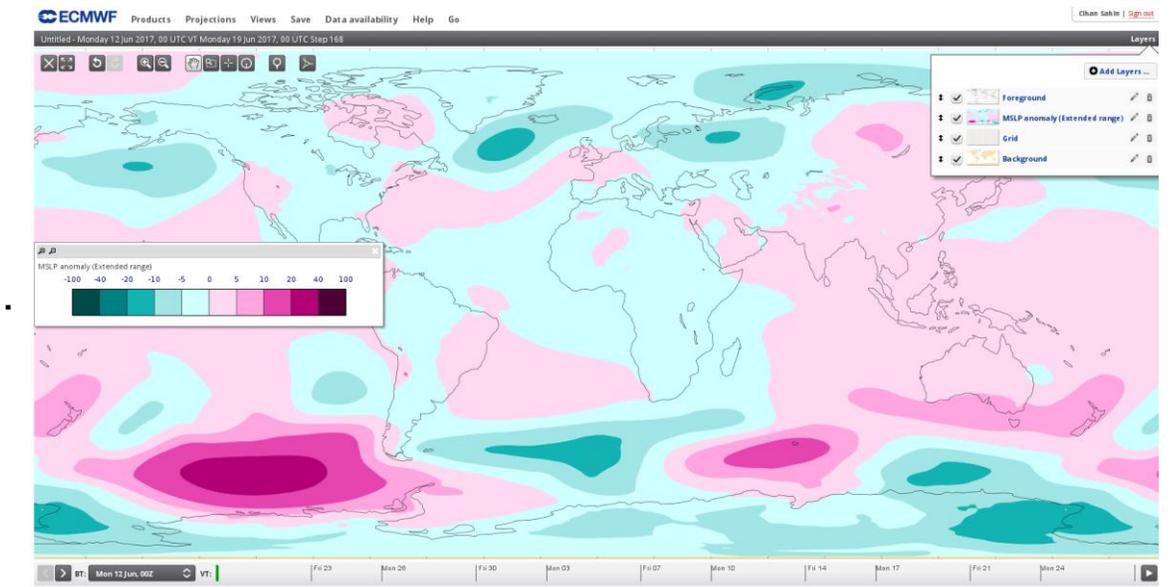
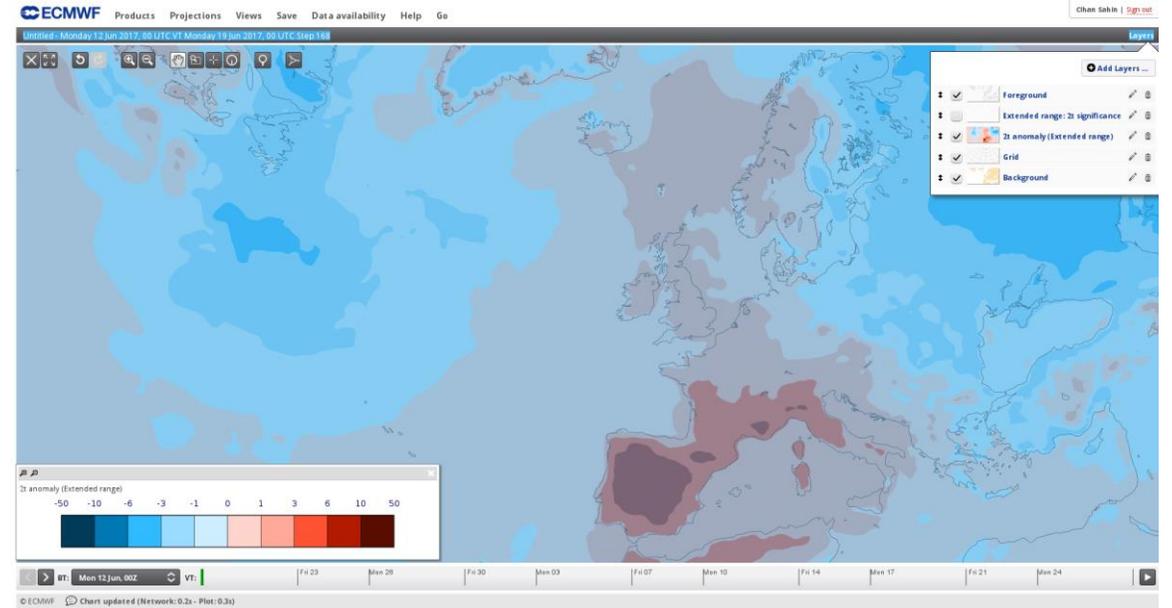
June

- Extended range charts:
 - Weekly mean anomalies
 - Terciles (more quantiles ...)
- Precipitation type probability
- Precipitation type probability meteogram
- Cloud depth layer

November

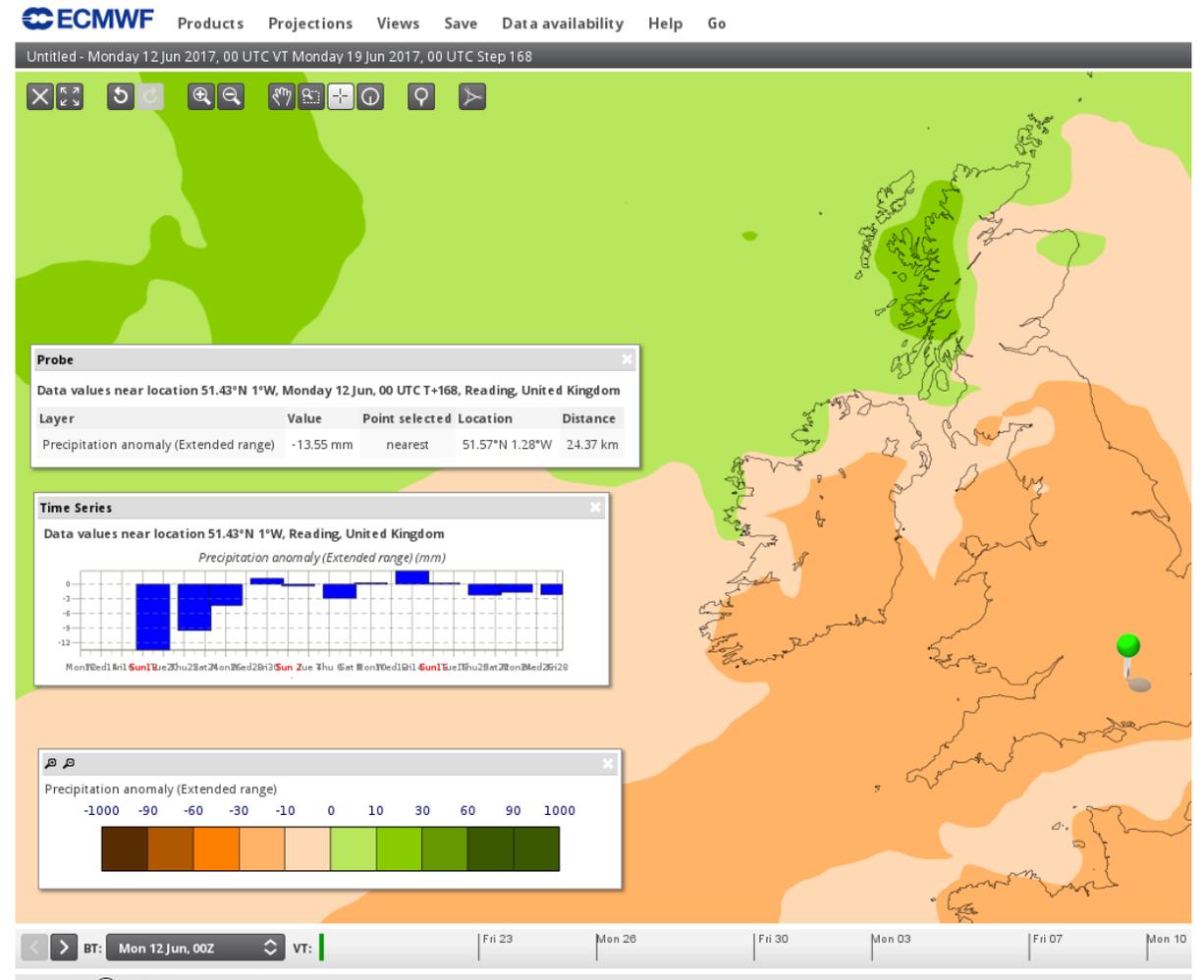
- Extended range: more parameters
- New IFS cycle related parameters: Lightning ...
- Common styles for all charts
- Start investigating vertical profiles !

Focus on performance improvements



Extended range charts

- First ever charts from extended range
 - Weekly time steps
 - Up to 4 weeks (OR 6 weeks ? Users to decide)
- Ensemble mean anomaly charts with controllable significance levels
 - 2t, soiltemp/sst, precipitation, mslp
- Probability terciles and possibly other quantiles
- Working on a Extended range meteogram
 - Ensemble mean anomalies with Model-climate
- More parameters to follow in November

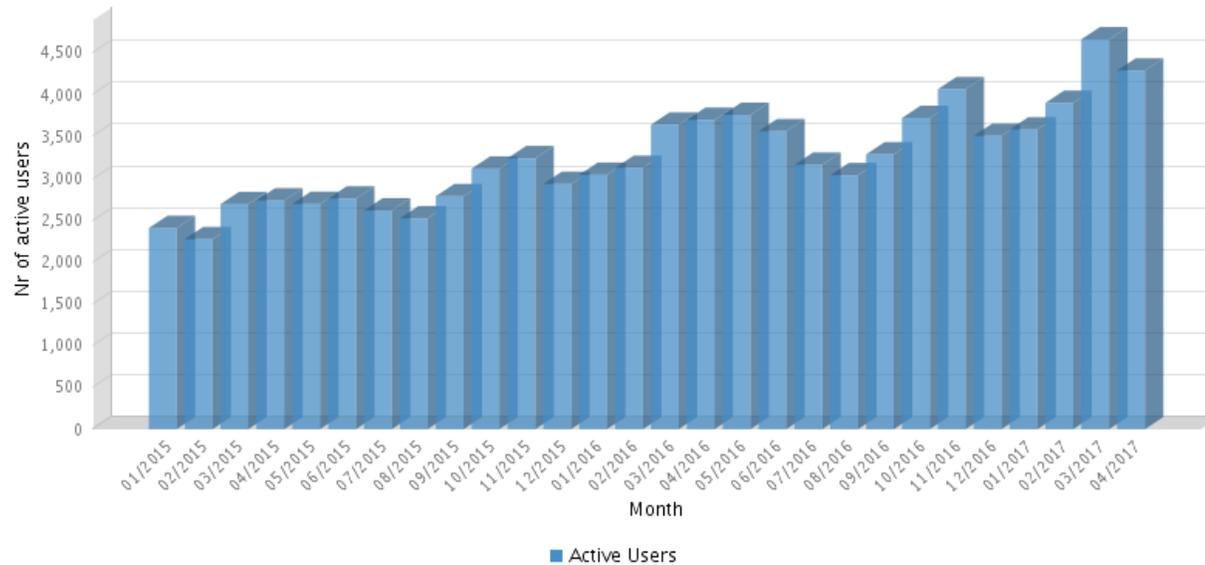


Any recommendation ? Let us know

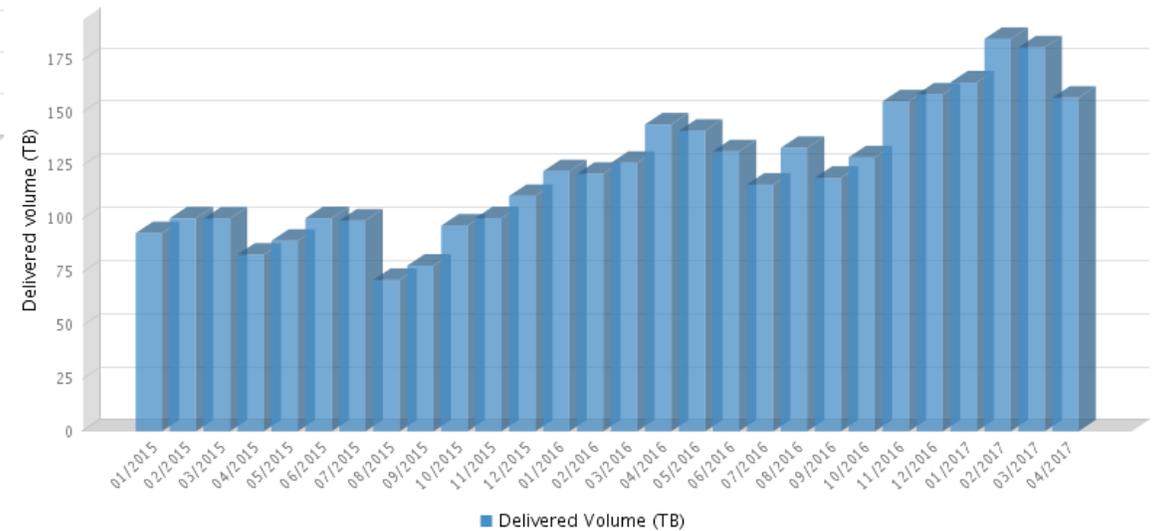
ECMWF public datasets and Web-API service

- Access to MARS via the Web-API
- Access to public datasets, via Web UI (discovery) and Web-API

Nr of active users per month



Delivered Volume (TB)



Web-API – recent updates and future plans

- CERA-20c daily and monthly (on-going)
- YOPP
- ERA-5 test reanalysis
- GEFM reanalysis beta version
- S2S (all partners)
- CAMS related datasets (Global fire assimilation, GHG flux inversion, NRT)
- ERA20C observations

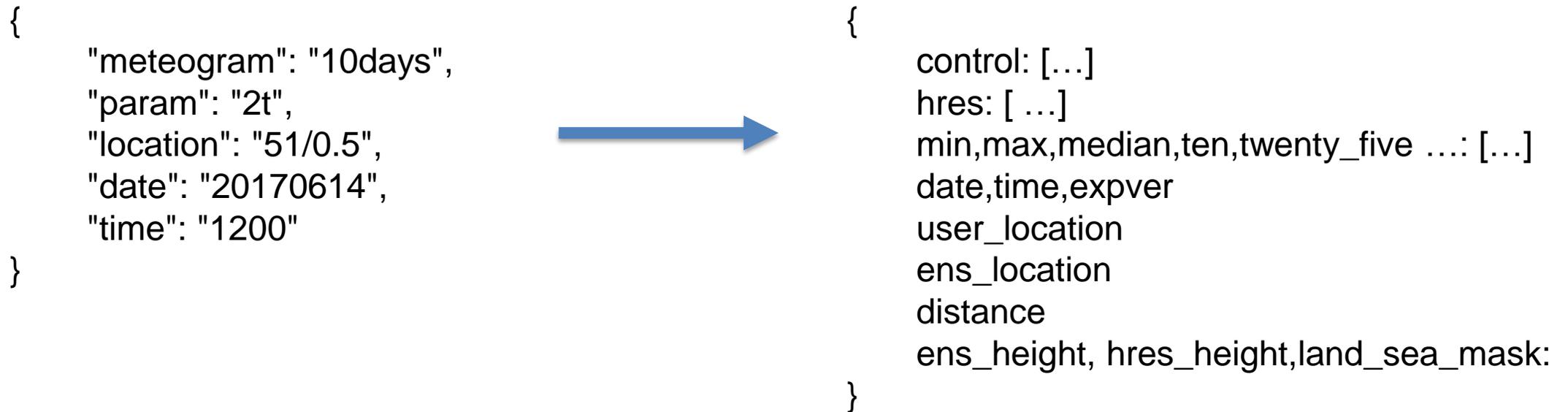
Development plans

- Improve API performance, quality of service
- Additional datasets
 - ERA5, CERA-20C ocean
 - GEFM reanalysis and realtime
 - Observation feedback archive (ERA-interim, CERA-20C, ERA5 ...)

Meteogram data on Web API

- Data we use to generate ECMWF meteograms are soon available to download by Web API
- Only available for Meteogram parameters and only on the percentiles displayed on Meteograms
- Output in JSON format

<https://software.ecmwf.int/wiki/display/WEBAPI/Meteogram+RESTful+Web+Service>



Questions ?

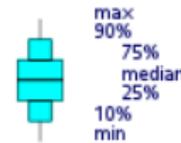
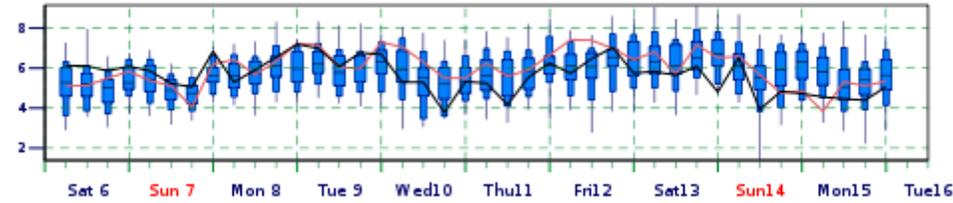
Thanks

Contact us
cihan.sahin@ecmwf.int

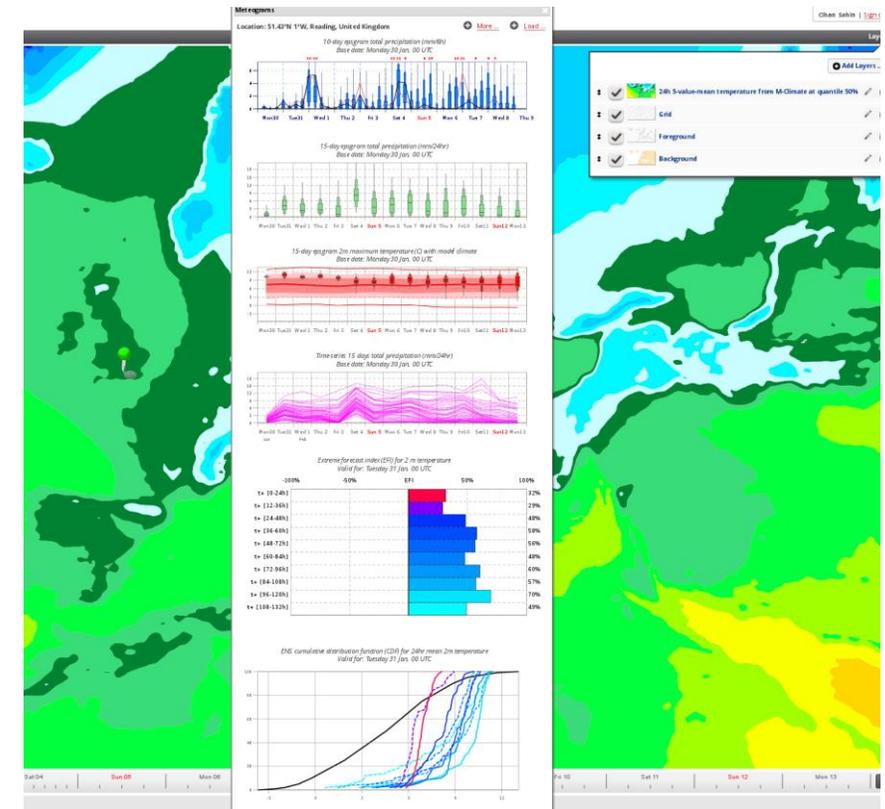
Meteograms

- Distributions are displayed using a box and whisker plot.
- Types of meteograms;
 - 10-day meteograms
 - 10-day meteograms for wave parameters
 - 15-day meteograms
 - 15-day meteograms with model climate
 - Plumes
 - ENS members (individual lines)
 - EFI and CDF diagrams
- All charts are clickable to show selected meteograms for a chosen location.

10-day epsgram 10m wind speed (m/s)
Base date: Saturday 6 Jun, 00 UTC

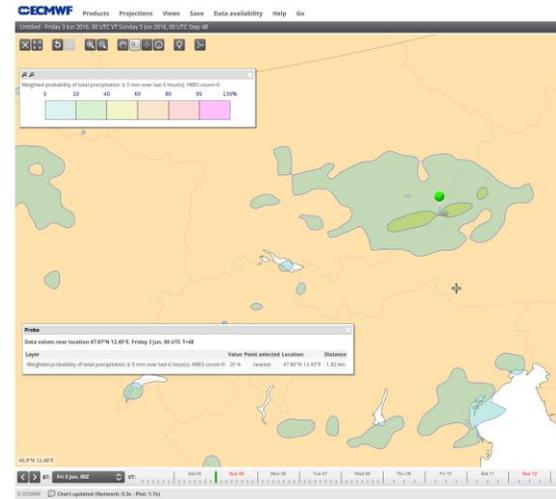
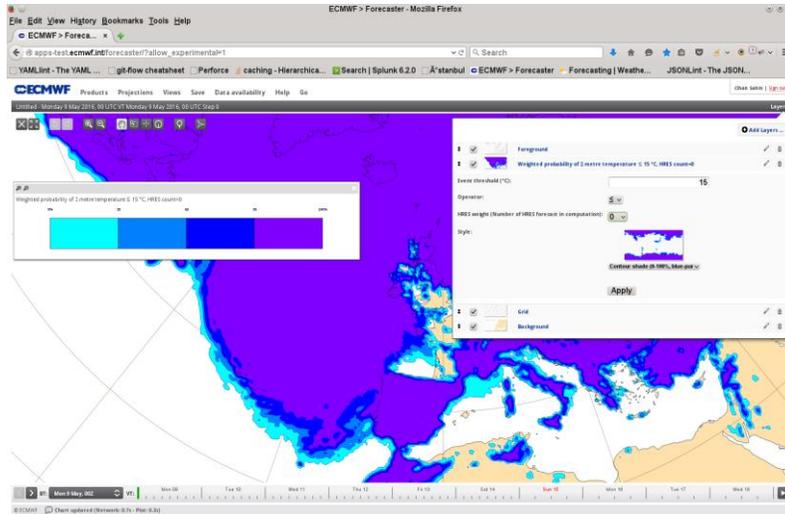


ENS Control(31 km) High Resolution (16 km)

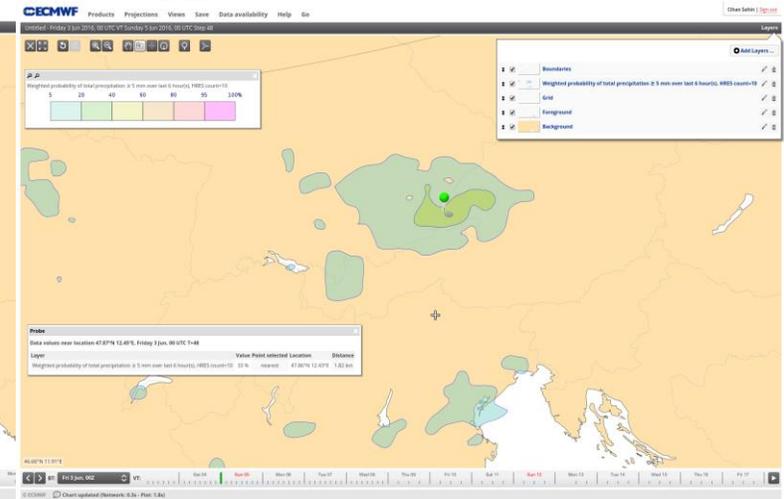


Weighted probabilities

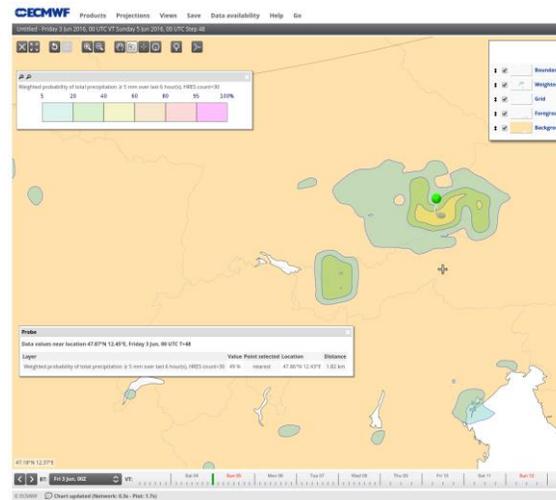
- An experimental set of probability layers
- Probabilities are computed by taking into account a user controllable weighting of High resolution forecast.
- As all probability layers, probability threshold and probability operator (less than, more than, equal to ...) can be customized by the users.



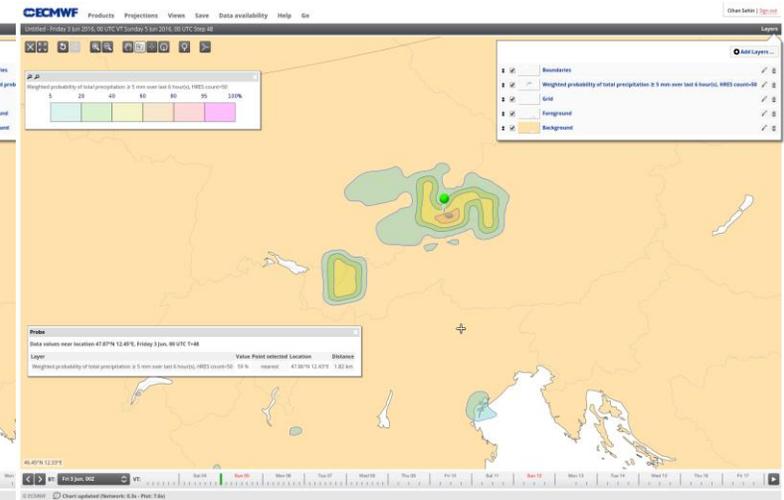
HRES count = 0 , 20 %



count=10, 33%



count=30, 49%



count =50, 59%

Other ensemble data

- Derived products
 - ENS combined and weighted probabilities
 - ENS mean and spread
 - EFIs
 - SOTs
 - Cyclone strike probabilities
 - Cyclone tracks
 - Model-climate

