ecCharts

Introducing ECMWF's web charts application

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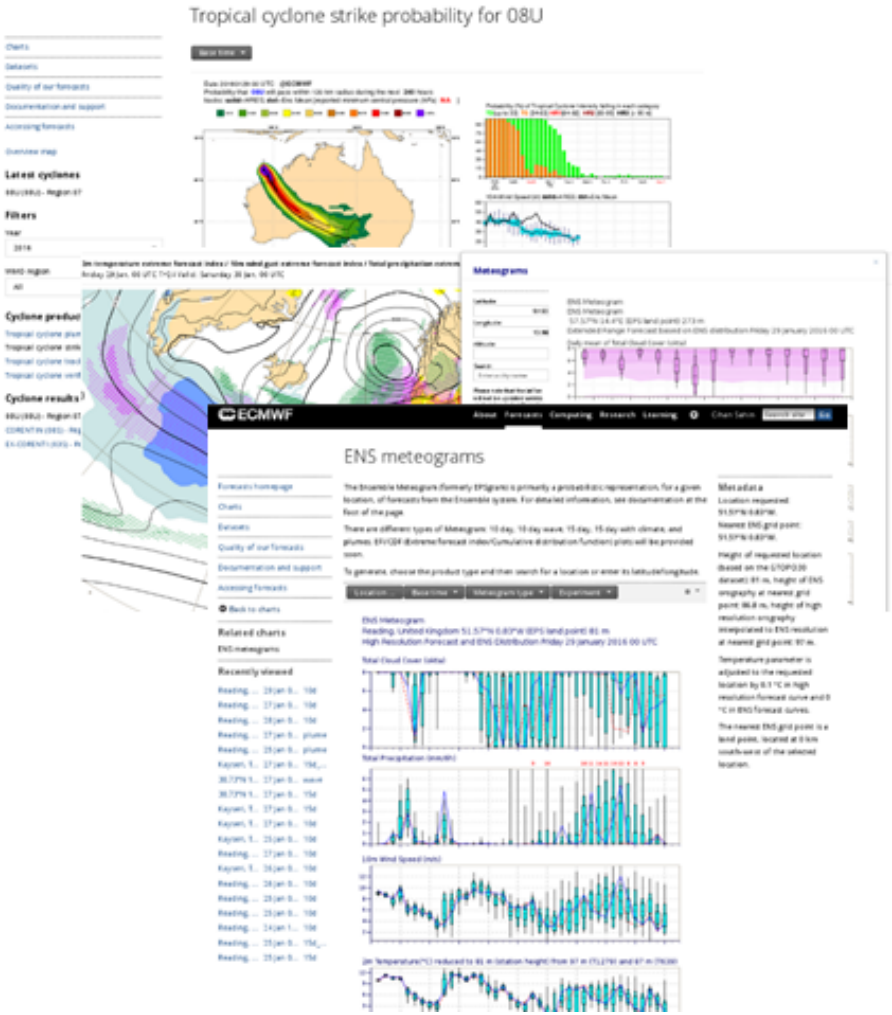
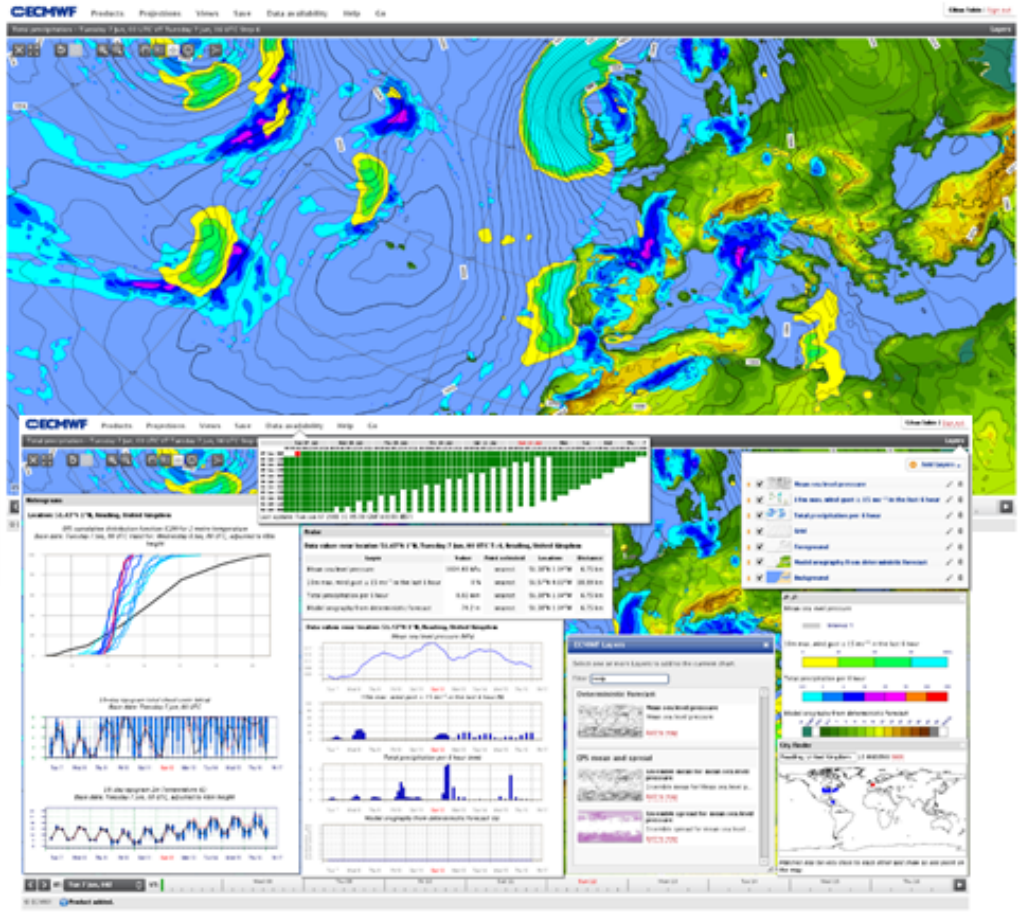
ECMWF

ECMWF graphical products

Charts on www



ecCharts



WWW Charts

- High resolution (HRES) forecast charts (Updated at 06:55 and 18:55)
- Ensemble prediction system (ENS) charts up to 10 days (Updated at 8:20 and 20:20)
- Ensemble prediction system (ENS) charts 10-15 days (Updated at 8:40 and 20:40)
- Position generated time series from Ensemble, so called ENS meteograms.
- Monthly forecast charts (Every Thursday and Monday)
- Seasonal forecast charts (once a month)
- Observation monitoring charts (Daily, monthly …)
- Research charts (Model climate based on different IFS cycles, Ocean reanalysis)

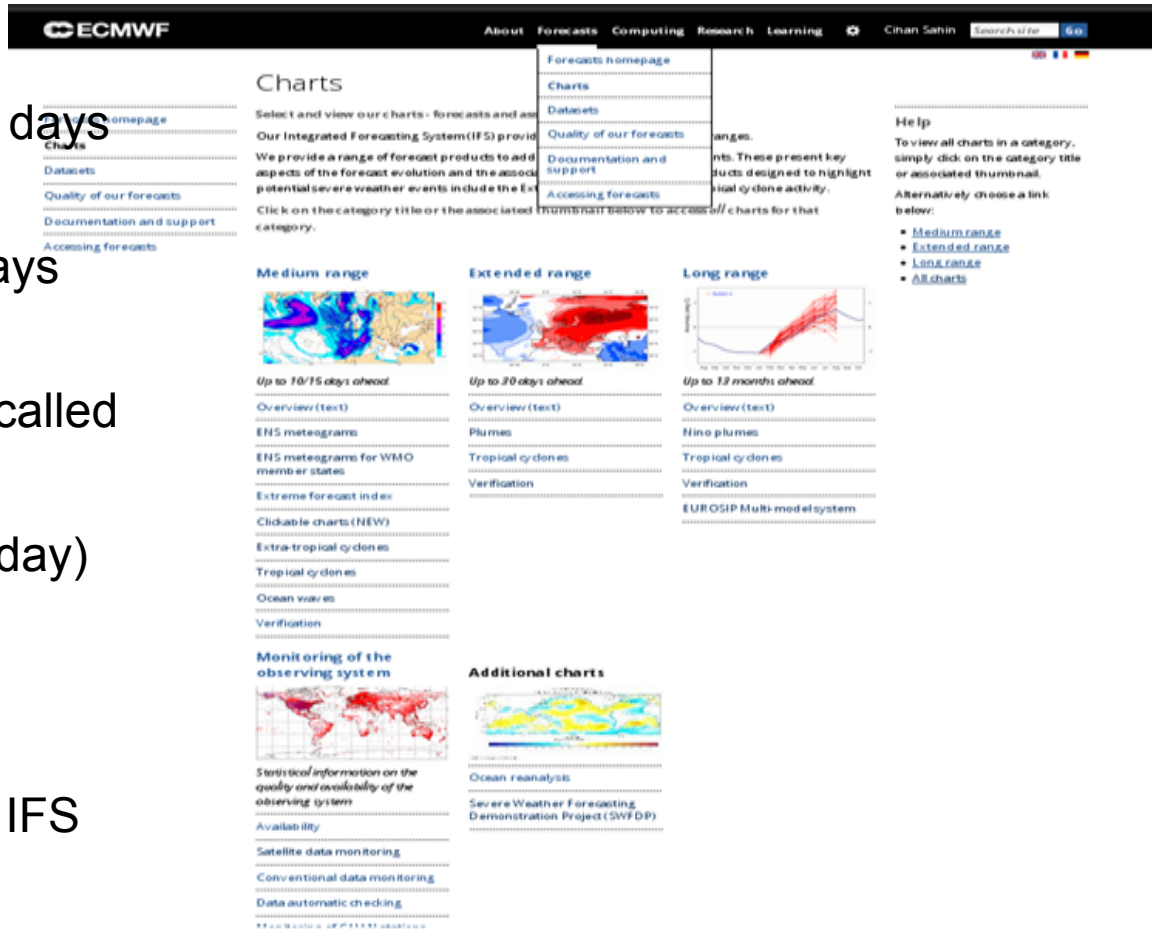
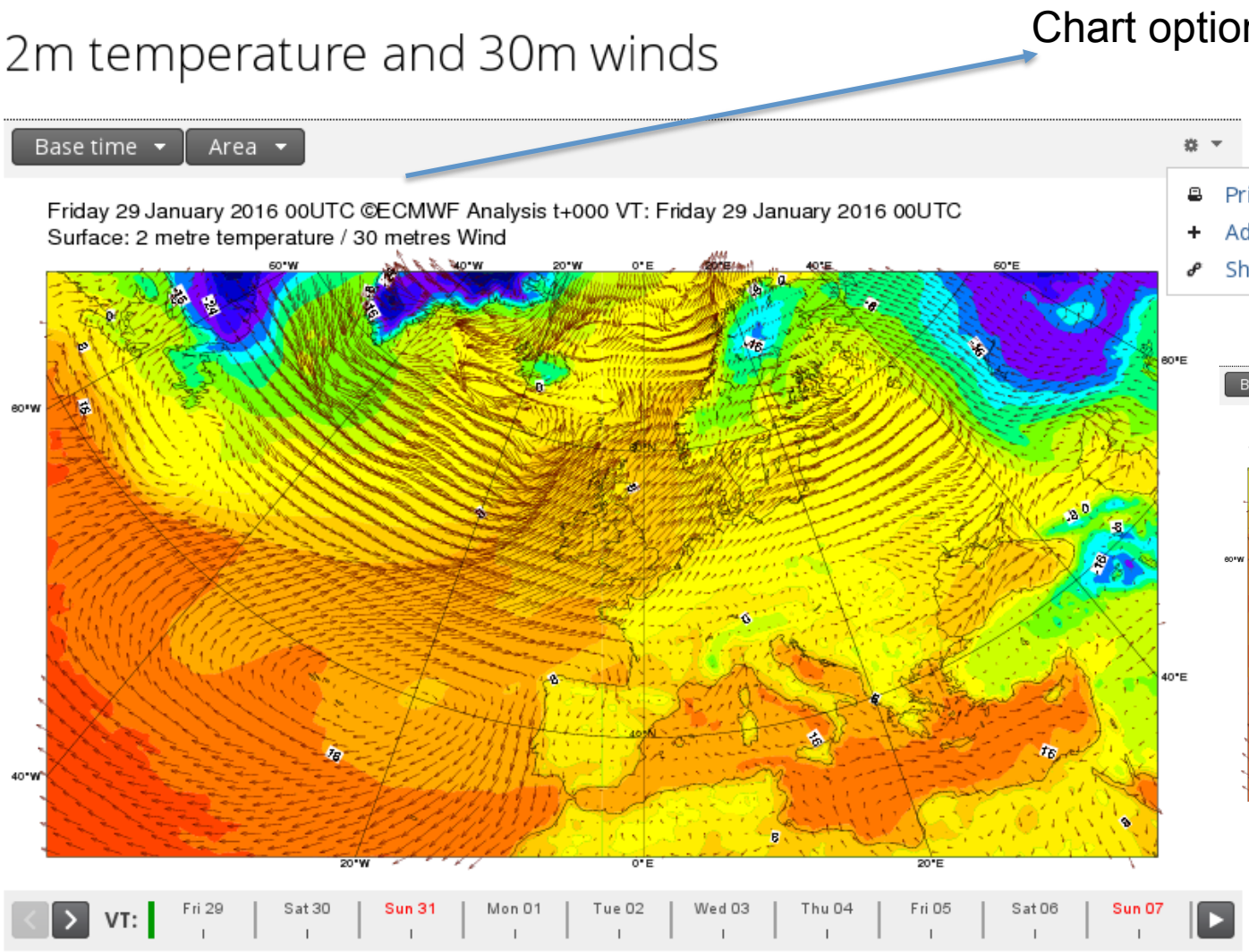


Chart functionalities



Clickable charts

- New generation of charts that produce Meteograms when clicked

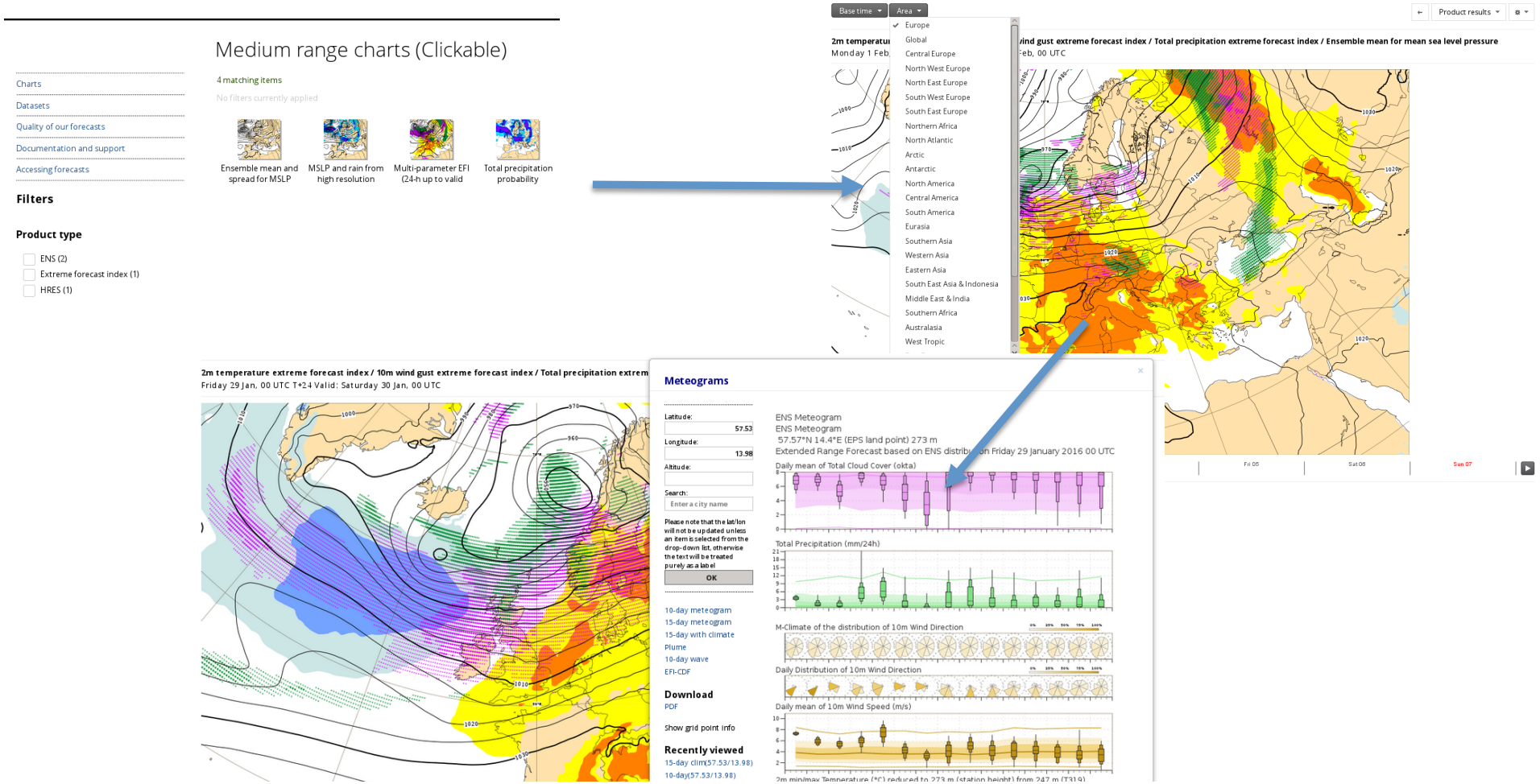
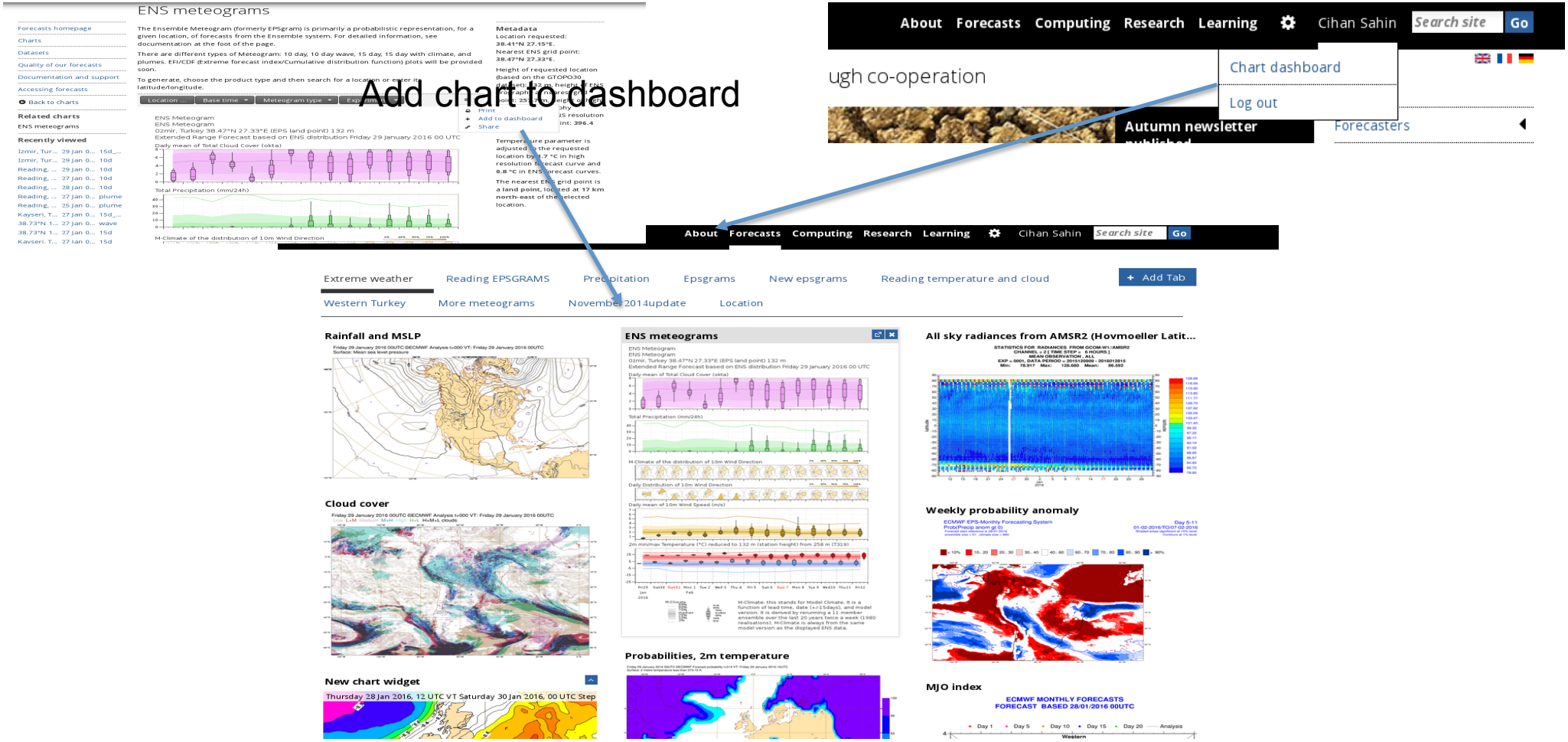


Chart dashboard

Organise multiple charts and meteograms in the same “page”.

Access to chart dashboard



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

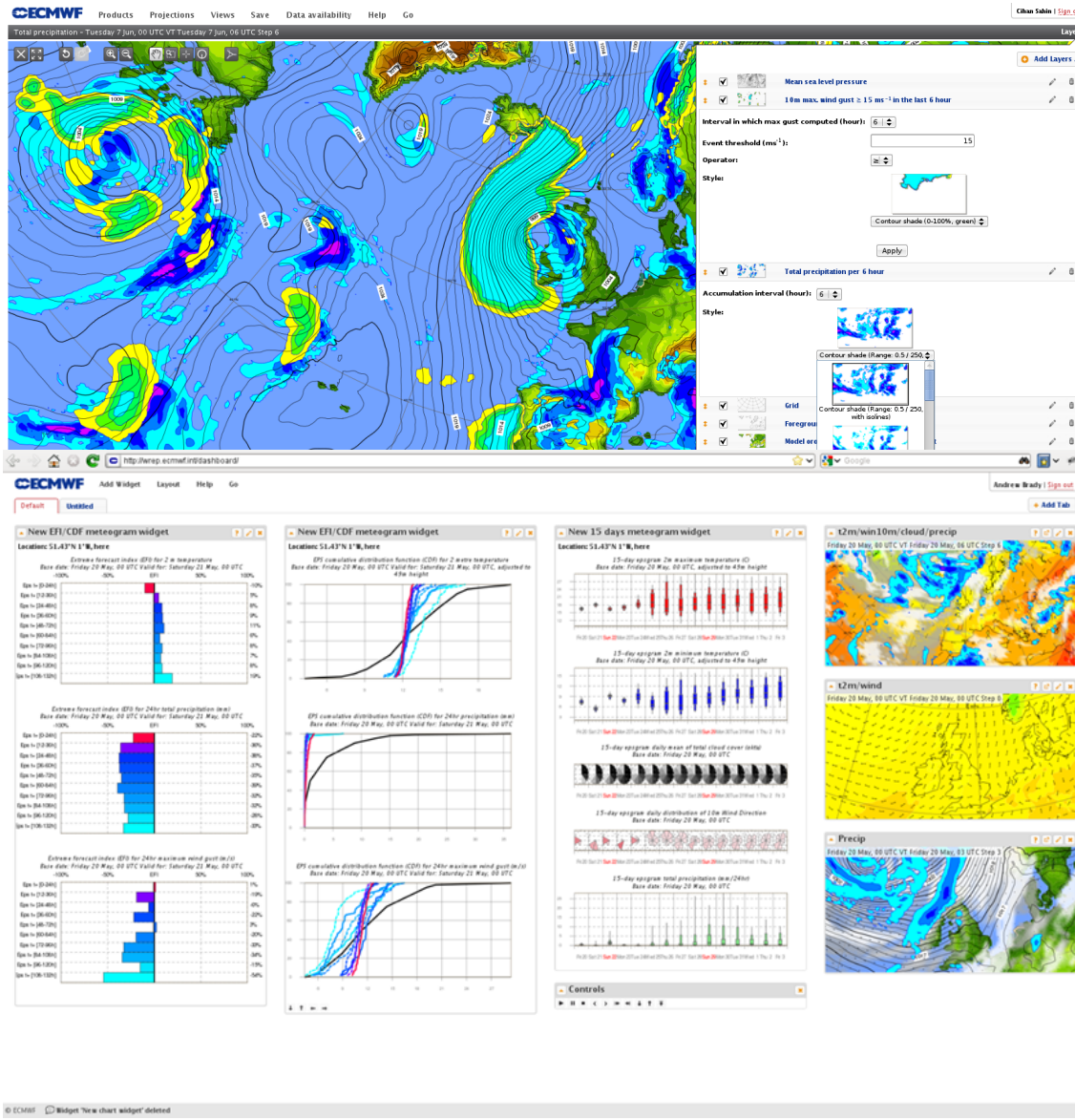
ecCharts

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, …)
- User controlled visualization
- Customisable parameters
- Download charts (through WMS)
- Operationally supported, highly available service

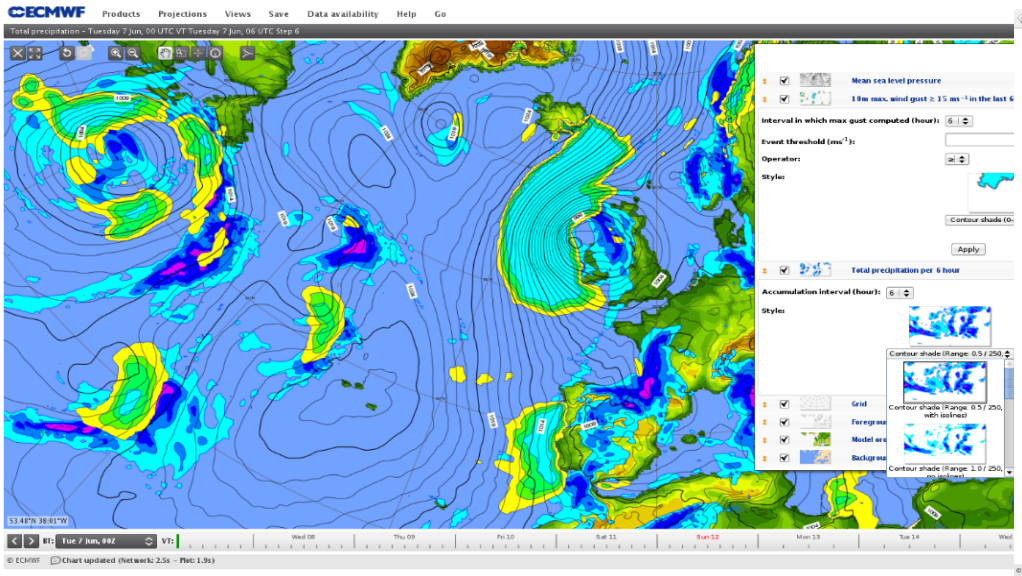
URL

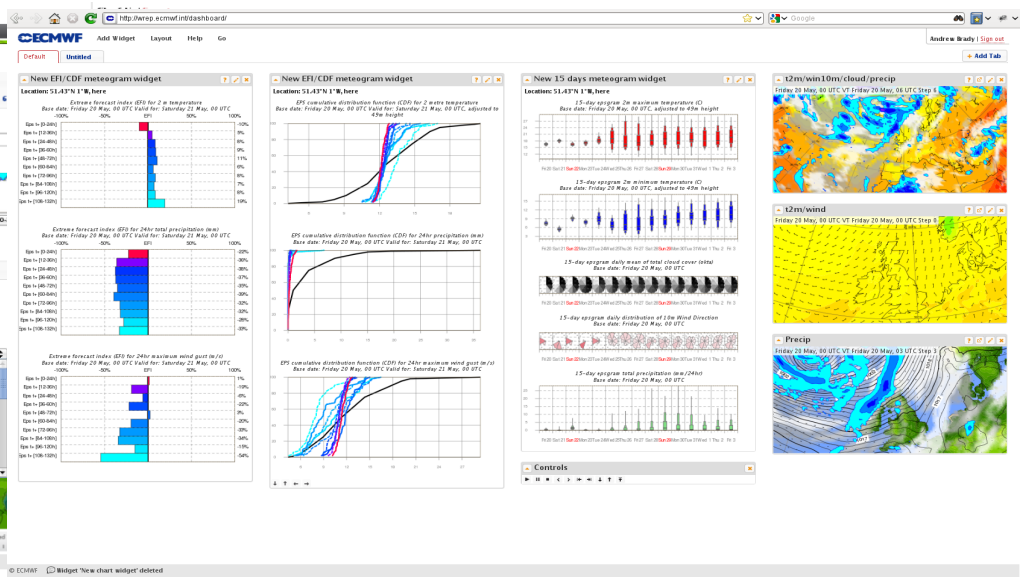
eccharts.ecmwf.int/forecaster/



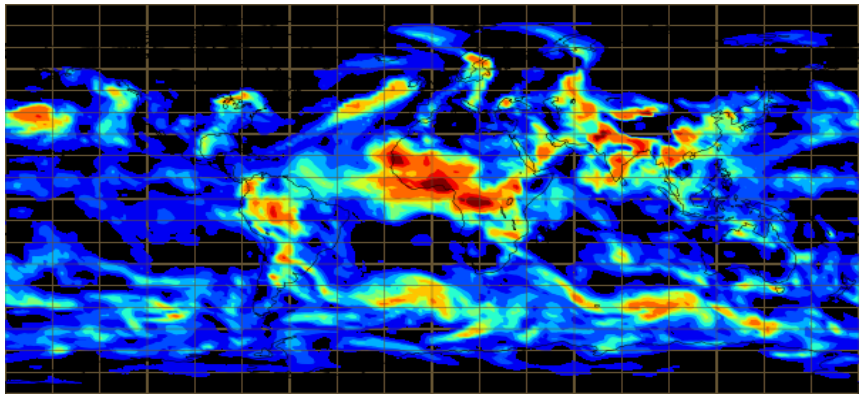
ecCharts user interfaces

Forecaster / Dashboard / WMS

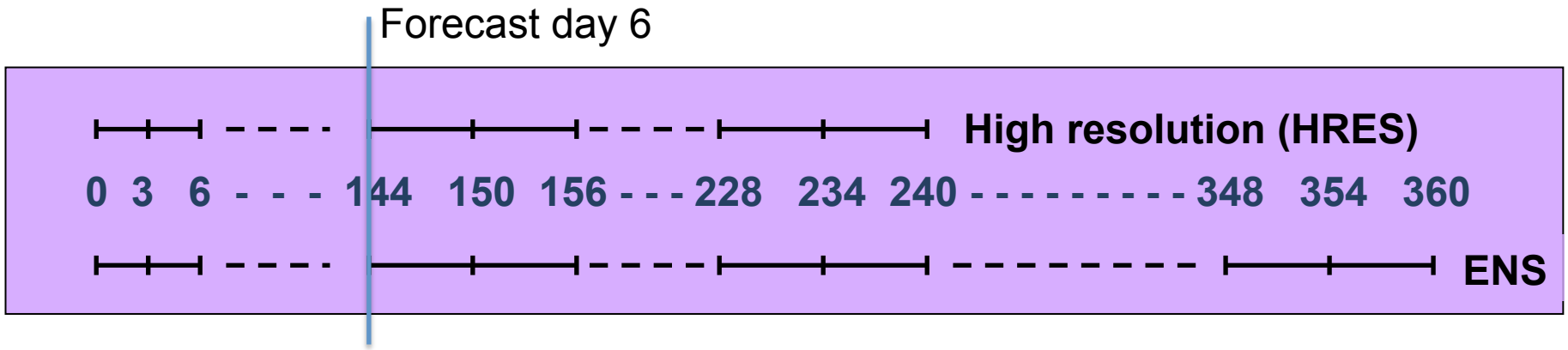




https://apps.ecmwf.int/wms/?token=public&request=GetMap&layers=composition_aod550,grid,foreground&width=600&bbox=-180,-90,180,90



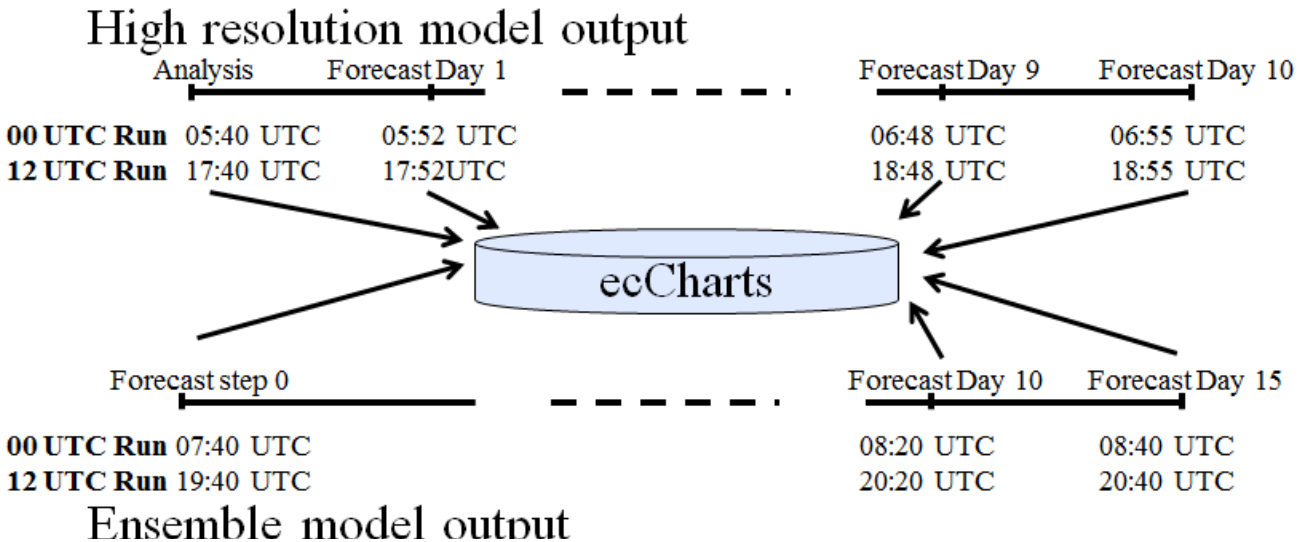
Data in ecCharts

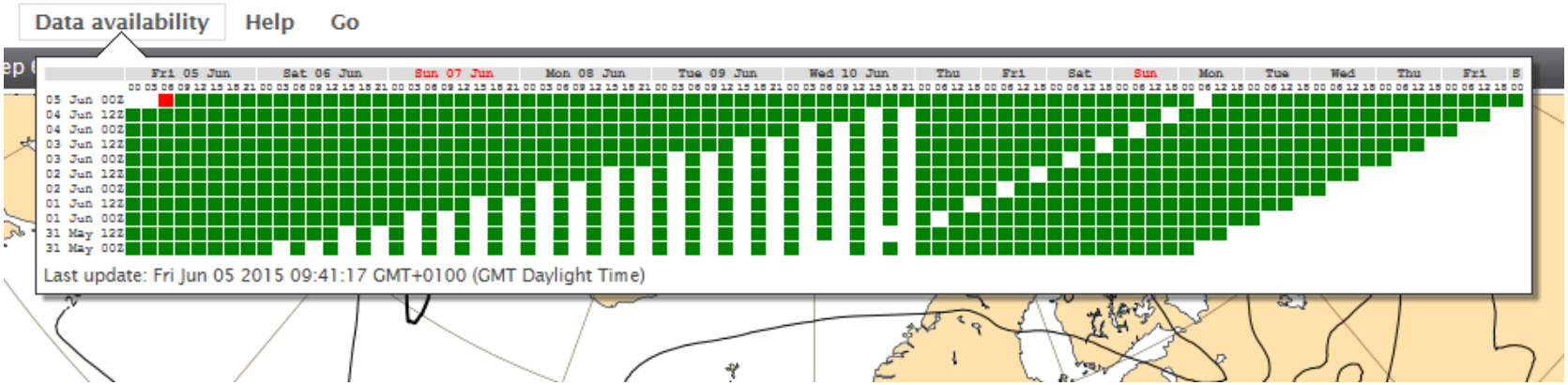


- High resolution and Ensemble model output (atmospheric & wave parameters)
- Point extracted data (for a given latitude/longitude)
  - Time series from all available parameters
  - ENS meteograms for a selected parameter set
- Ensemble derived data
  - Probabilities, percentiles,EFI/SOTs, Ensemble mean and spread …

Data availability

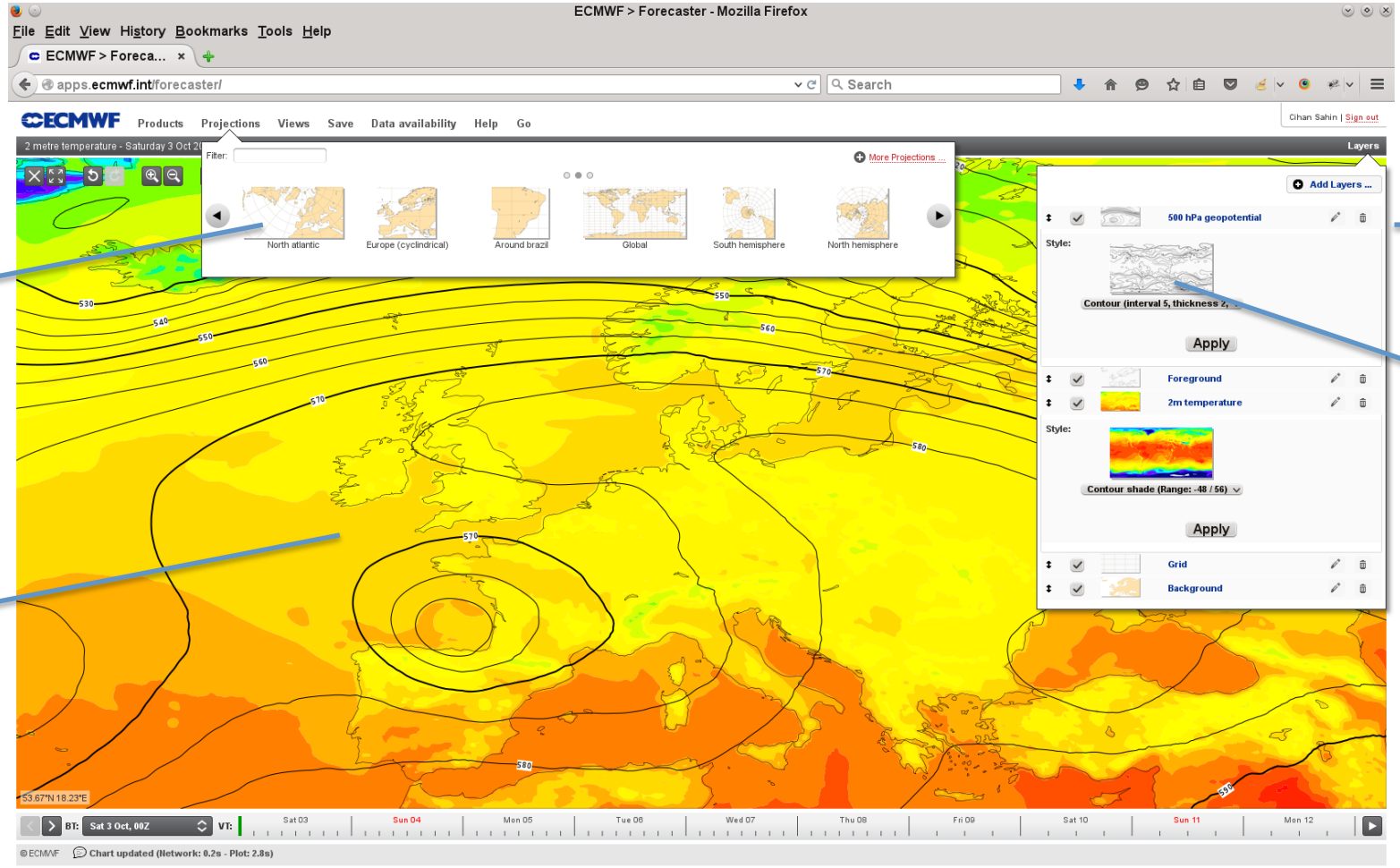
- Data made available based on dissemination schedule.
- Once data is available, all charts are generated dynamically on demand.





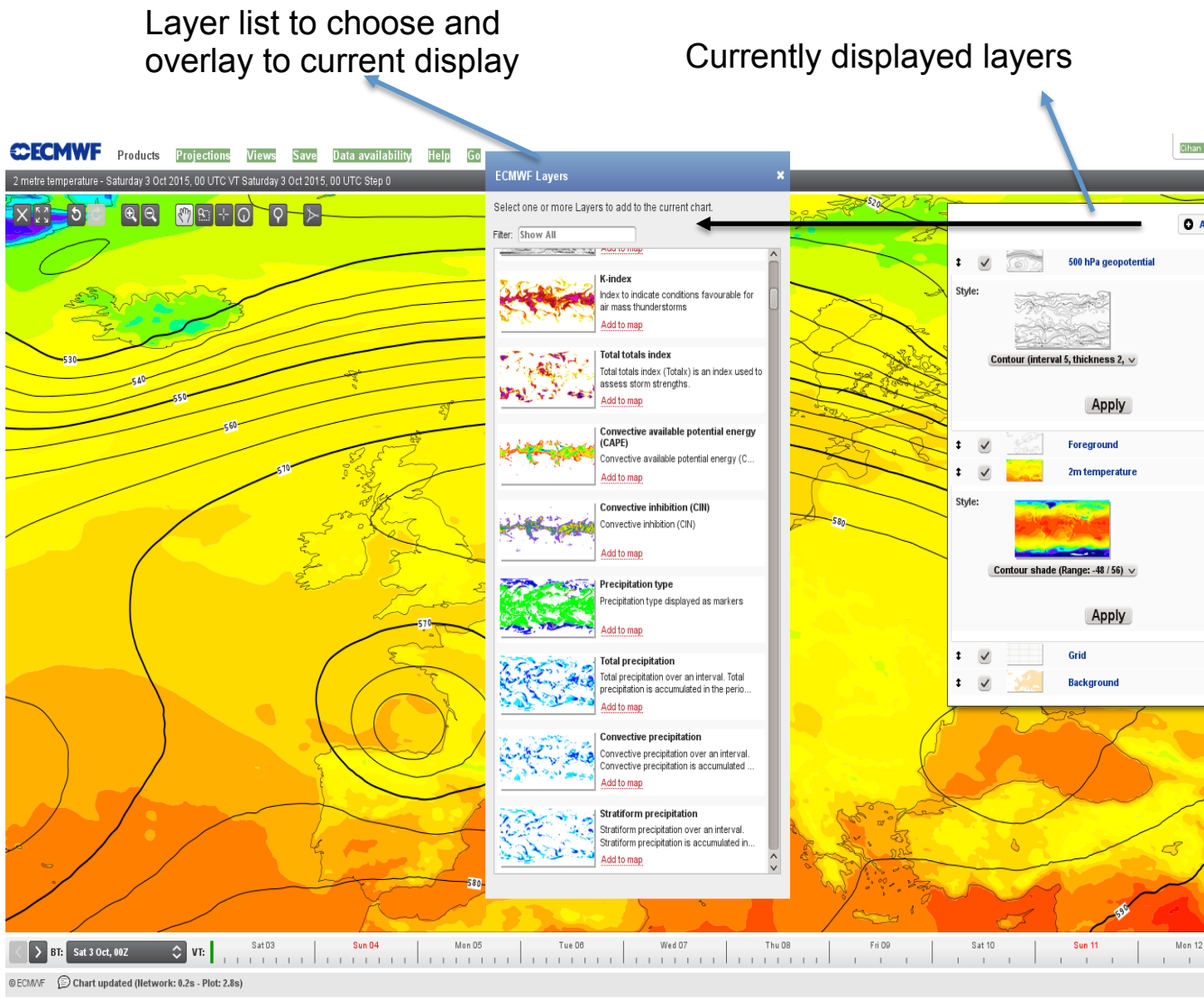
Basic ecCharts concepts

- Basic components to build a plot : Style, Layer, Projection
- What you have on your screen is combination of those components and is called a Product



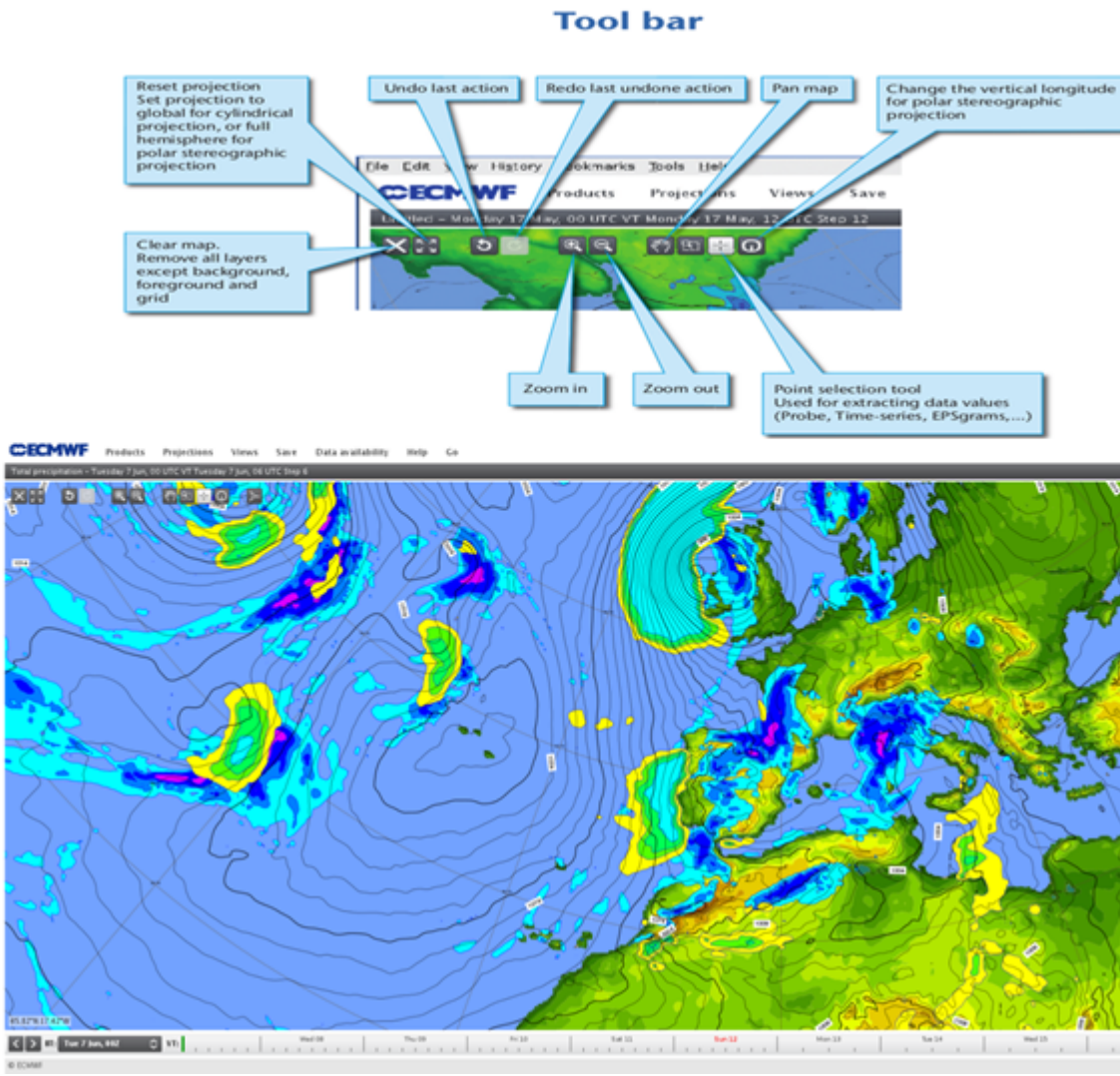
More on layers and products

- Layers are basic visual elements (meteorological parameters, result of complex computations, coastlines …)
- Overlay-able
- Customisable (ie. Accumulation period for total precipitation, Event threshold and event operator for probability layers, Interval in which maximum wind gust computed …)
- Can be re-ordered
- Final display is “Product”. Can be saved for re-use.
- A small set of pre-defined Products are available. But idea is that user creates products as they wish.



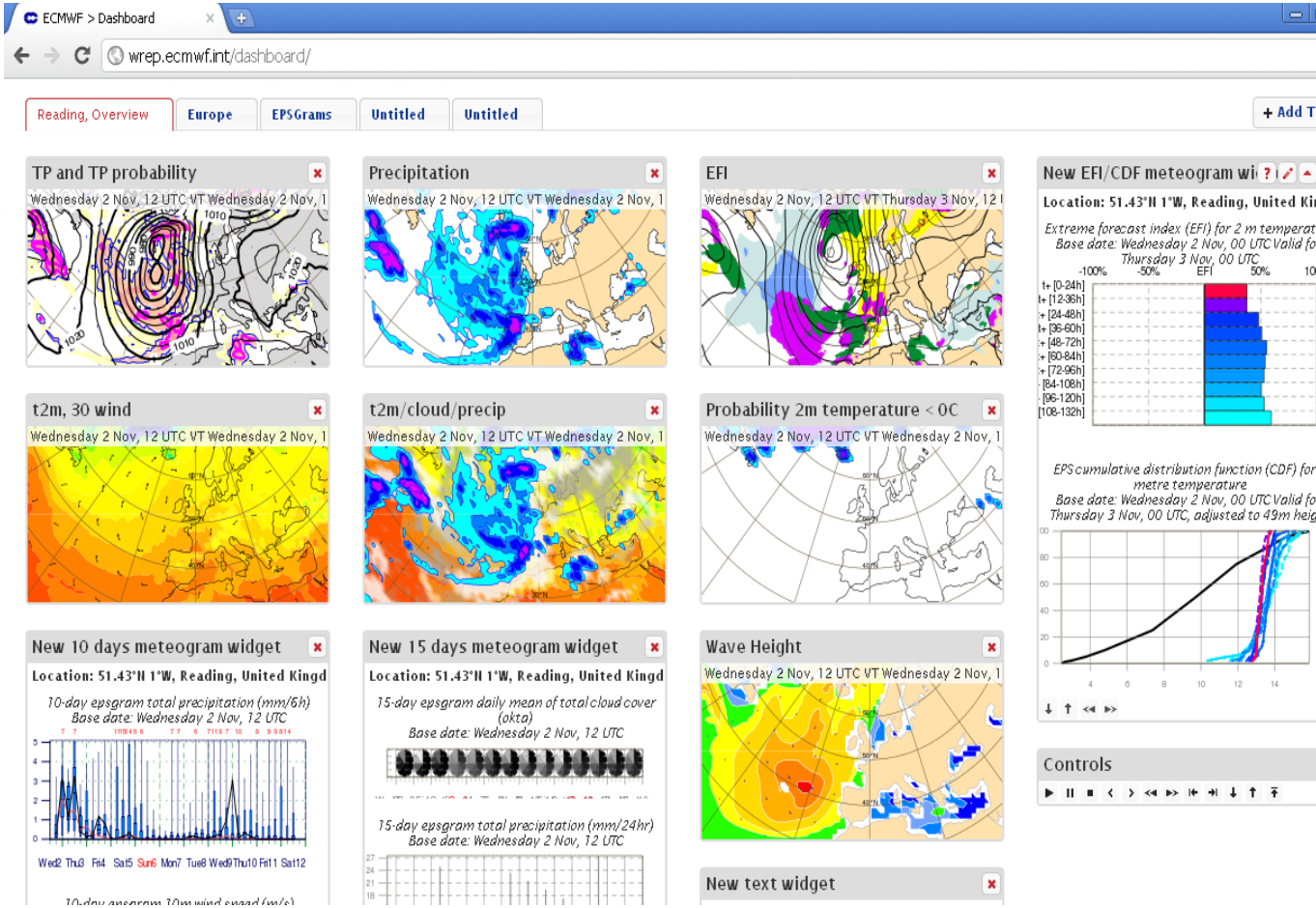
User interfaces – Forecaster tool

- Zoom, pan, undo, redo a plot
- Plot area maximised
- Work and create a product and save as your own.
- Data fields are global.
- Charts are clickable to extract information
- Overlay any combination of parameters (currently around 200) from HRES and ENS.
- Design and save as your “own” product to re-use.
- Control projection
- Control time (Animation, steps, base time …)



User interfaces - Dashboard

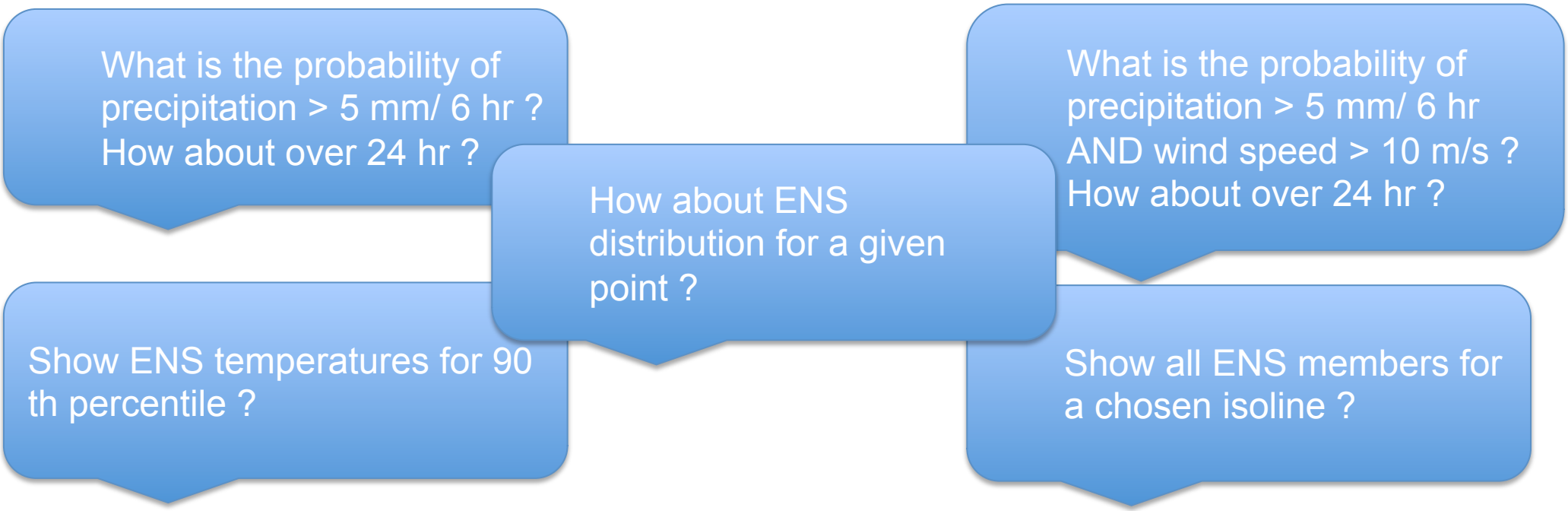
- Organise multiple charts and meteograms in the same “page”. Basic elements are called widgets.
  - A chart widget is used to display a product either from ECMWF pre-defined set or your saved products.
  - ENS meteograms widgets (10 days, 15 days, EFI/CDF)
  - Control widget to apply collective actions for the charts on the same page ie. All charts in a tab animate simultaneously.
- User can create many tabs each containing many widgets.



More on Ensemble data

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

Ensemble data = 50 perturbed forecasts (lower resolution) + Control forecast (No perturbation)



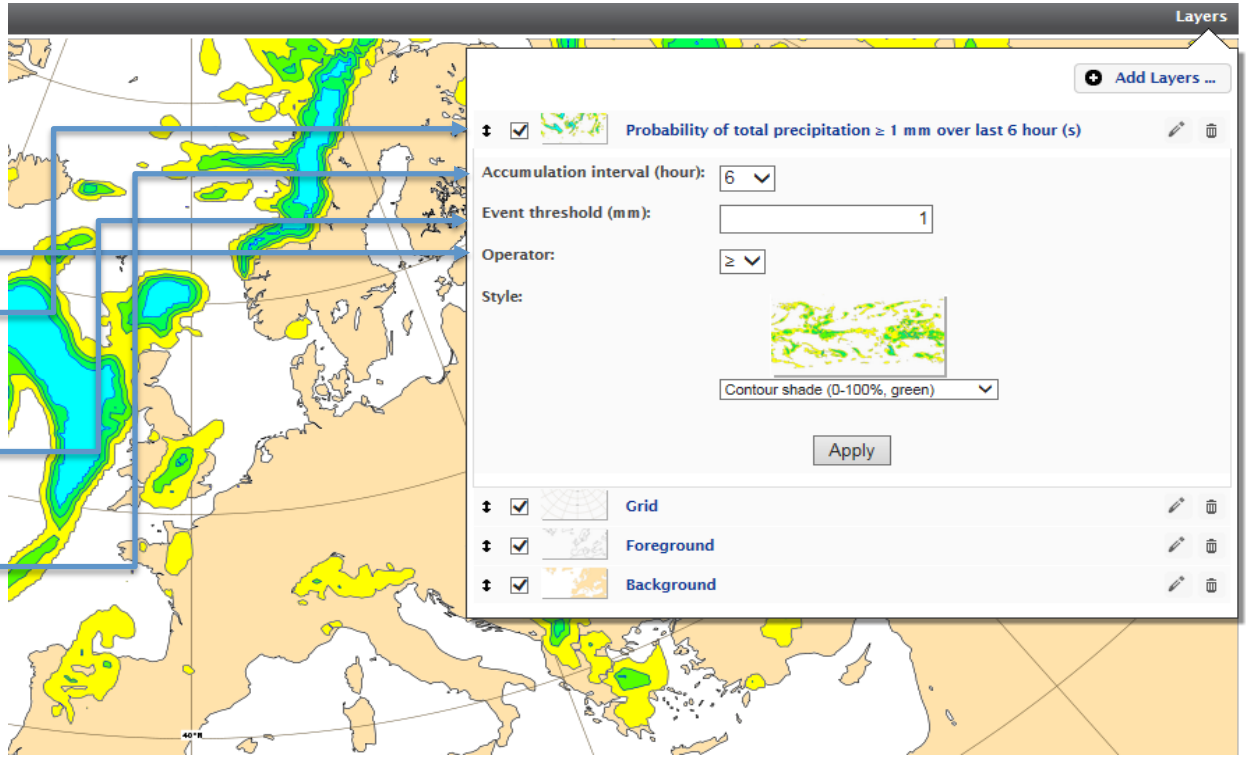
Customising charts is the key functionality to explore Ensemble data in detail.

- Charts need to be generated dynamically from raw data.

Probabilities

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

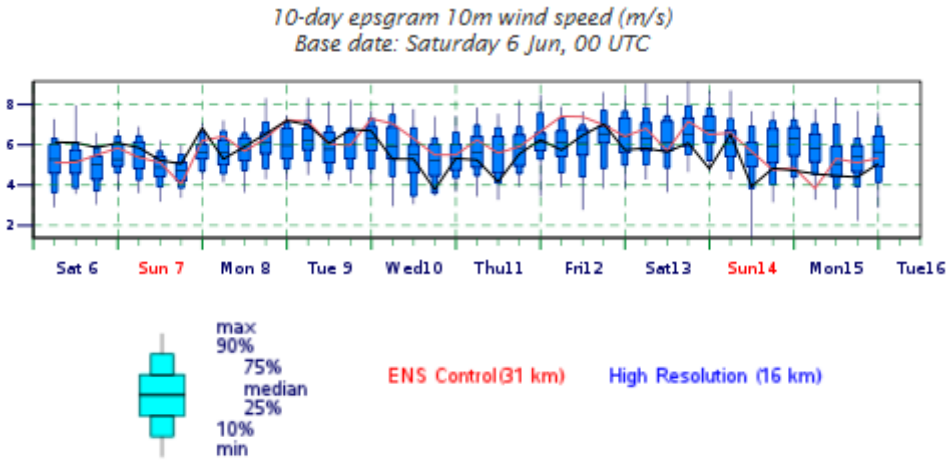
What is the probability of precipitation
>
5 mm/ 6 hr ?
How about over 24 hr ?

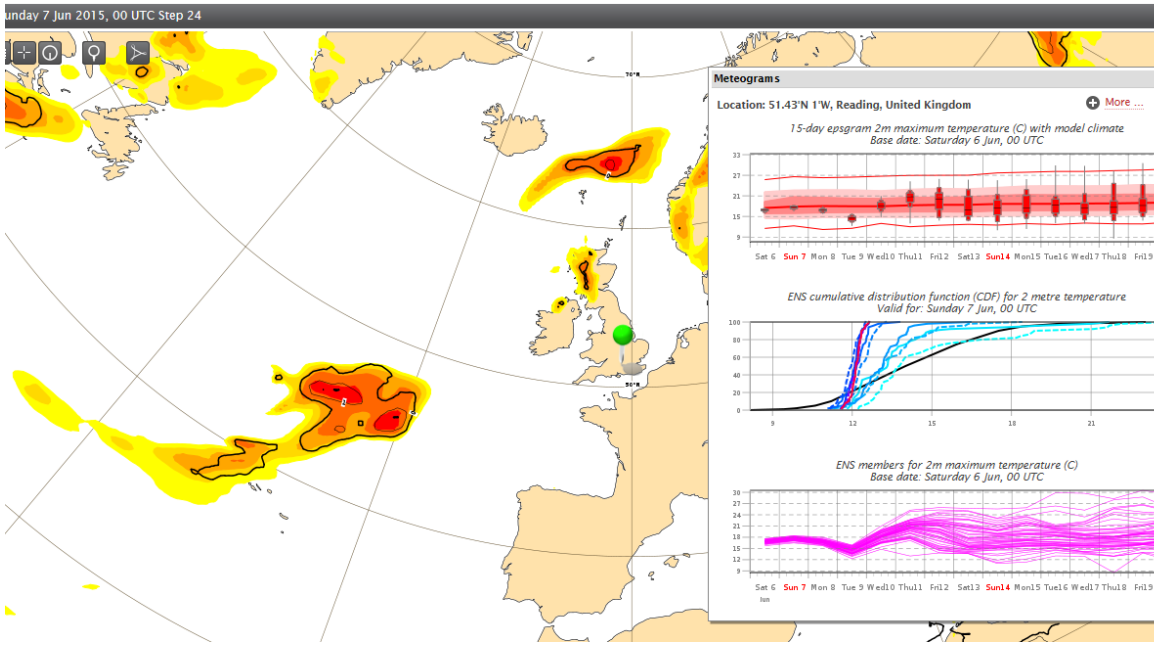


- Similar customisation applies for percentiles and probability of combined events.

Meteograms

- Special databases to retrieve pre-defined percentiles from ENS 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.





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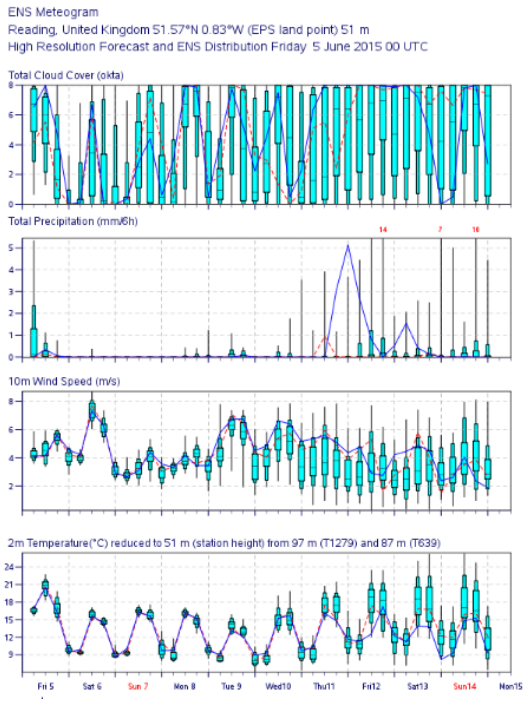
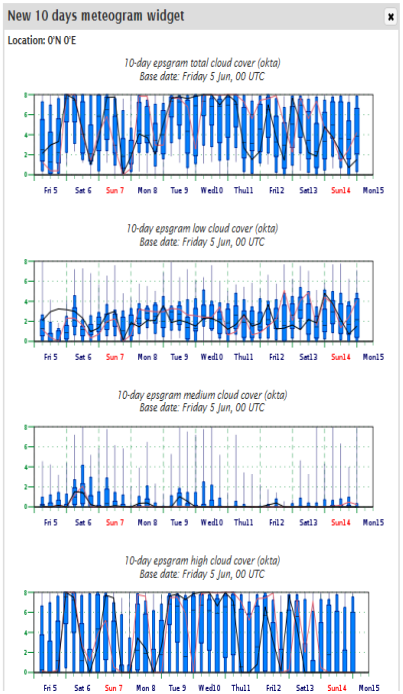
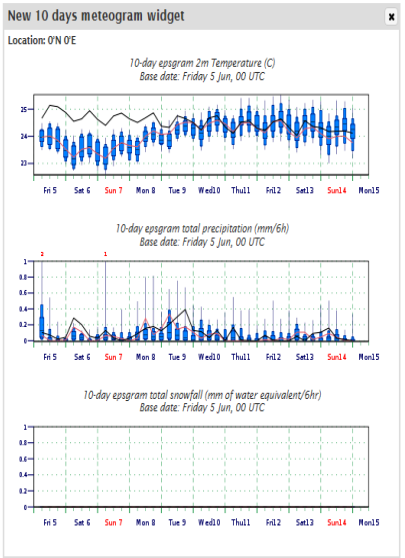
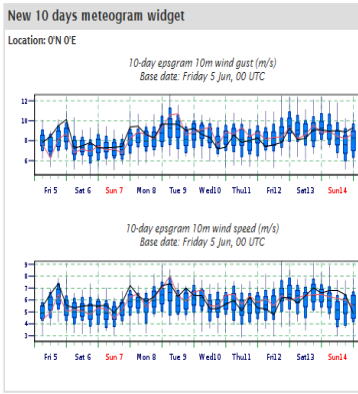
Meteograms – more parameters in ecCharts

- 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)



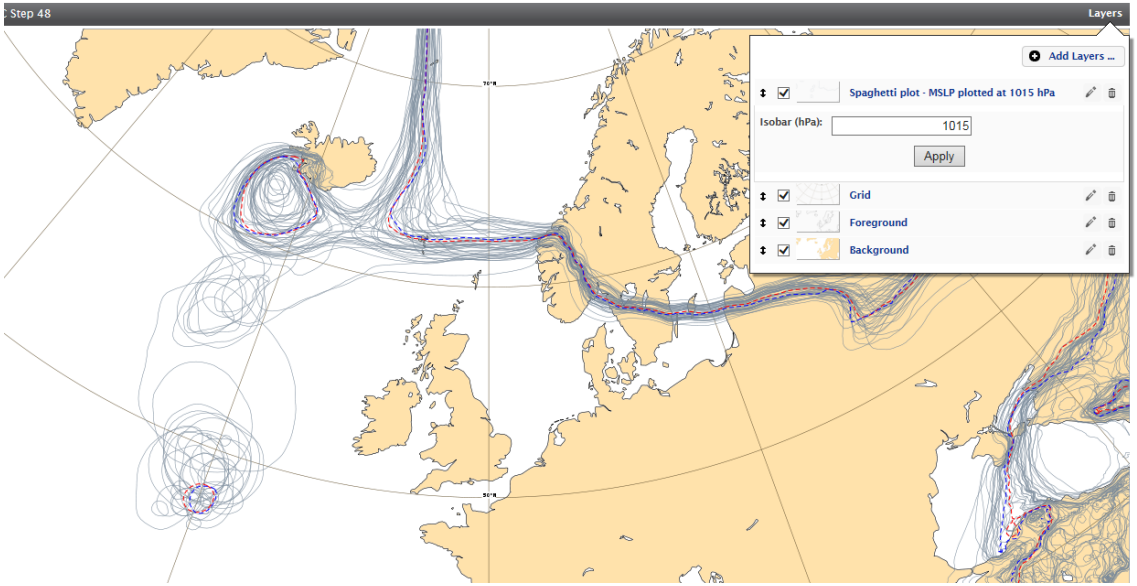


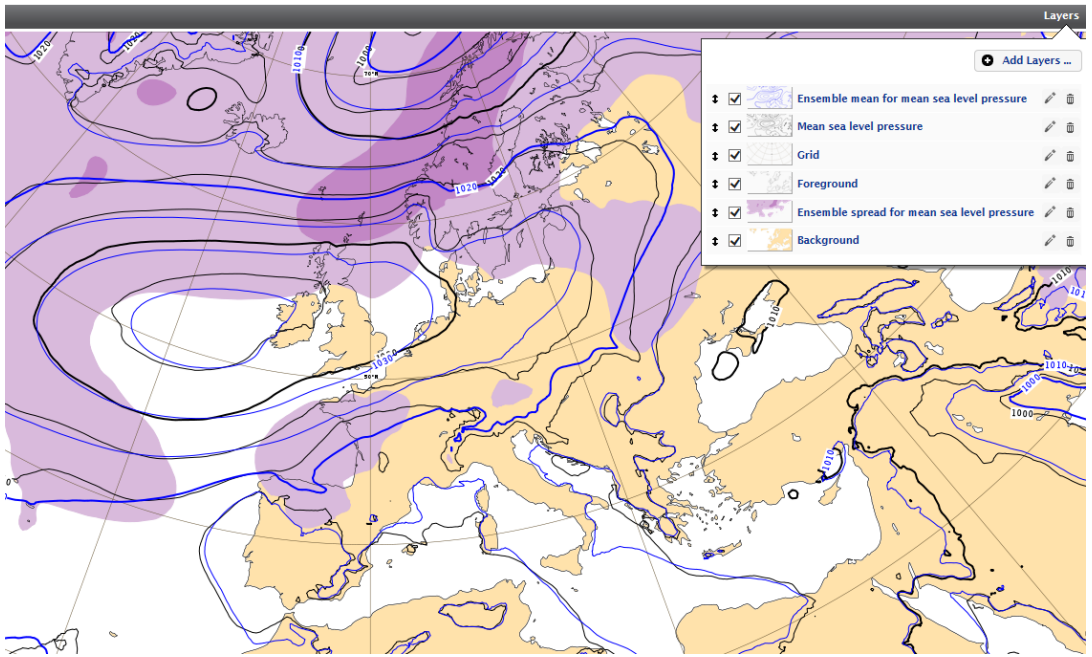




Other ensemble data

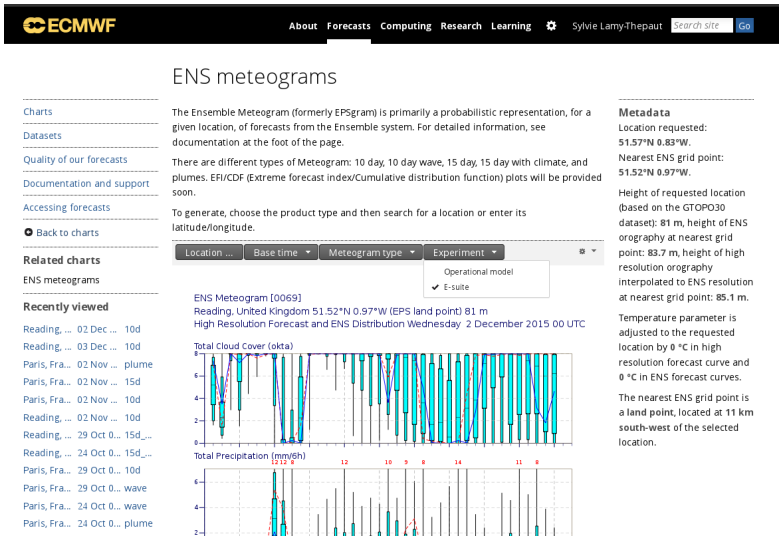
- Derived products
  - ENS mean
  - ENS spread
  - EFIs
  - SOTs
  - Cyclone strike probabilities
  - Cyclone tracks

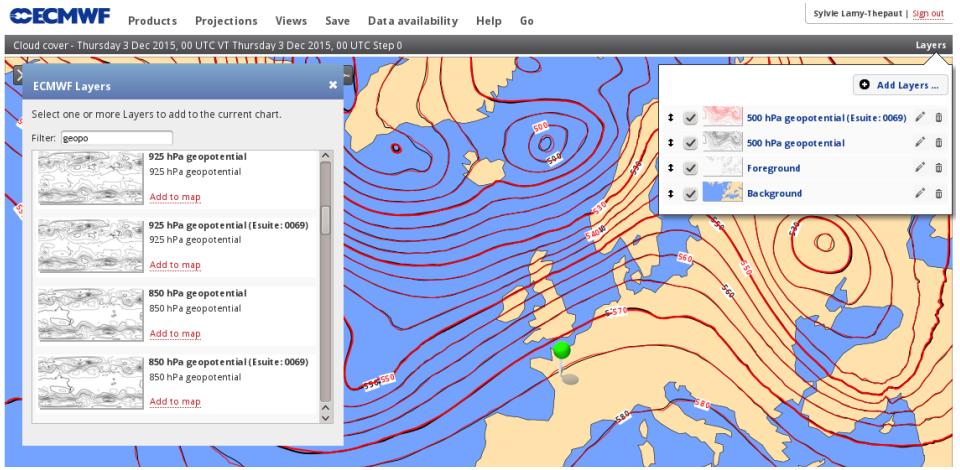


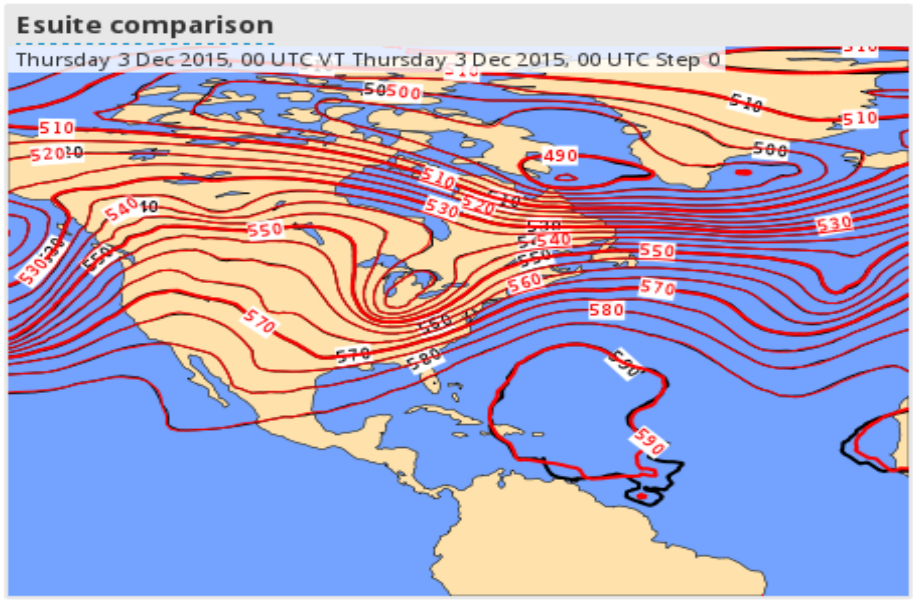


ecCharts – Updates December 2015

- Dedicated to new IFS cycle upgrade (e-suite cycle 41r2)
- All e-suite data/charts made available for 3 months until implementation date.
- Operational layers were duplicated for e-suite to overlay/compare with operational data.
- Meteograms from e-suite were available on Meteogram page on www.





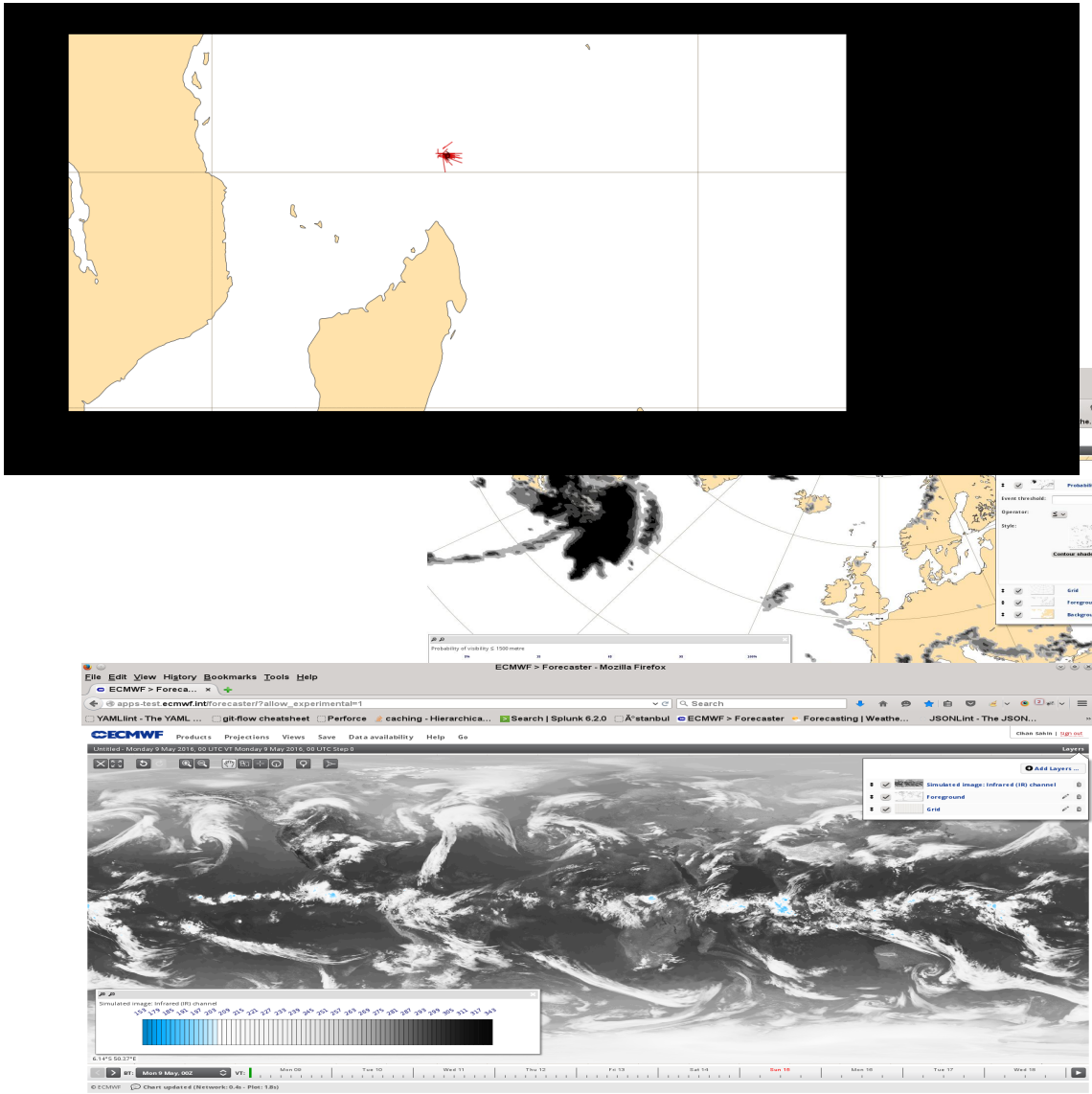


June updates

- Implementation of new parameters (~20) (end of May) 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

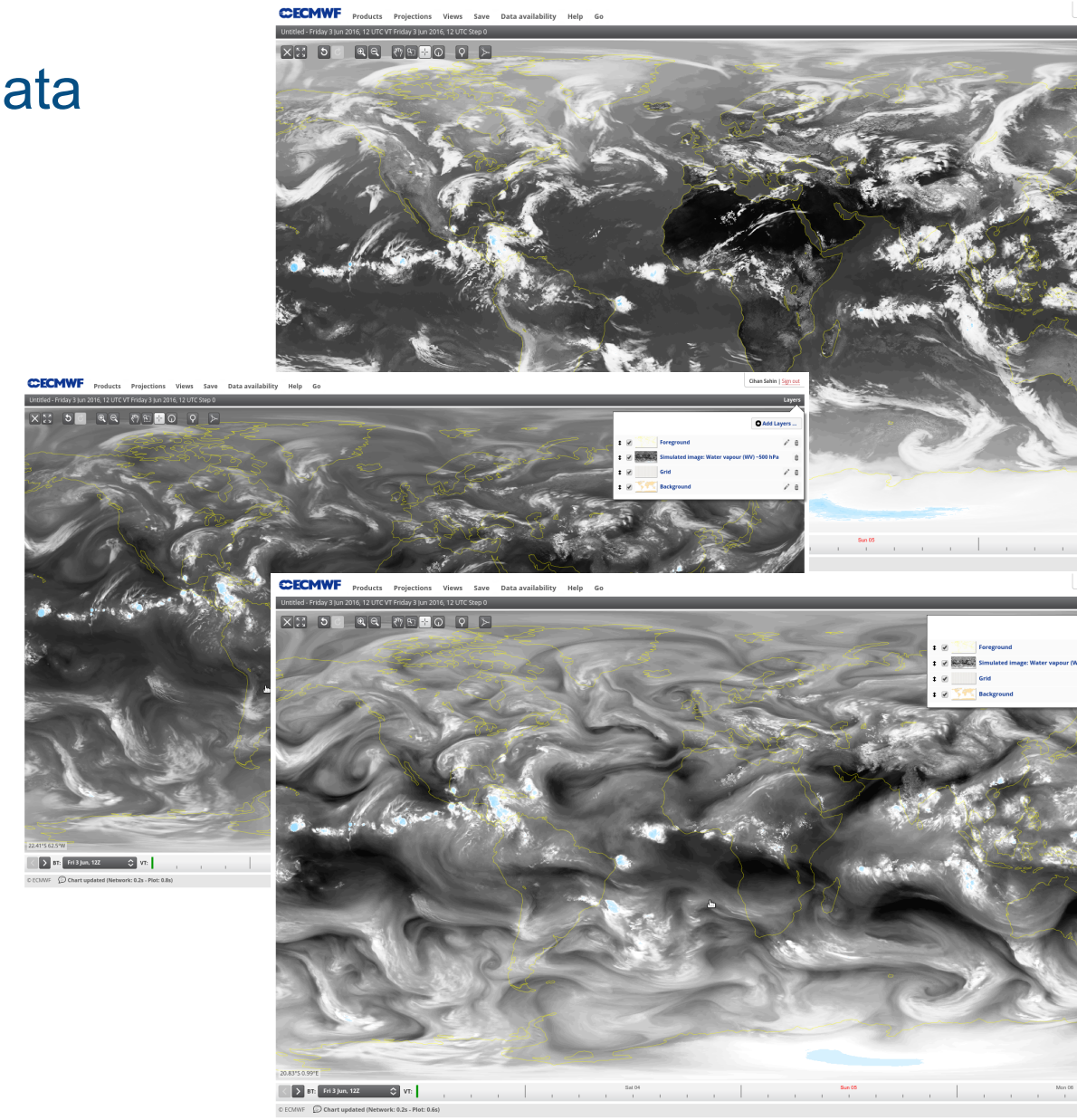
Full list available at;

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



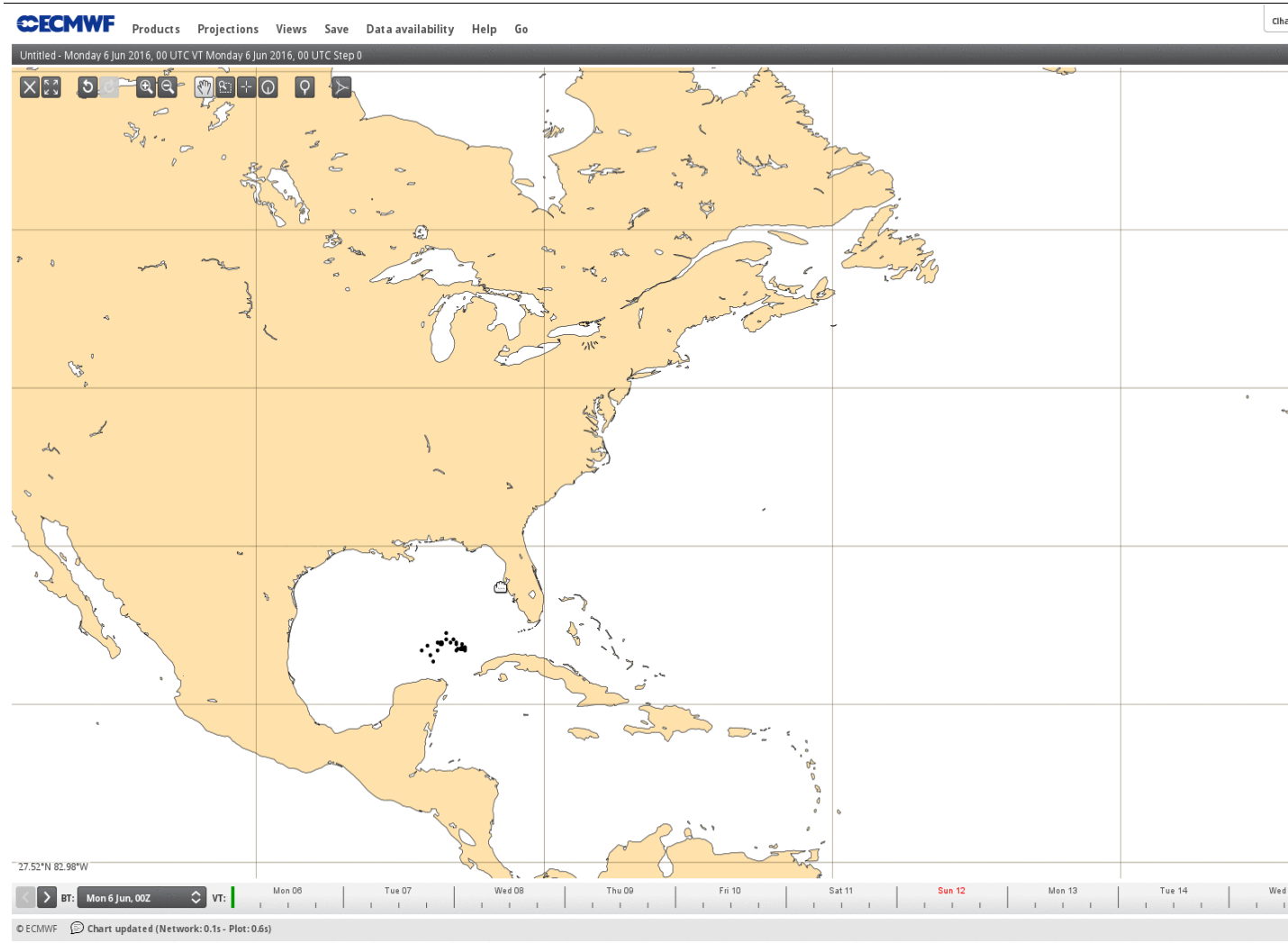
June update – Simulated satellite data

- Simulated data available (Meteosat-10 like)
- Global fields up to day 10.
- 3 layers;
  - Water vapour at ~300 hPa
  - Water vapour at ~500 hPa
  - Atmospheric window channel (Clouds and surface)



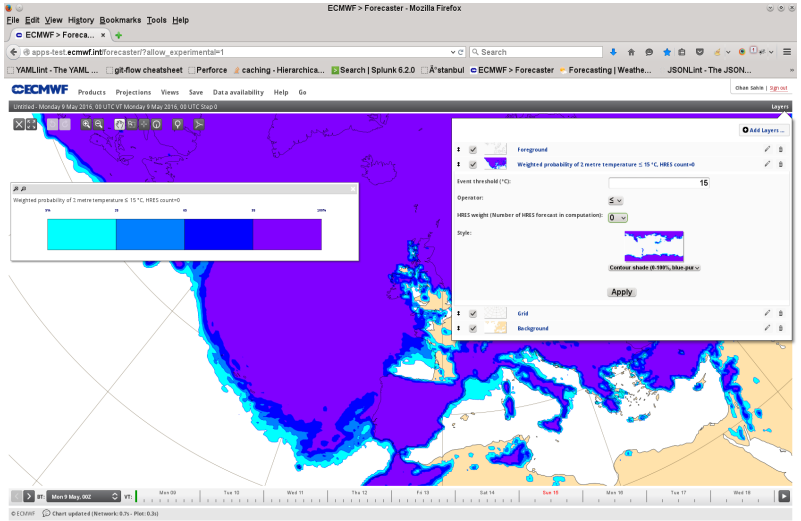
June update – Tropical cyclone tracks

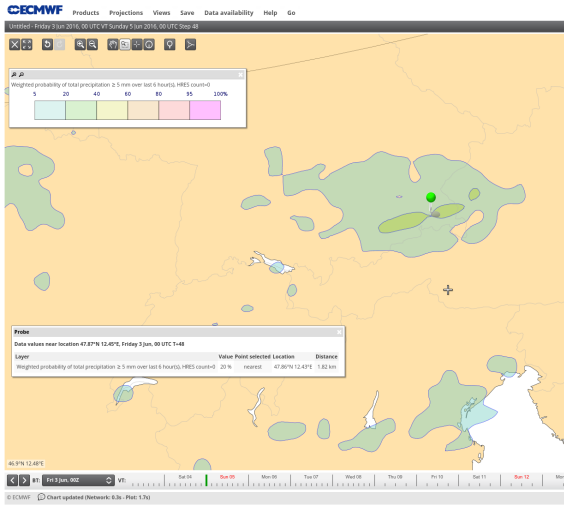
- Tracks are generated for all TCs that have been officially observed.
- 2 layers available
  - Named tropical cyclone (name and positions only)
    - Displays track positions (HRES and ENS members) and name
  - Named tropical cyclone tracks
    - Displays tracks of HRES and ENS members.
- Parameters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



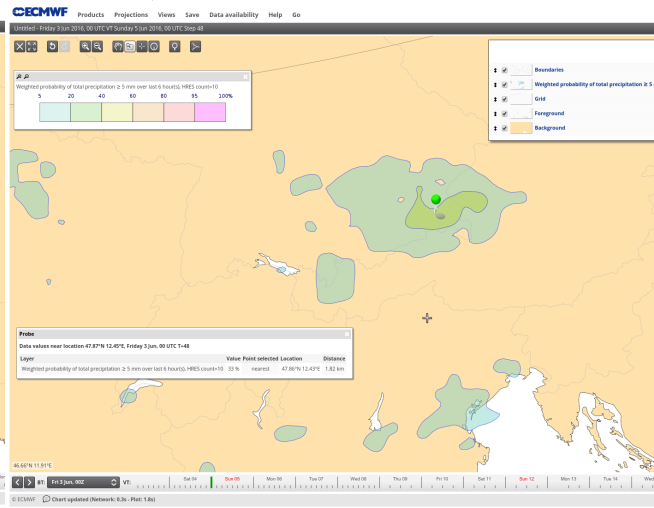
June update – Weighted probabilities

- 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 then, more then, equal to ...) can be customized by the users.

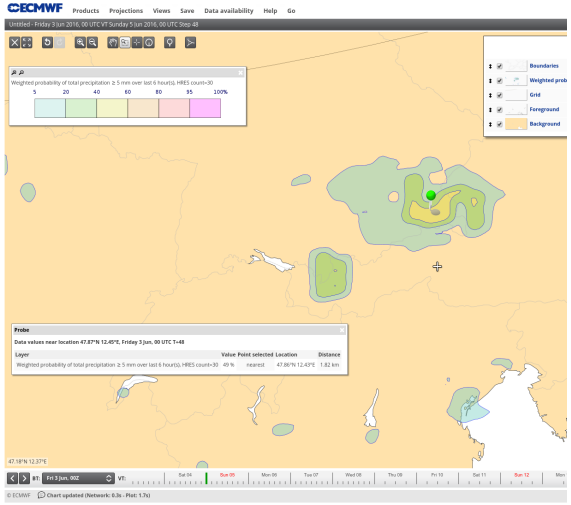




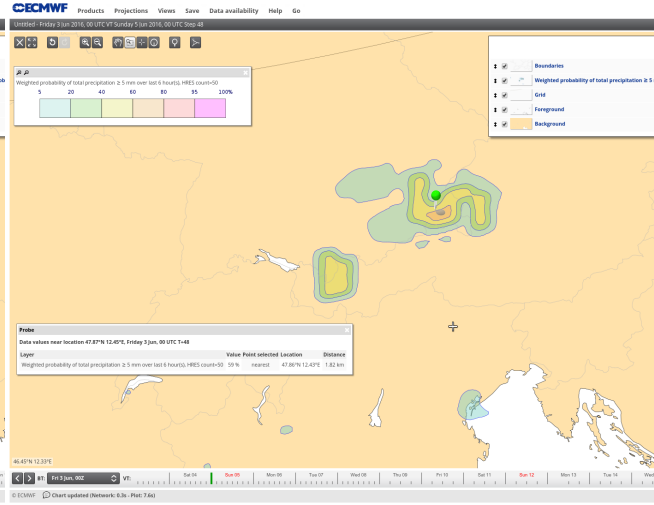
HRES count =0 , 20 %



count=10, 33%



count=30, 49%



count =50, 59%

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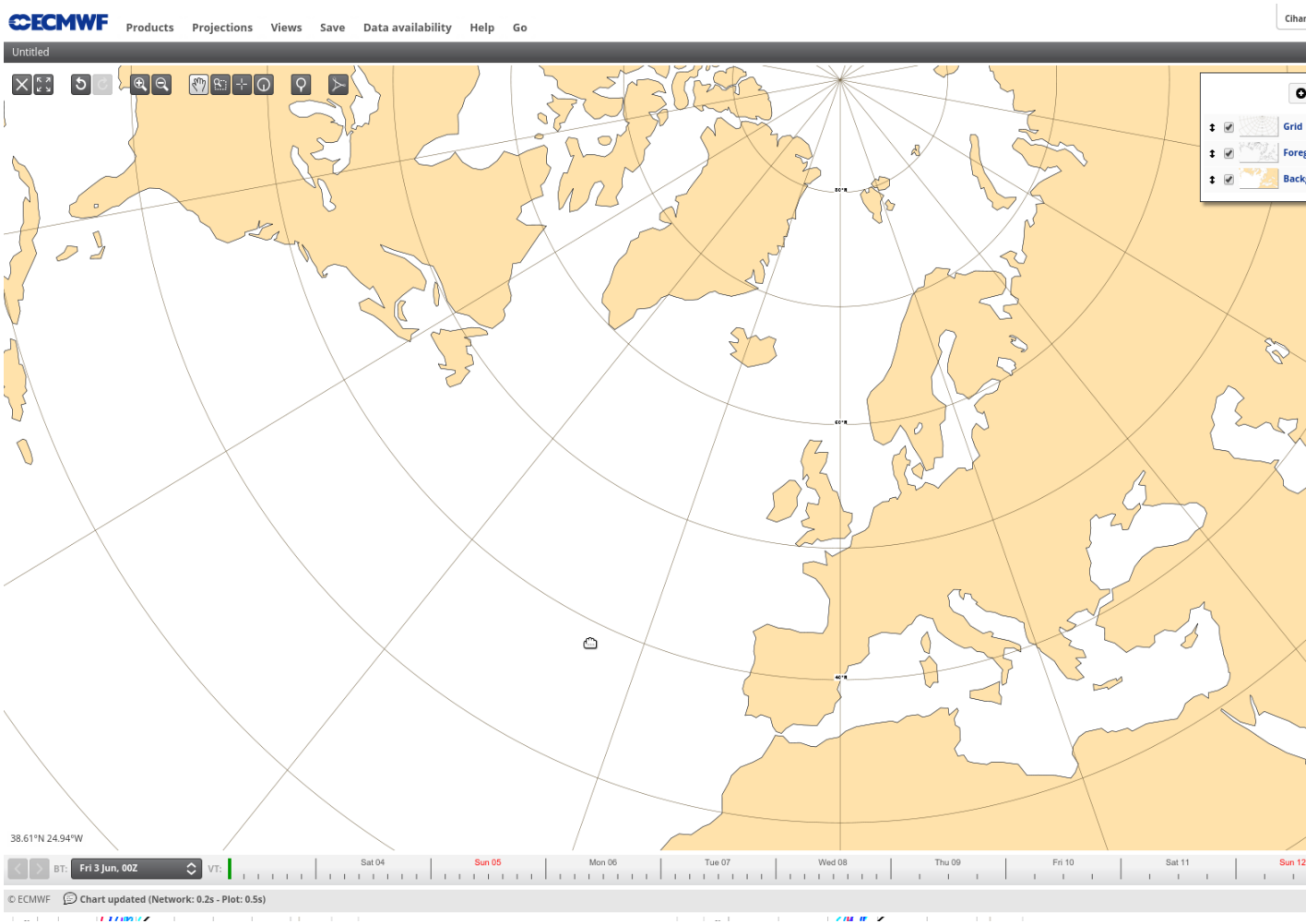
Use case: Make your own products

- Design your product
- Save as your own product
- Display in your Dashboard



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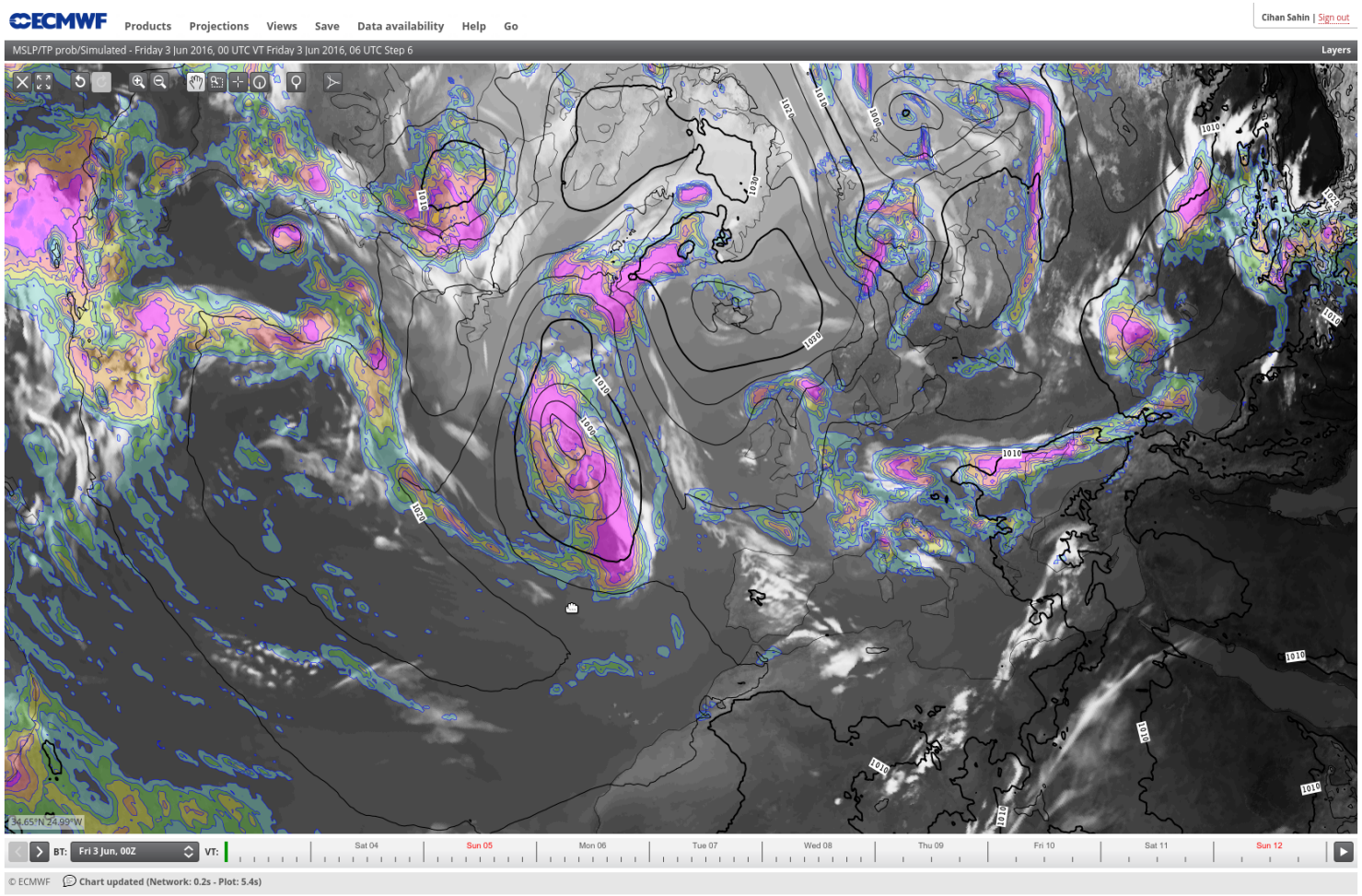
Use case: Explore data

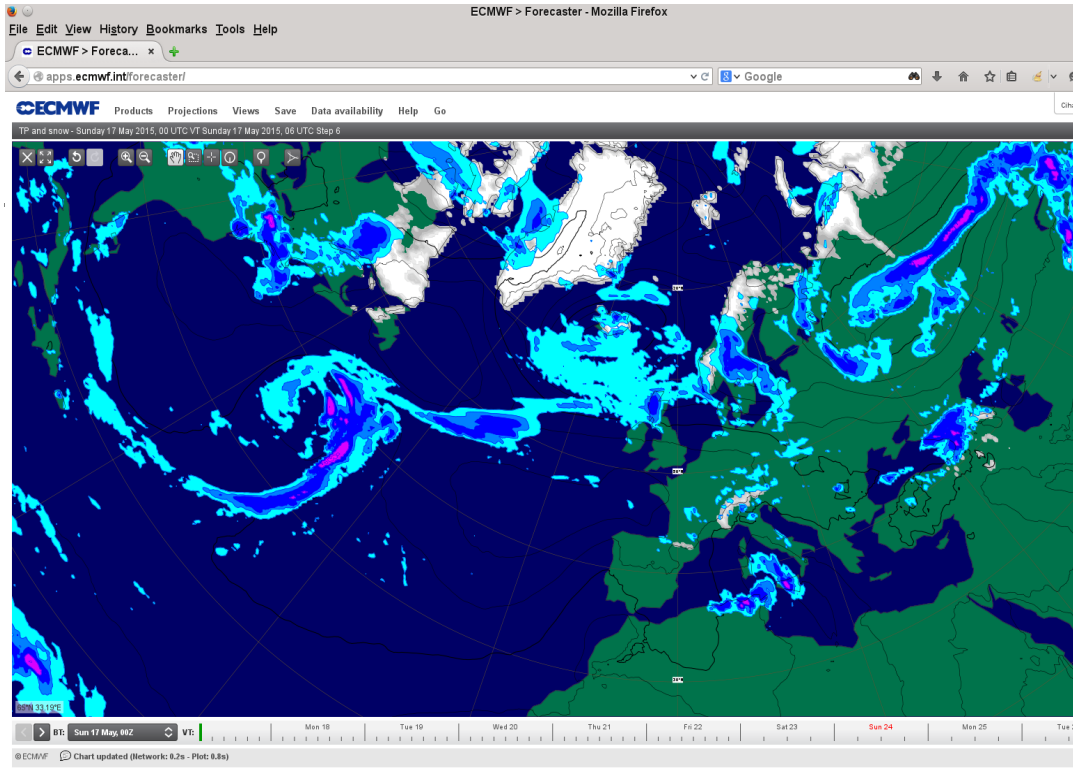
- Display your product
- Probe data values
- Generate time series
- Display meteograms



Next update

- Adding more parameters based on user requests
  - More Meteogram parameters
  - Extra-tropical cyclone feature tracks (Fronts …)
  - Model climate parameters, ensemble clustering …
  - Provide IFS cycle upgrades (e-suites) when available

- Next content update is in November 2016.



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.

ecCharts documentation & feedback

- Documentation is under ECMWF wiki pages. Help > ecCharts on ecCharts user interface.
  - https://software.ecmwf.int/wiki/display/ECCHARTS/Home
- Request new product or feature
    - Click here to make a new product or feature request
- Report bug or general communication
- ecCharts updates
  - Follow recent and planned updates

Please follow hands-on practicals