

ecCharts

Ensemble data and recent updates

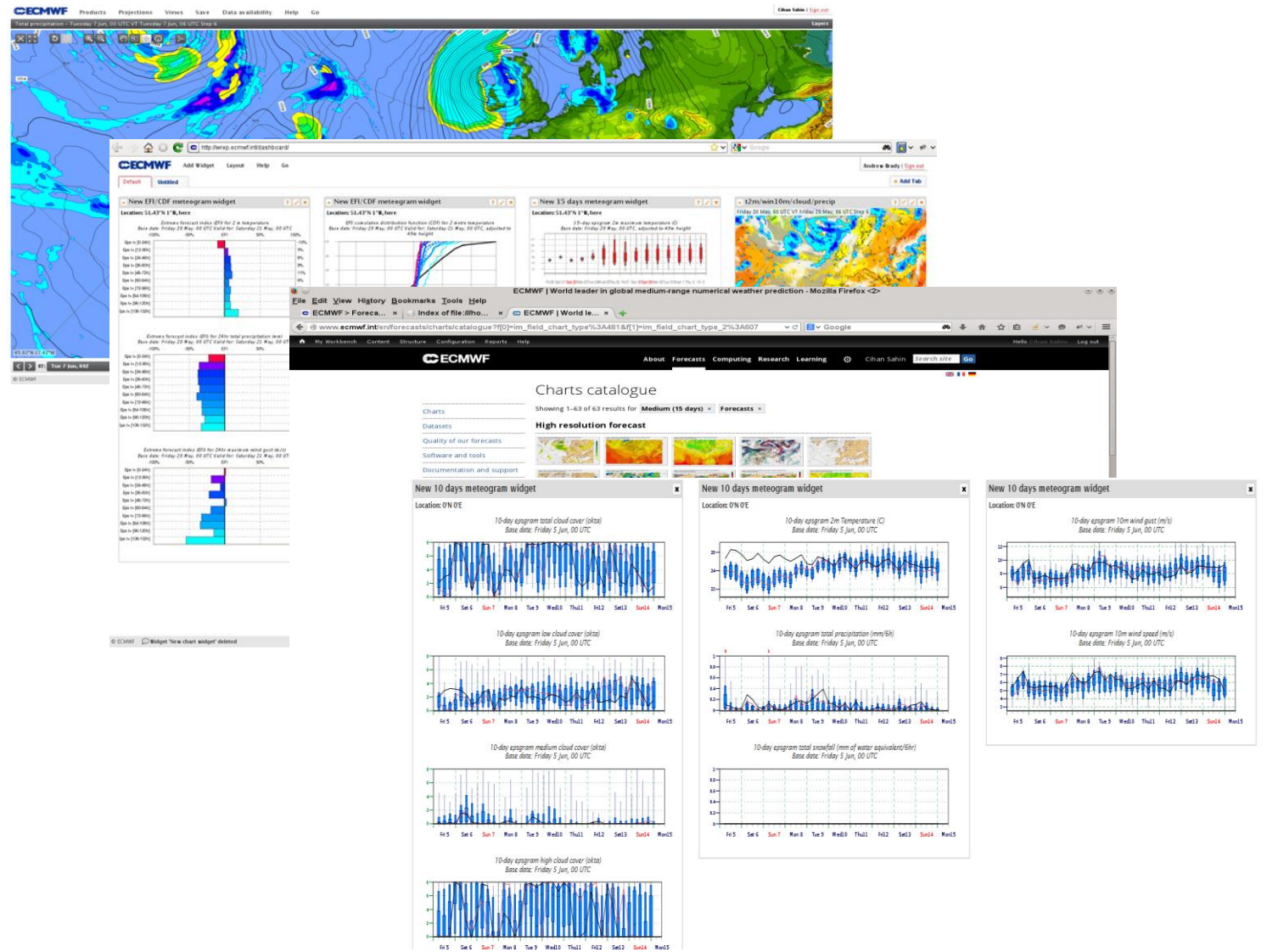
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Web development team, ECMWF

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Outline

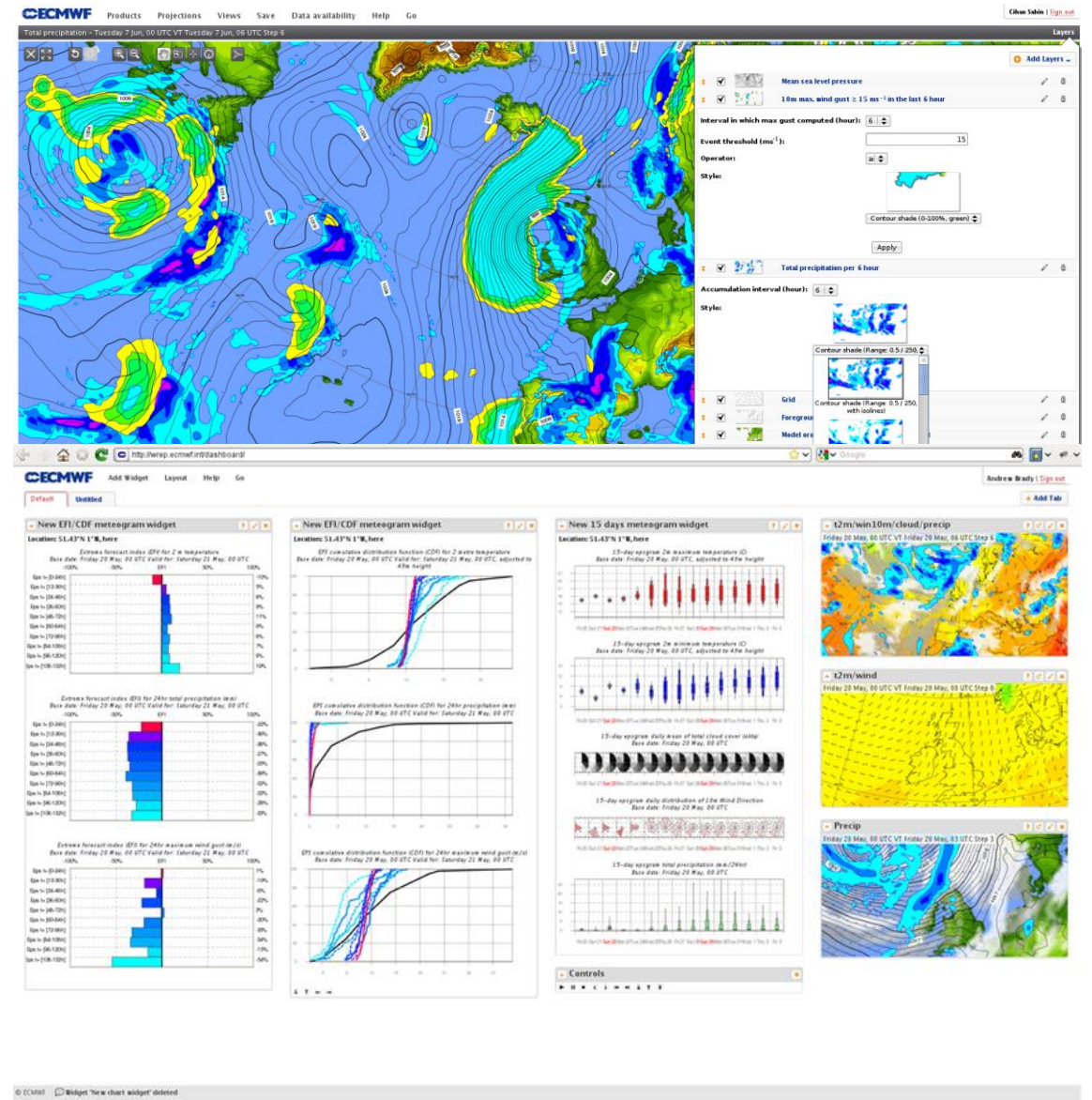
- ecCharts
- Ensemble data in ecCharts
- Update on ecCharts
- Update on static charts (www)



ecCharts

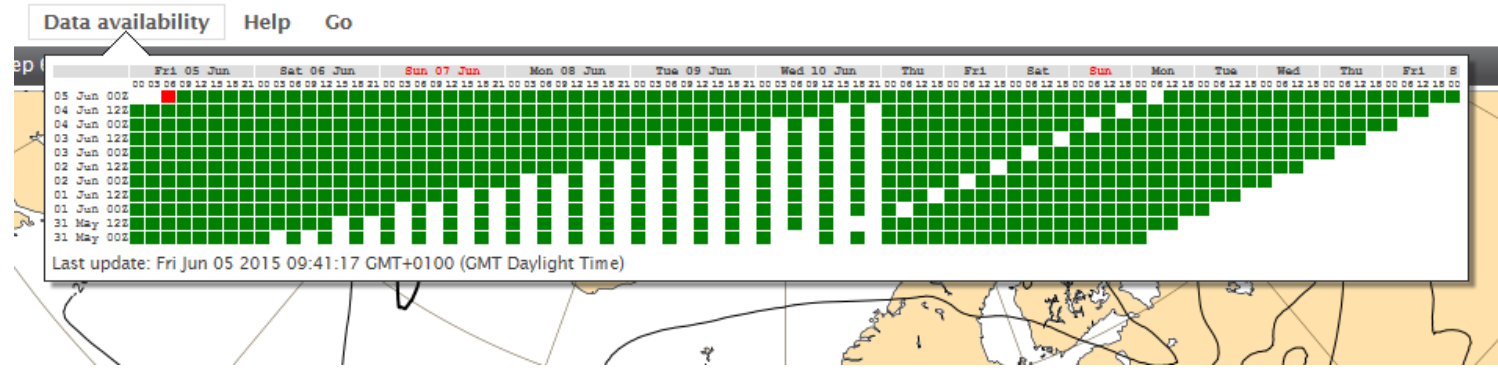
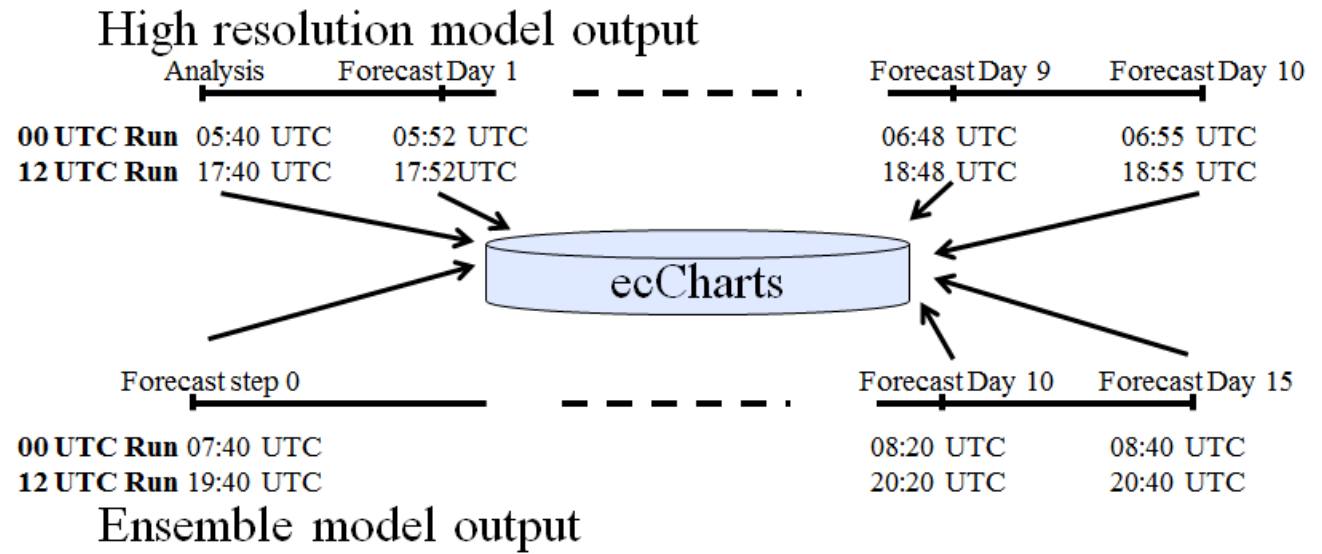
Web based application to explore and visualize ECMWF data

- Easy and immediate access to charts
- Native data resolution
- Interactive features (zoom, pan, click, extract data information, ...)
- Apply different colour styles
- Customisable parameters
- Operationally supported, highly available service



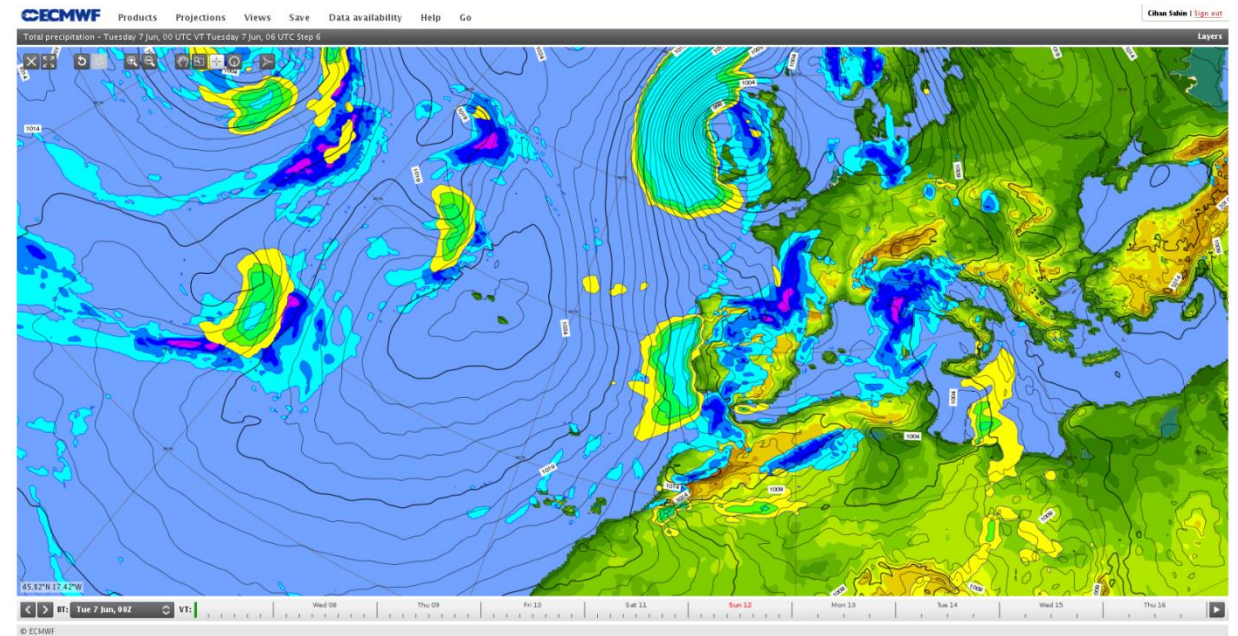
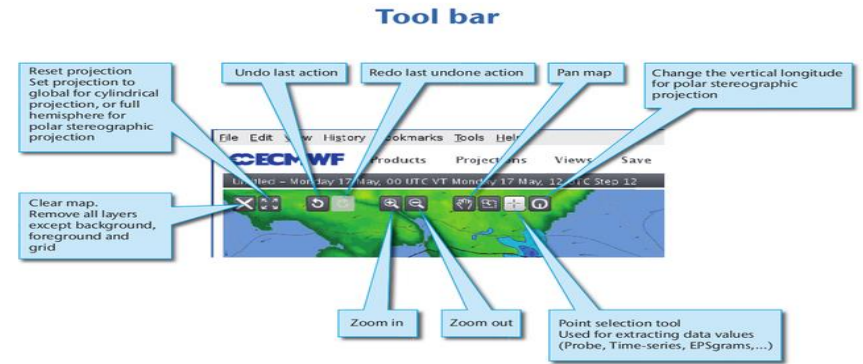
Data availability

- Data made available based on dissemination schedule.
- Once data is available, all charts are generated dynamically on demand.



Interactive features

- Data fields are global.
- Zoom, pan, undo, redo a plot
- Click on charts to show data values or ENS meteograms.
- Overlay any combination of parameters (HRES + ENS) , currently we have around 170.
- Design and save as your “own” product to re-use.
- Control time - Animate, change steps, change basetime
- Dashboard facility to show many charts simultaneously.



Ensemble data

ecCharts provides an easy way to access and visualise ECMWF Ensemble data

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

What is the probability of precipitation > 5 mm/ 6 hr AND wind speed > 10 m/s ?
How about over 24 hr ?

How about ENS distribution for a given point ?

Show ENS temperatures for 90th percentile ?

Show all ENS members for a chosen isoline ?

Customising charts is the key functionality to explore Ensemble data in detail.

- Achieving customisation is costly.
 - No more static generation of charts
 - They need to be generated dynamically from raw data.

Probabilities

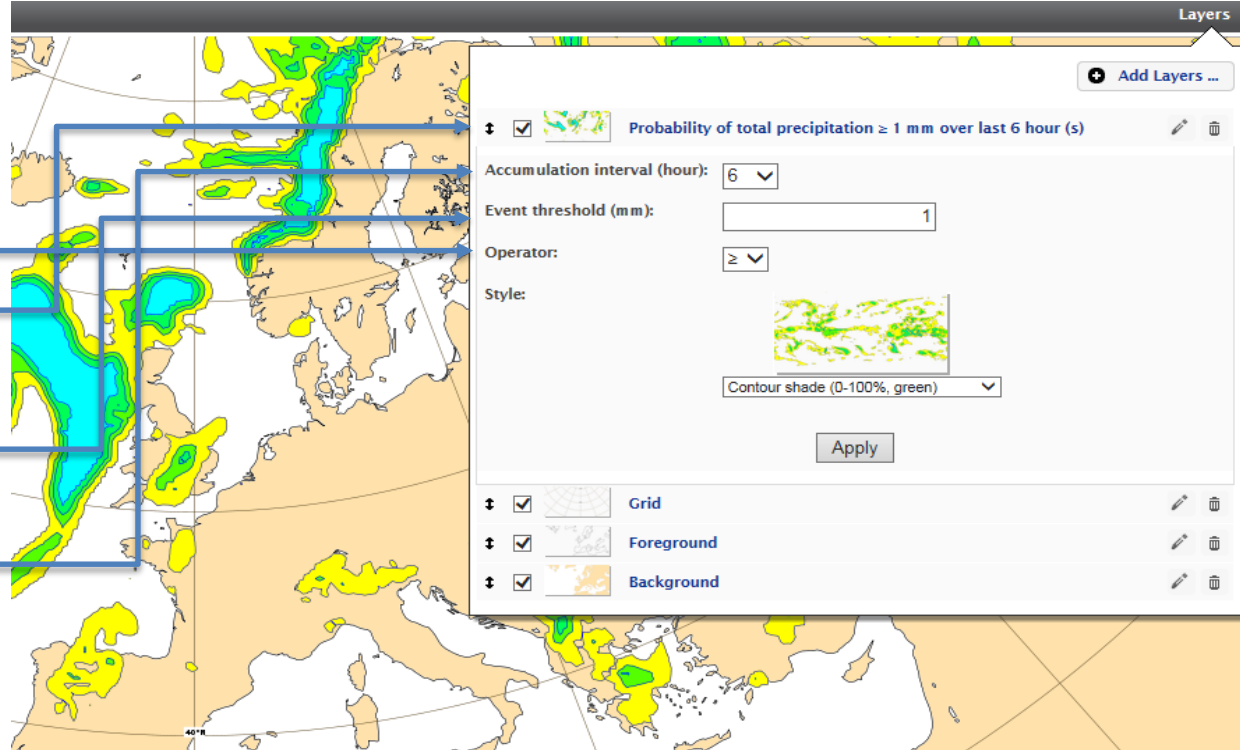
- To convey forecast uncertainty information by the probability of the occurrence of an event.

What is the probability of precipitation

>

5 mm/ 6 hr ?

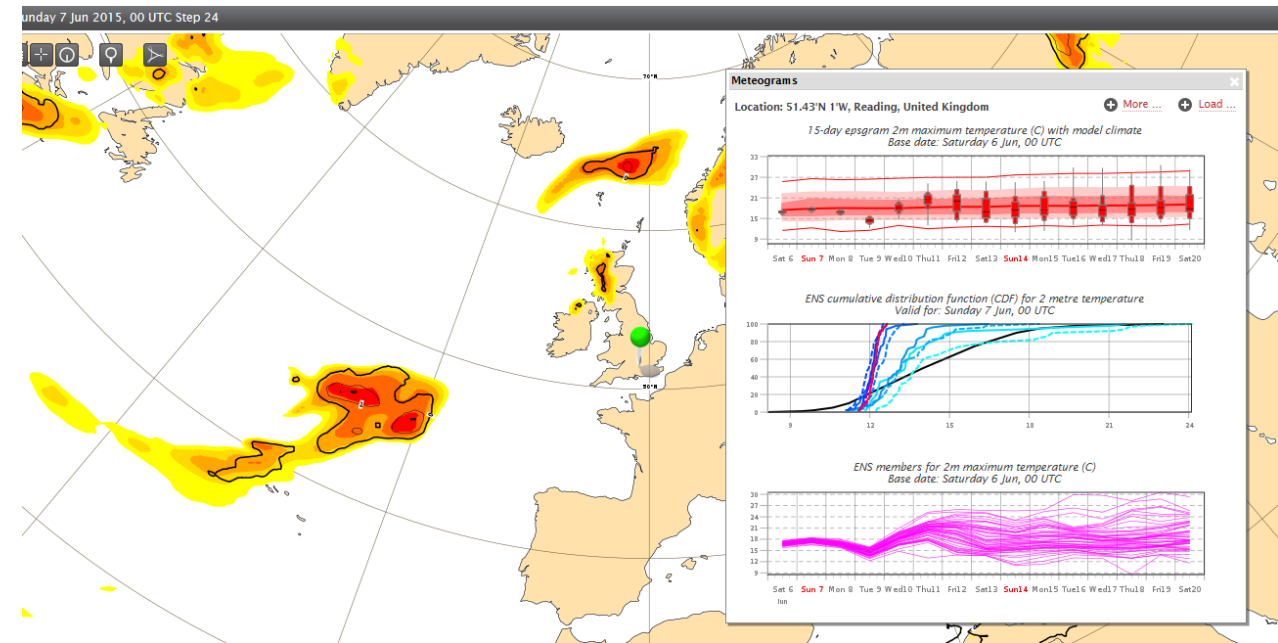
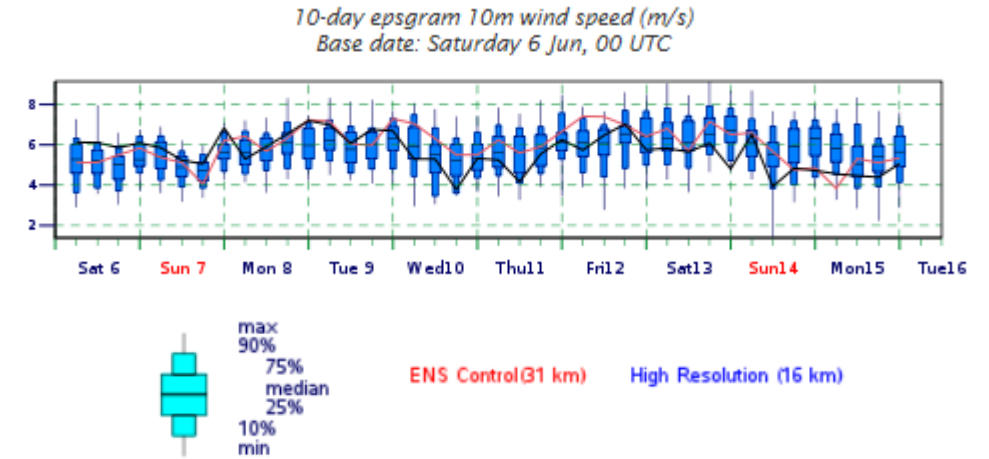
How about over 24 hr ?



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

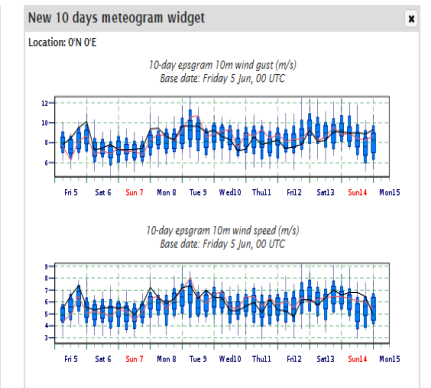
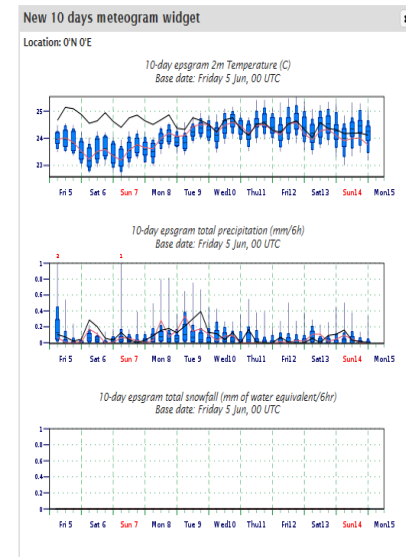
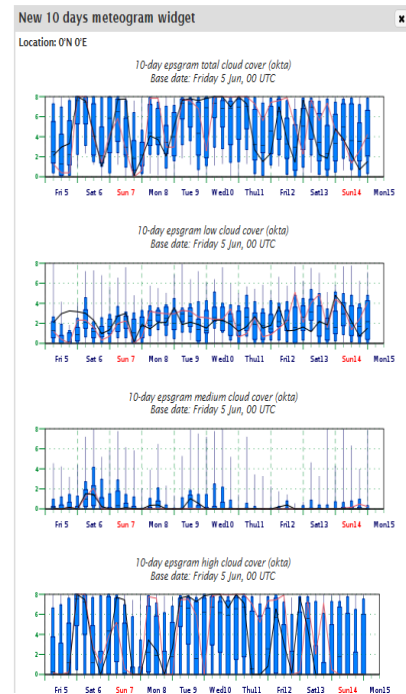
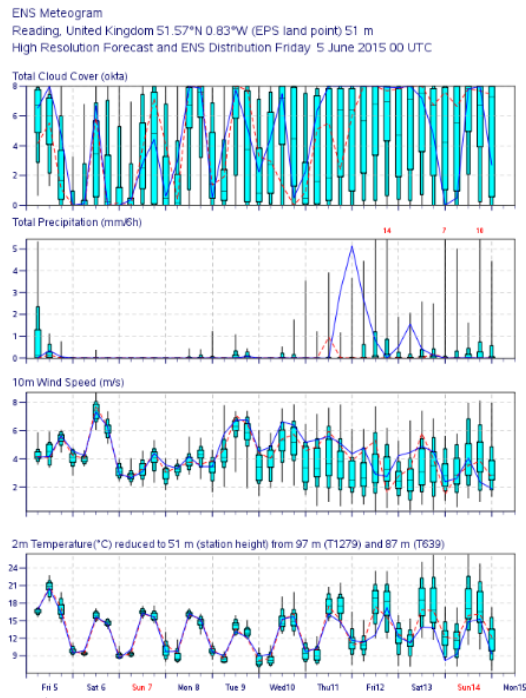
Meteograms

- Special databases to retrieve pre-defined percentiles efficiently.
- Distributions are displayed using a box and whisker plot.
- Types of meteograms & point based distributions;
 - 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.

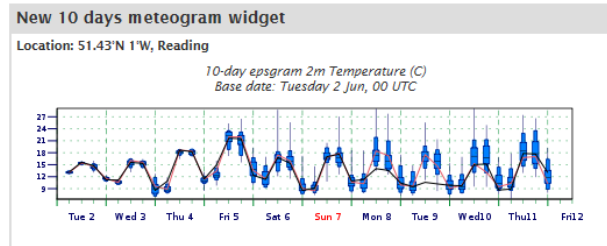
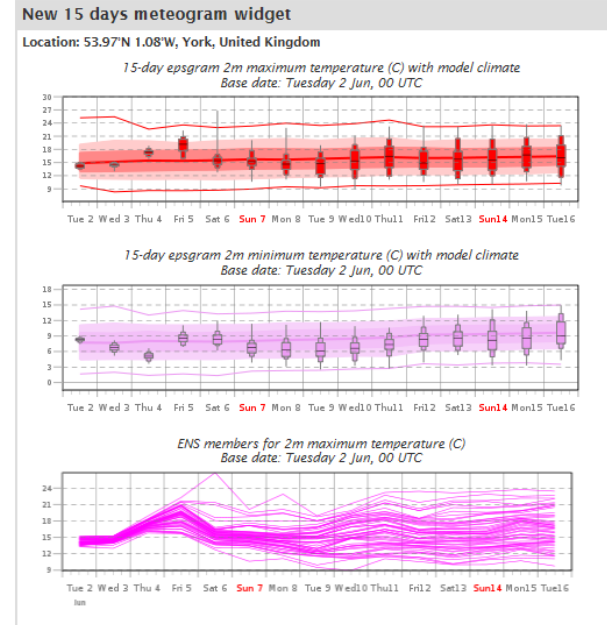
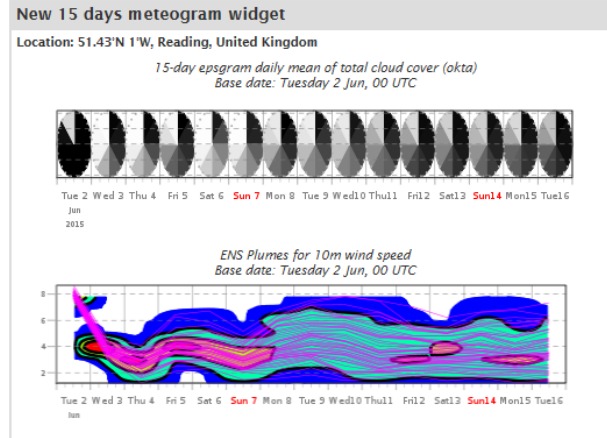
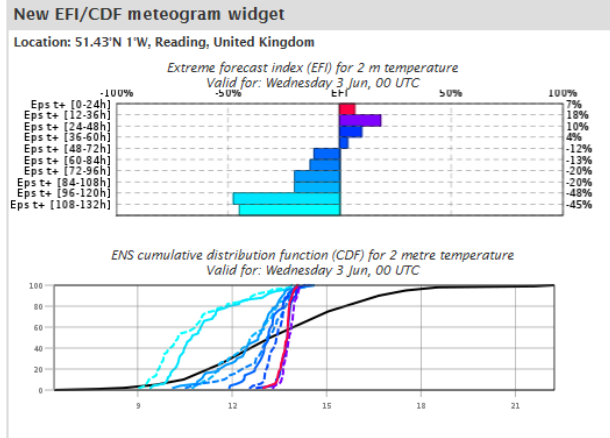


Meteograms – more parameters in ecCharts

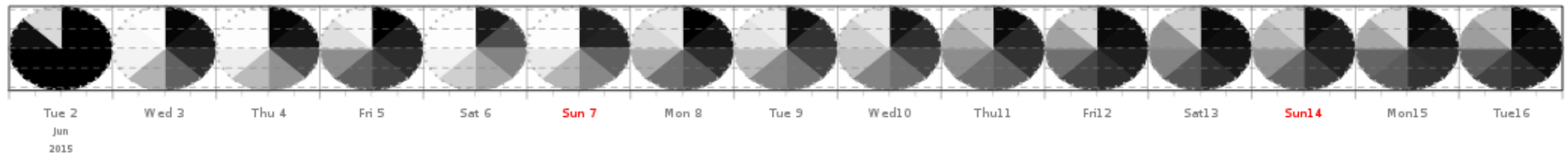
- Classical meteograms have a limited number of parameters (4 for 10-day meteogram)
- ecCharts displays meteogram parameters individually. That allows us to produce and present new parameters.
- (2t, total precipitation, wind gust, low/medium/high/ total cloud cover, snowfall, wind speed, mean wave period/direction, wave direction, significant wave height)



Meteograms

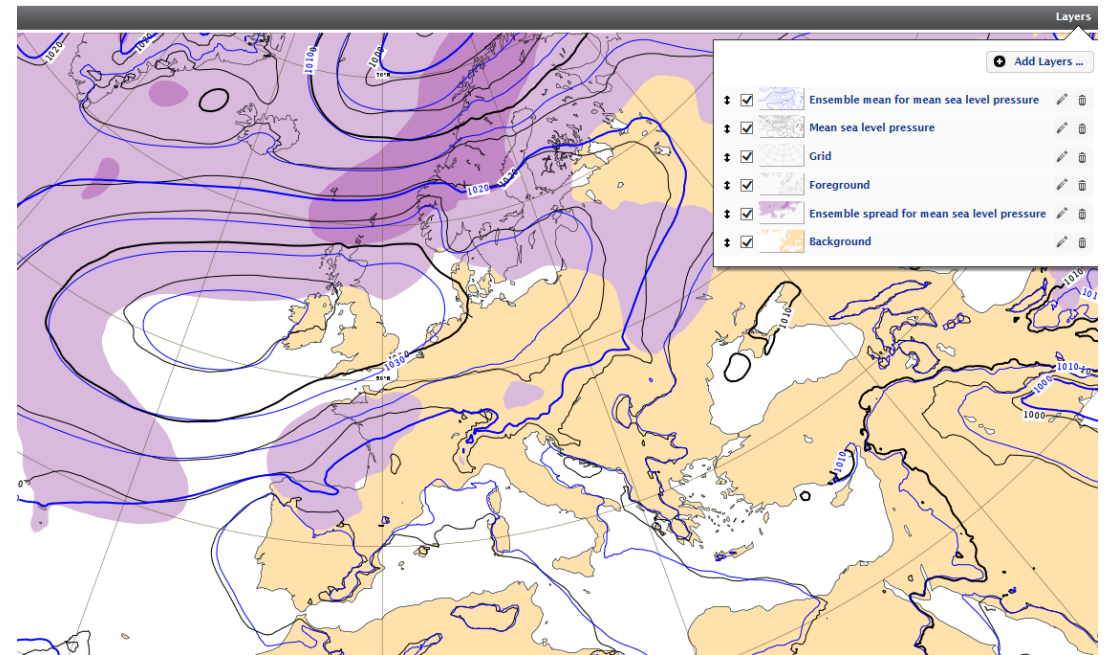
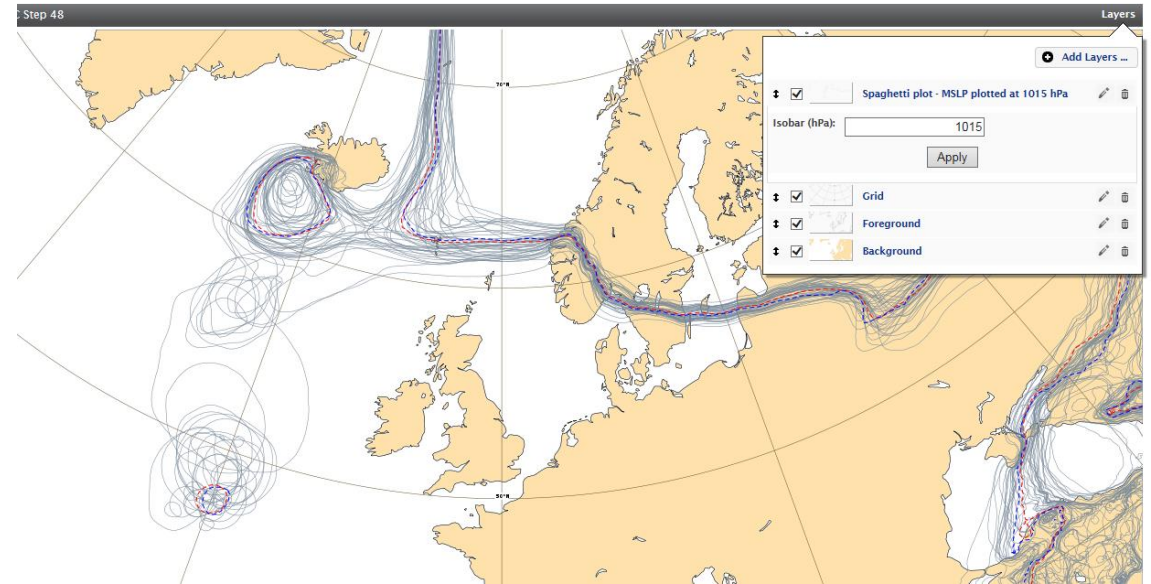


15-day epsgram daily mean of total cloud cover (okta)
Base date: Tuesday 2 Jun, 00 UTC



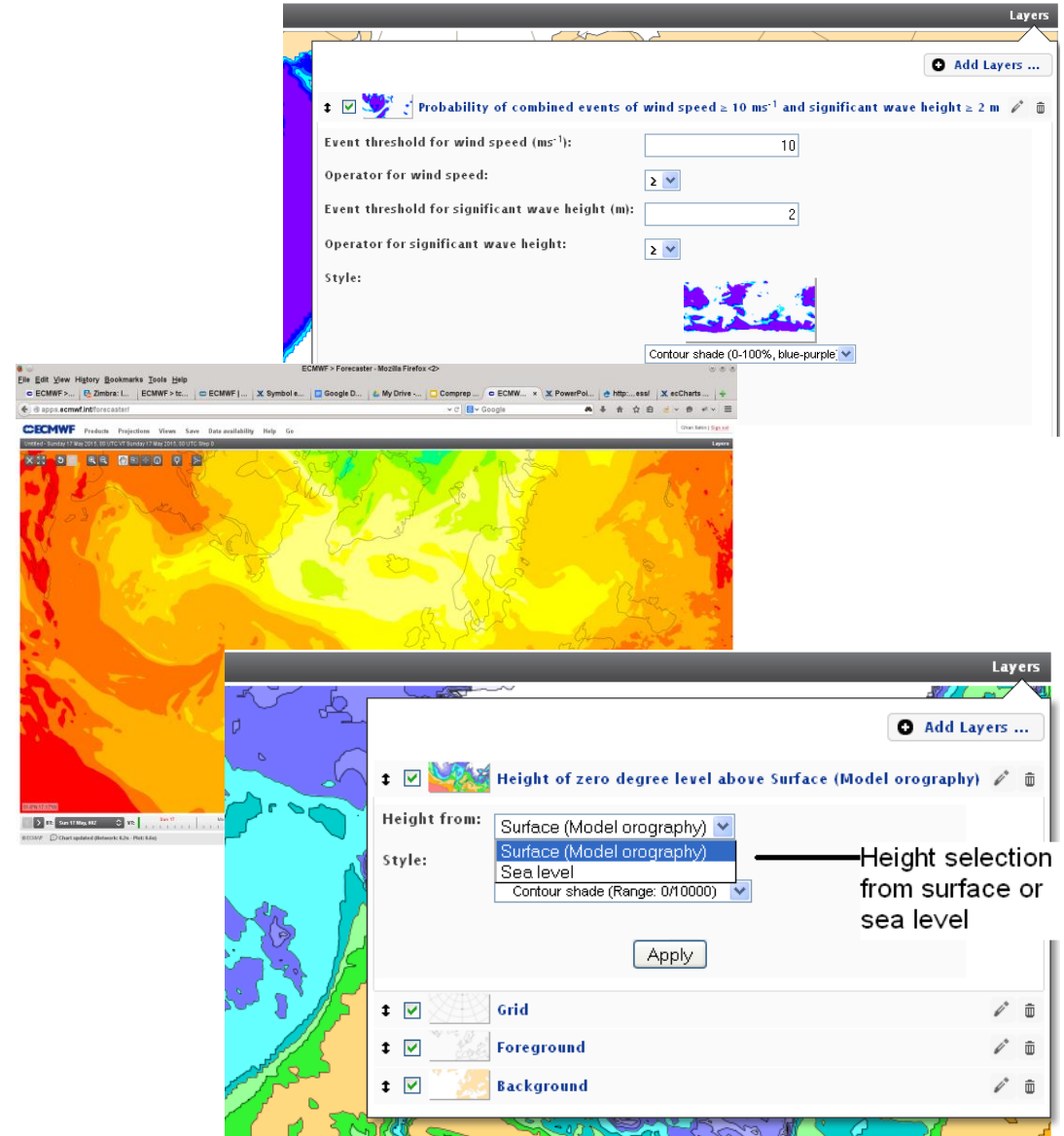
Other ensemble data

- Spaghetti plots
 - All ENS members are shown together with HRES and Control forecast.
 - Isoline/isobar can be customized.
- Derived products
 - ENS mean
 - ENS spread
 - EFIs
 - SOTs
 - Cyclone strike probabilities



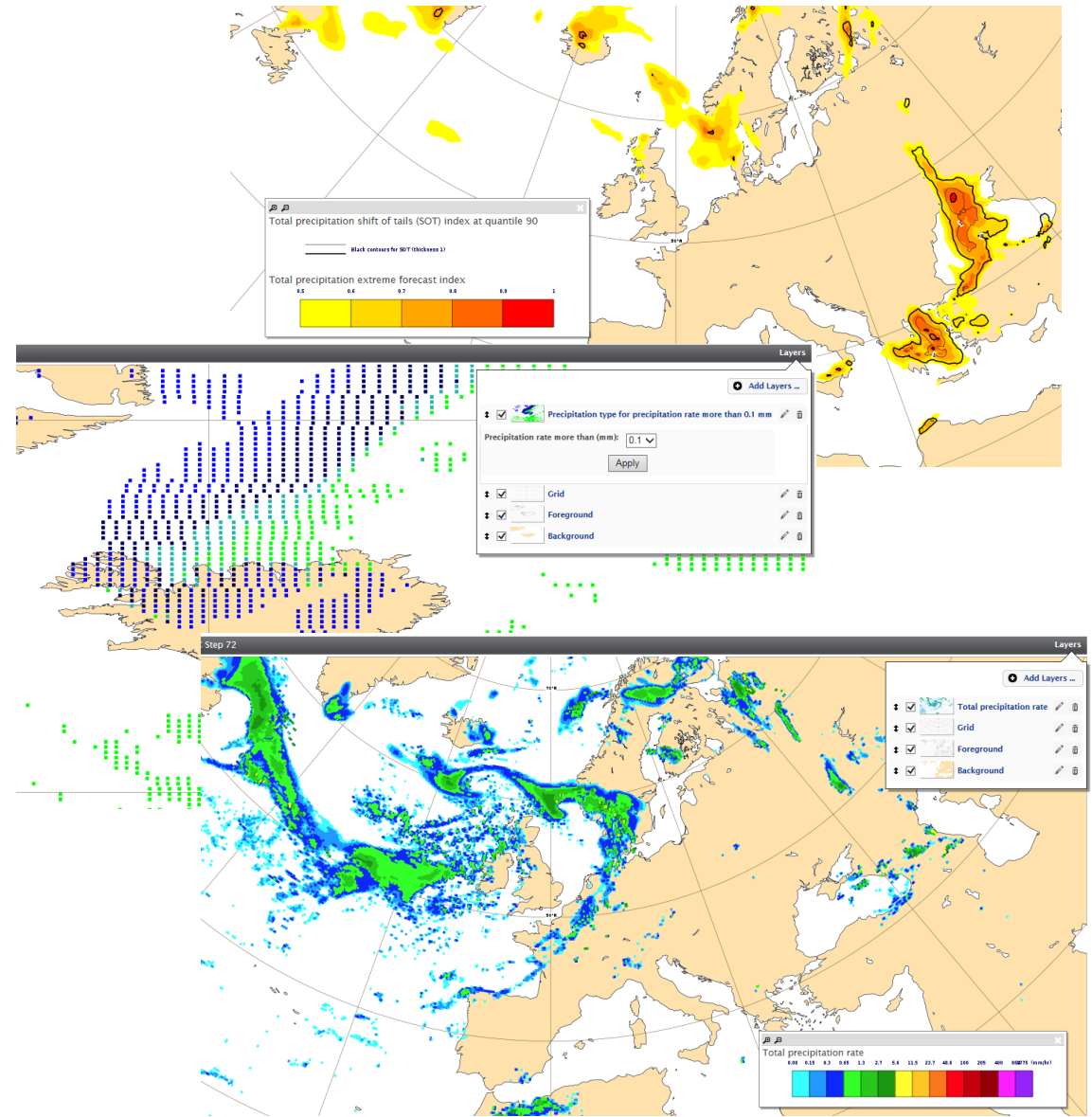
Updates – November 2014

- High resolution forecast (HRES):
 - Total totals index, Height of zero degree level, Specific humidity at 1000 hPa and 925 hPa, Wet bulb potential temperature from 850 hPa , Divergence at 1000 hPa, 925 hPa, 500 hPa and 300 hPa, Geopotential/ wind/ wind speed/temperature/relative humidity at 800 and 600 hPa.
- Ensemble forecast (ENS):
 - EFI for significant wave height, Ensemble mean/spread for 500 hPa temperature,
 - Probability of combined events of 10 metre wind speed and significant wave height



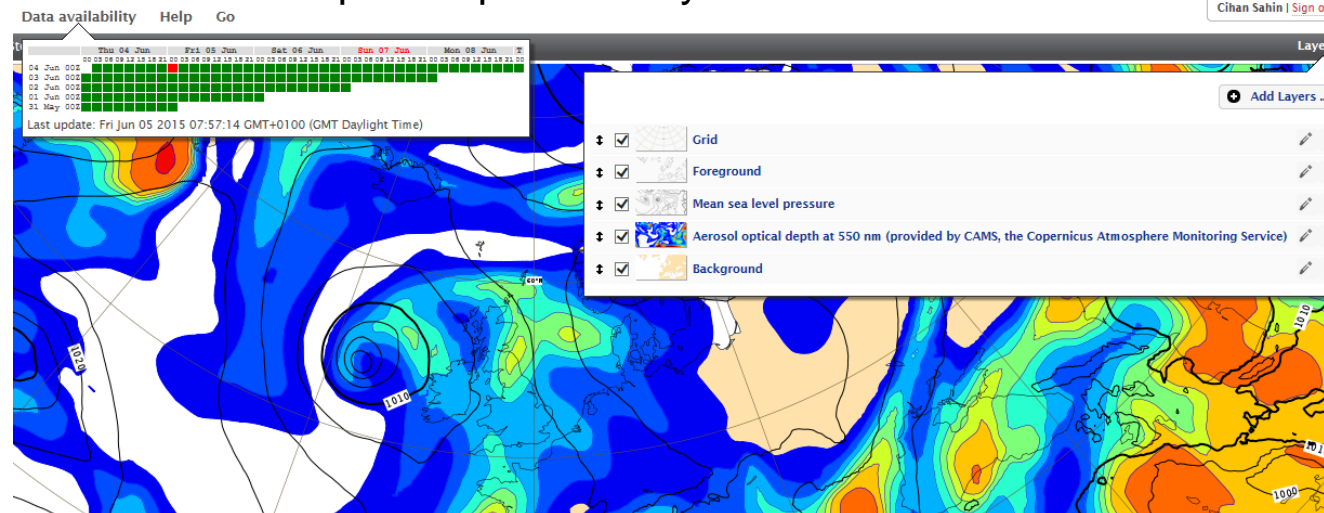
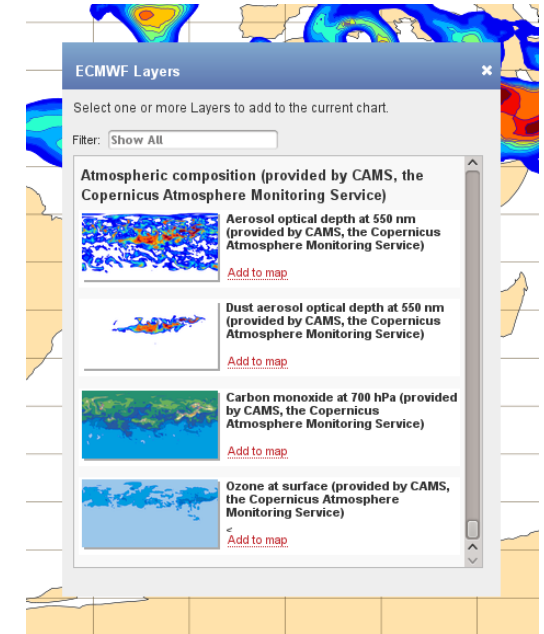
Updates – June 2015

- High resolution forecast (HRES):
 - Bulk wind shear (compute from levels), Bulk wind shear between 925-500 hPa, Precipitation type, total precipitation rate, convective precipitation rate, stratiform precipitation rate, total snowfall rate, 1000 hPa relative humidity
- Ensemble forecast:
 - Shift of tails (SOTs)
 - 2 metre temperature index at quantile 10/90
 - Maximum temperature at 2 metres index at quantile 10/90
 - Minimum temperature at 2 metres index at quantile 10/90
 - 10 metre speed index at quantile 90
 - Total precipitation index at quantile 90, 10 metre wind gust index at quantile 90, Snowfall index at quantile 90,



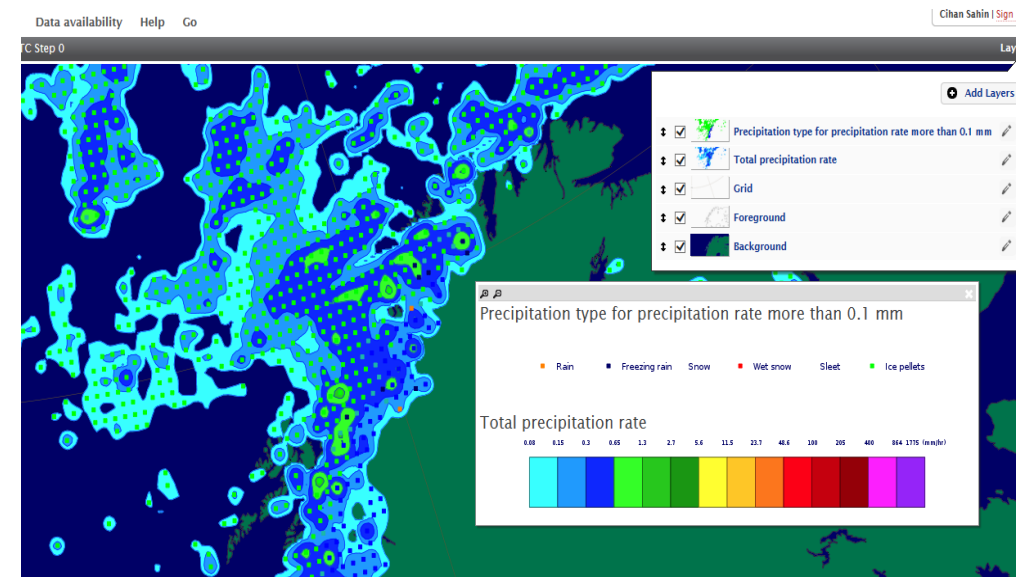
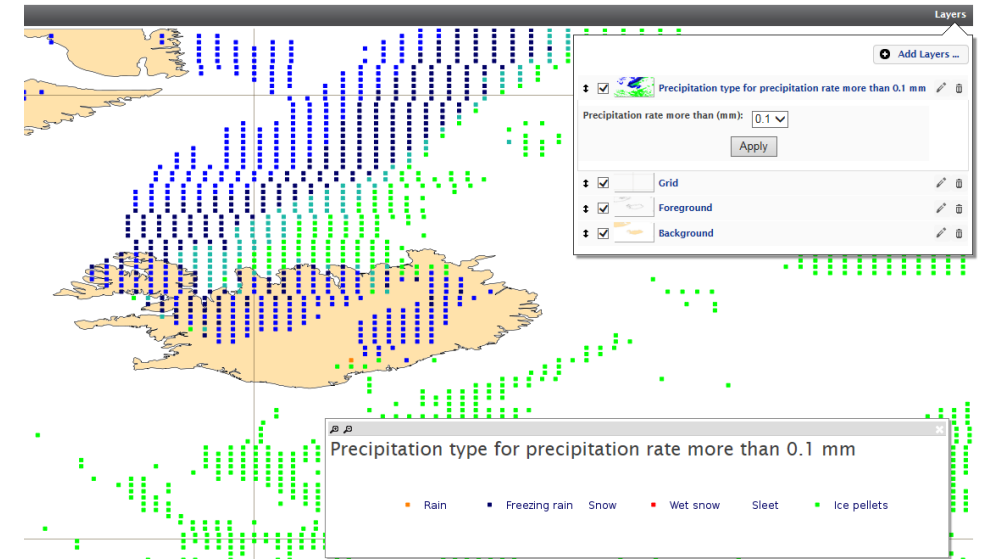
Updates – June 2015

- Atmospheric composition parameters in ecCharts (provided by CAMS, the Copernicus Atmosphere Monitoring Service):
 - Total aerosol optical depth at 550 nm, Dust aerosol optical depth at 550 nm, Carbon monoxide at 700 hPa, Ozone at the surface
- CAMS parameters have the following limitations that ecCharts users should be aware when displaying them;
 - CAMS data from 00UTC run is available around ~20UTC that is nearly 13 hours later than the corresponding high resolution forecast (HRES) data.
 - Only 00UTC run is available up to step 120 every 3 hour.



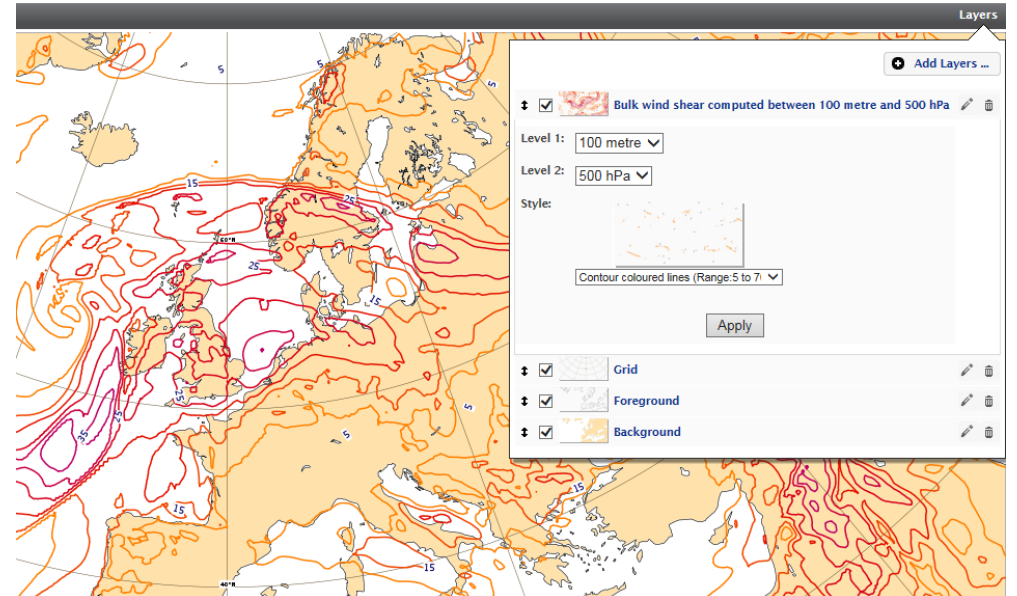
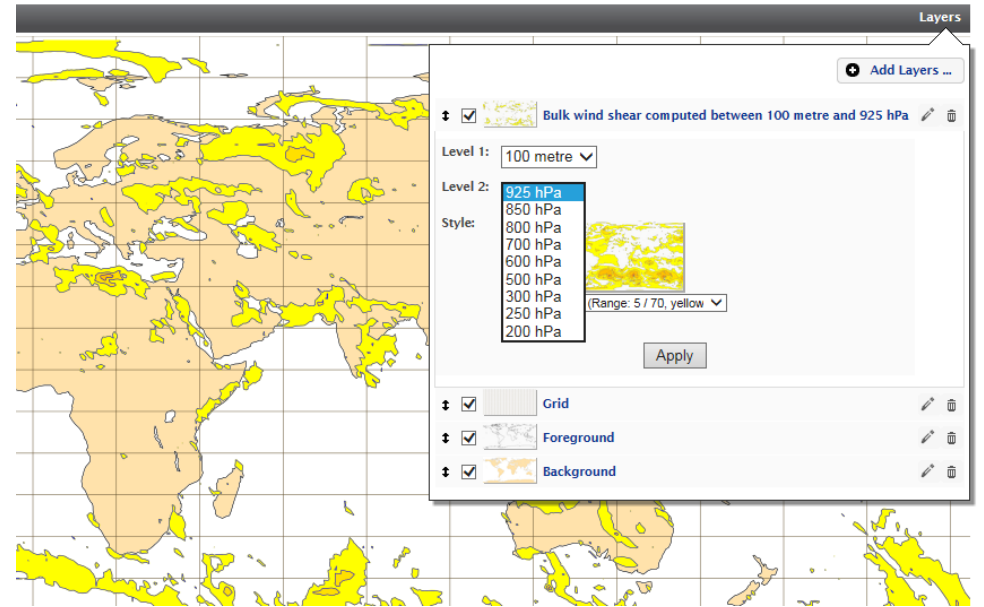
Precipitation type and rates

- New parameters from recently implemented IFS cycle.
- Precipitation type
 - 0 = No precipitation
 - 1 = Rain
 - 3 = Freezing rain
 - 5 = Snow
 - 6 = Wet snow
 - 7 = Mixture of rain and snow (Sleet)
 - 8 = Ice pellets
- Customisable to show types more than a given total precipitation rate
- Limitation: Too costly to generate on Global projection.
- Rates: Total, convective, stratiform, snowfall



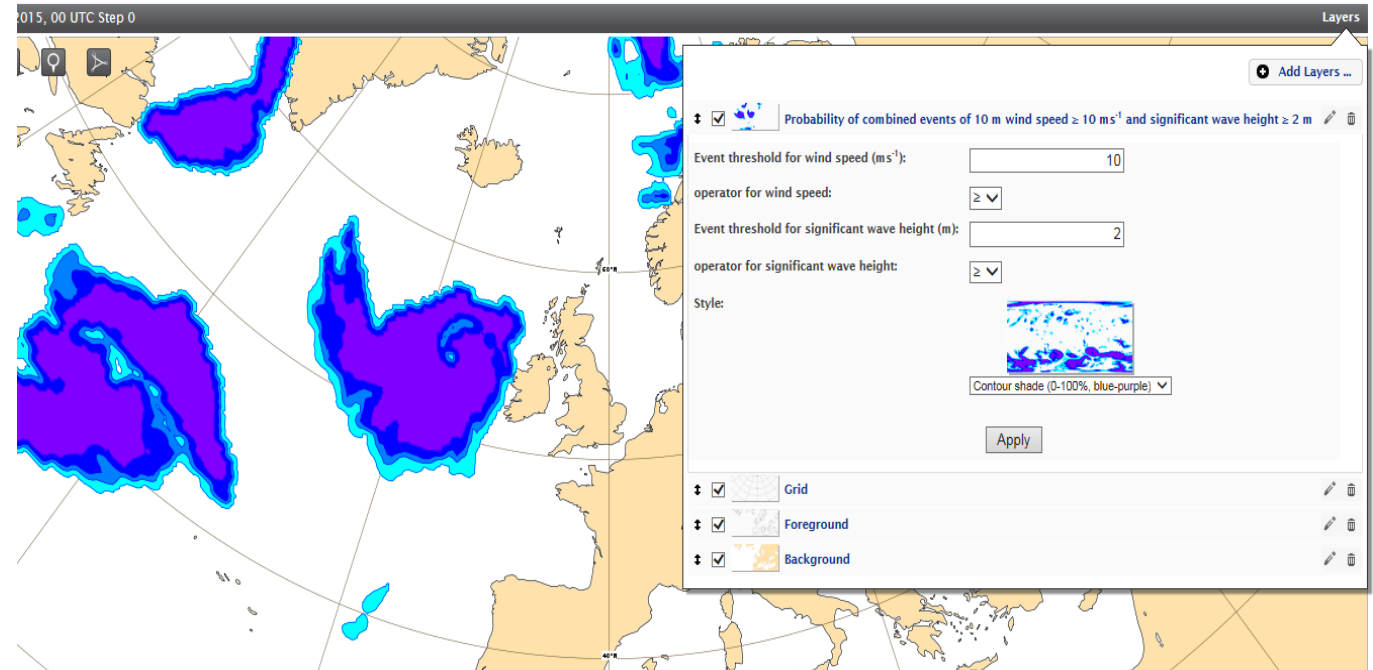
Bulk wind shear

- Bulk wind difference between various pressure levels and 100 m level.
- On demand computation of bulk wind shear between different levels
- Available;
 - 100 metre, 925, 850, 800, 700, 600, 500, 300, 250, 200 hPa



Probability of combined events of 10 m wind speed and significant wave height

- The probability is computed as the ratio of the number of the ensemble members in which both event conditions are met to the total number of ensemble members.
- In case of both parameters, event threshold and operator can be controlled by user.
- Other probability of combined events:
 - Wind gust & total snowfall
 - Wind speed and total precipitation
 - 2m temperature and total precipitation



Update procedure

- Product updates are done twice a year June and November.
- Requests are collected via meetings, requests coming to ECMWF documentation pages, e-mails, Training courses ...
- ecCharts will contain only parameters that are in [The Catalogue of ECMWF Real-Time Products](#)
- Full information available in ecCharts documentation pages.

You can follow the updates here;

<https://software.ecmwf.int/wiki/display/ECCHARTS/Updates>

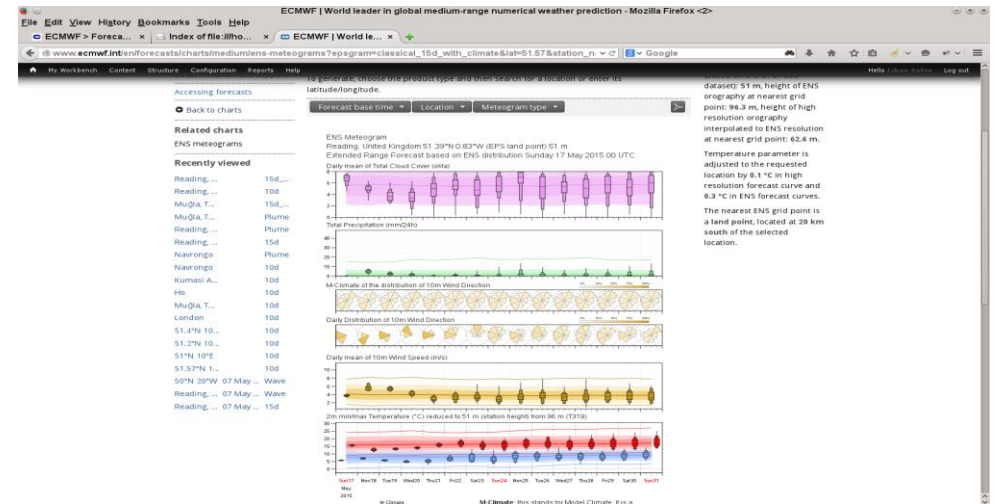
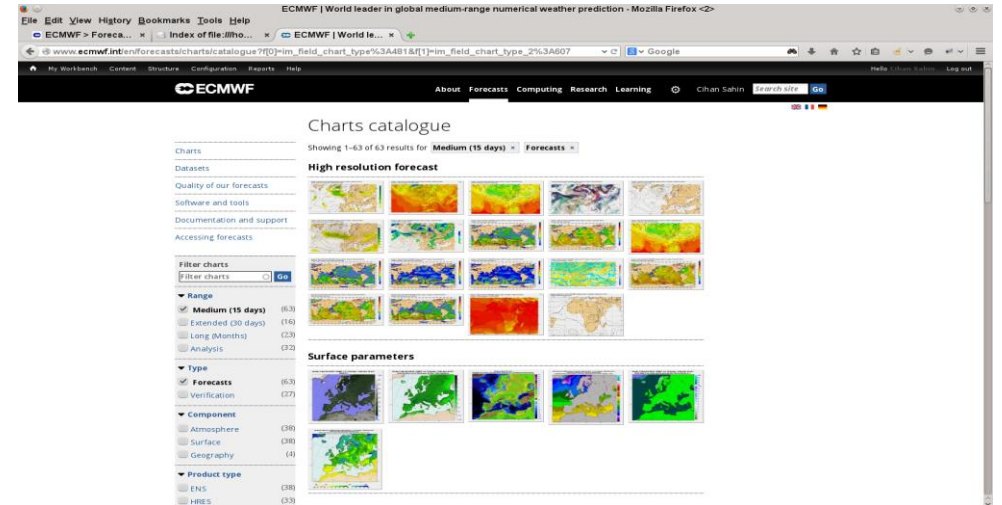
Please contact us if you wish to see additional parameters in ecCharts.

Future plans

- Collect, review and implement user requests
 - ENS probabilities/percentiles of some parameters currently only available from HRES
 - Explore possibility to add visibility
 - Explore possibility of adding Model-climate data.
 - More requests from you ...
- Explore weighted probabilities from HRES and ENS data.
- Offer e-suite data via ecCharts.
- Explore including synoptic features (fronts ...) from extra-tropical cyclone application.
- Review frequency of updates

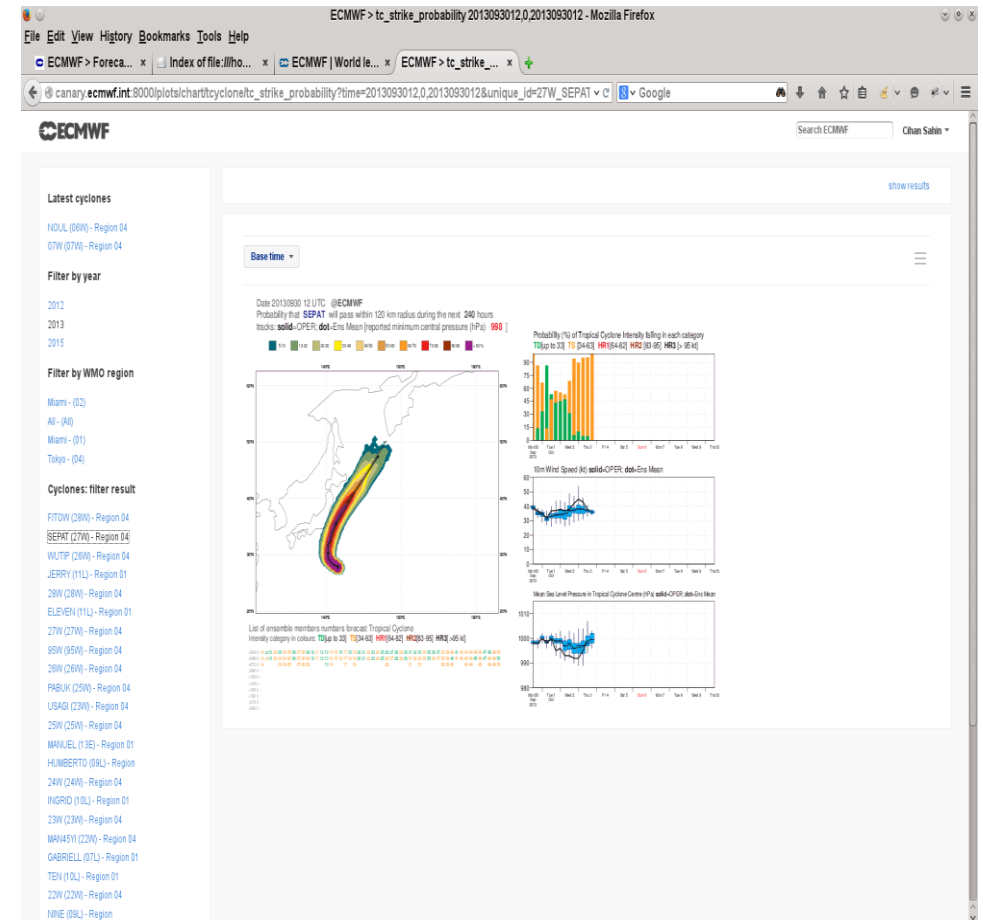
www charts

- Real time static charts from
 - HRES
 - ENS
 - Extended range (weeks)
 - Long range(months)
- ENS Meteograms (10 days/15 days/Plumes/15 days with climate/ Wave grams)
- Verification charts of HRES/ENS/Long range forecasts



www Charts - update

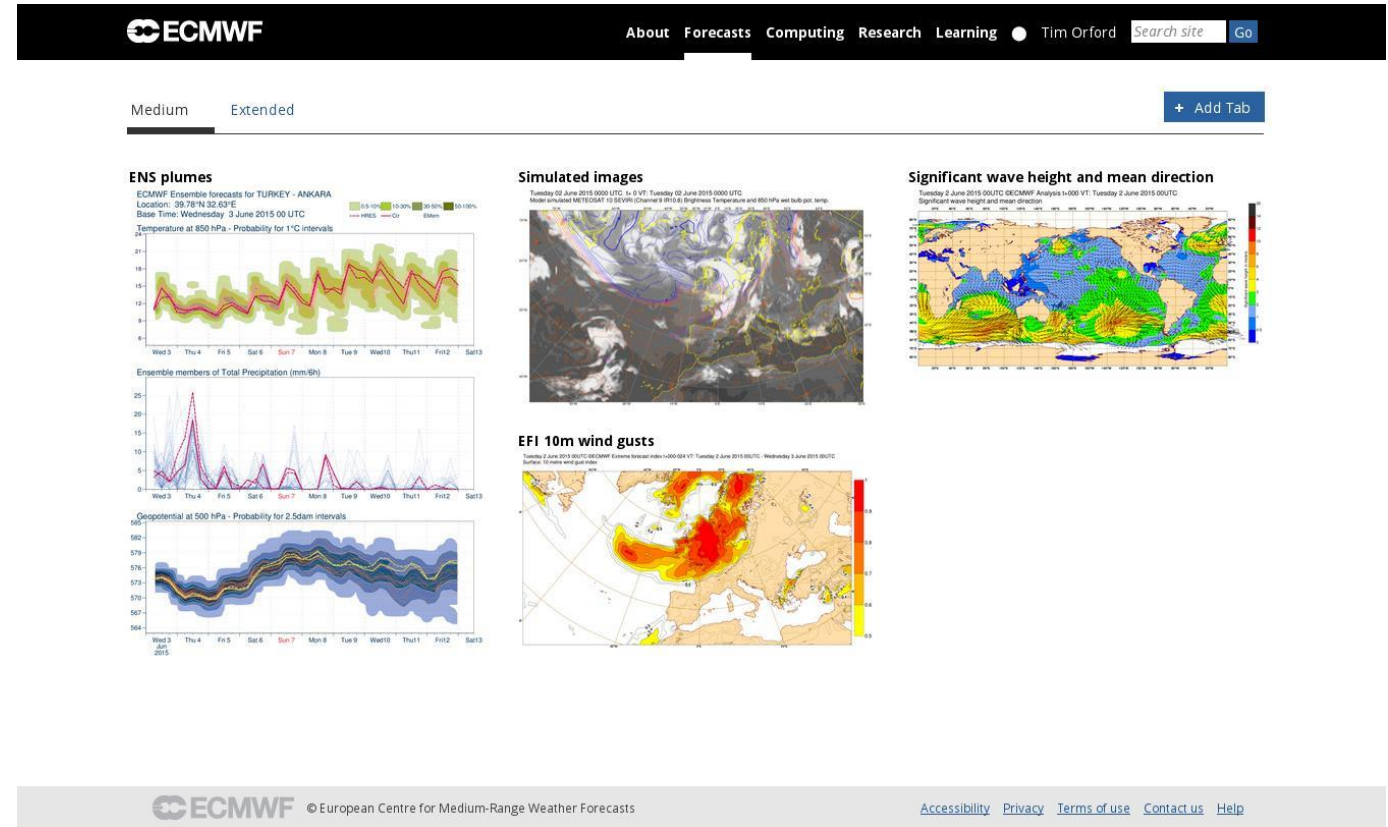
- Development in place for an improved processing system for static charts and corresponding user interfaces.
- Migration of content from old to new web site by using the new processing system
 - Tropical cyclones
 - Observation monitoring system
 - Charts for special projects
 - Verification of extended range
 - Extra tropical cyclone application
- Migration of all charts from old web site to be completed before December deadline.



www / Dashboard (Your room)

The Dashboard is a place to organise regularly used charts and diagrams (Replacement of your room on the old web site)

- Build on ecCharts dashboard.
- Users of ecCharts can display ecCharts and static charts in one user interface.
- User interface work in progress.
- First version to be made available after completion of charts migration to the new web site.



Future plans

- Completion of charts processing and migration
- Production of some static charts from ecCharts system
- Introducing interactive charts (similar to Clickable EFI) that shows a set of meteograms for a selected position.
- A batch interface (API) to download static charts
- Improving ENS meteograms interface
 - Click and select meteograms from various charts
 - Offer e-suite ENS meteograms

Thanks & Questions ?

Weather wall is powered by ecCharts and www static charts. Please go and explore.

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ecCharts

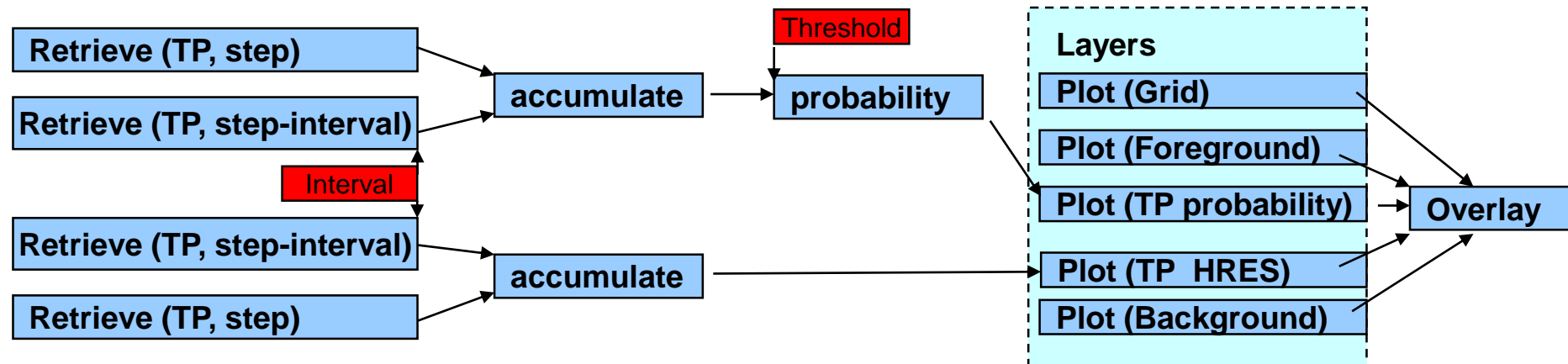
<http://eccharts.ecmwf.int/forecaster/>

Documentation

<https://software.ecmwf.int/wiki/display/ECCHARTS/Home>

Customisation – behind the curtains

Total precipitation from HRES and Total precipitation probability > 5 mm/6hr



Ensemble data

- ENS probabilities and percentiles (Customisable)
- ENS probabilities of combined events ie:
wind speed > 10 m/s AND significant wave height > 5 m (Customisable)
- ENS meteograms : location based ENS distributions
- Spaghetti plots Z500, T850, MSLP (Customisable)
- Extreme forecast index (EFI), Shift of tails (SOT)
- Tropical cyclone strike probabilities
- Ensemble mean and spread

