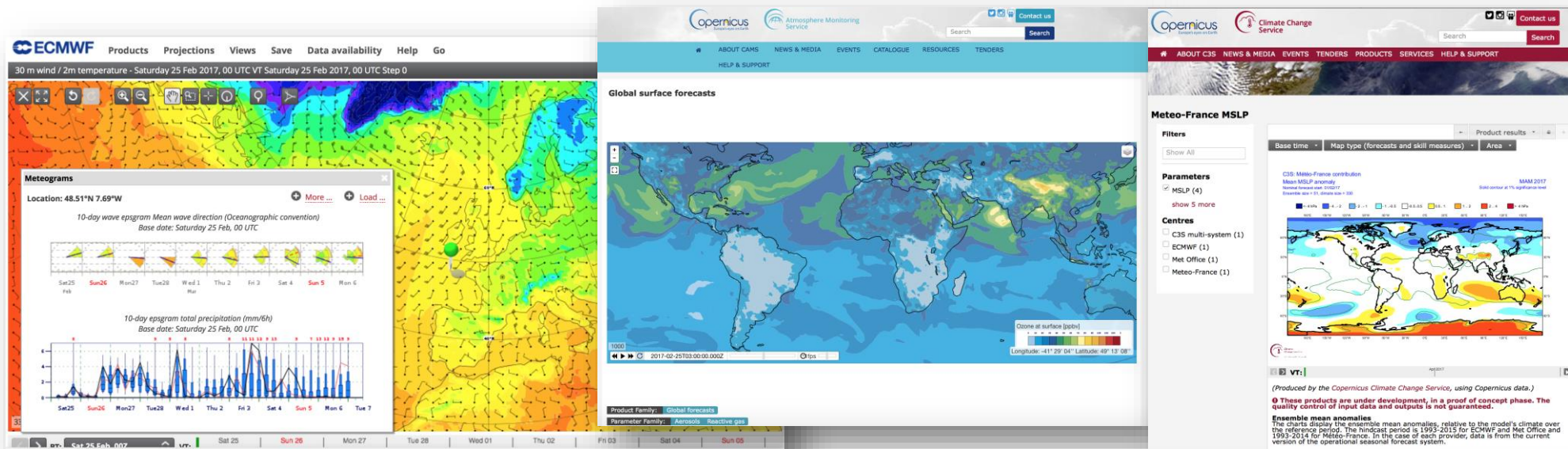


Web Services at ECMWF

Delivering data and graphical products to our Users



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Web services at ECMWF

- Which services do we offer?

WMS URL: <https://apps.ecmwf.int/wmstest/?token=public>

Version: 1.1.1

2017-02-20T12:00:00Z

- How do they work?
- What are our plan for the future?

Data Access - Public Datasets

The screenshot displays the ECMWF Public Datasets website interface. It features a navigation menu on the left with options like 'Home', 'Public Datasets', and 'Job list'. The main content area is titled 'Public Datasets' and lists various datasets such as 'Global Reanalyses', 'ERA-20C', and 'ERA-Interim/LAND'. A 'CERA-20C, Synoptic Monthly Means' dataset is highlighted, showing a grid of data points for different years and months. Below the grid, there are sections for 'Select a list of months', 'Select time', 'Select number', and 'Select parameter'. An 'Additional filtering' section is also visible, allowing users to refine their search based on 'Stream', 'Type', 'Number', 'Month', 'Version', and 'Type of level'. The website footer includes the ECMWF logo and the text 'EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS'.

- Available to all self-registered users after accepting a license agreement
- Discovery mode
- Retrieve functionalities
- New datasets :
 - CERA, GEF
 - and soon ERA5

Data Access – MARS Catalogue

The screenshots illustrate the user interface for accessing MARS data. The top-left screenshot shows the main 'MARS Catalogue' page with a navigation menu and a list of operational data and experiments. The middle-left screenshot shows a 'MARS Catalogue' page with a table of parameters and a 'Check for availability' section. The middle-right screenshot shows an 'Additional filtering' page with a form for selecting data parameters and levels. The bottom-right screenshot shows a 'Job list' page with a table of job execution results.

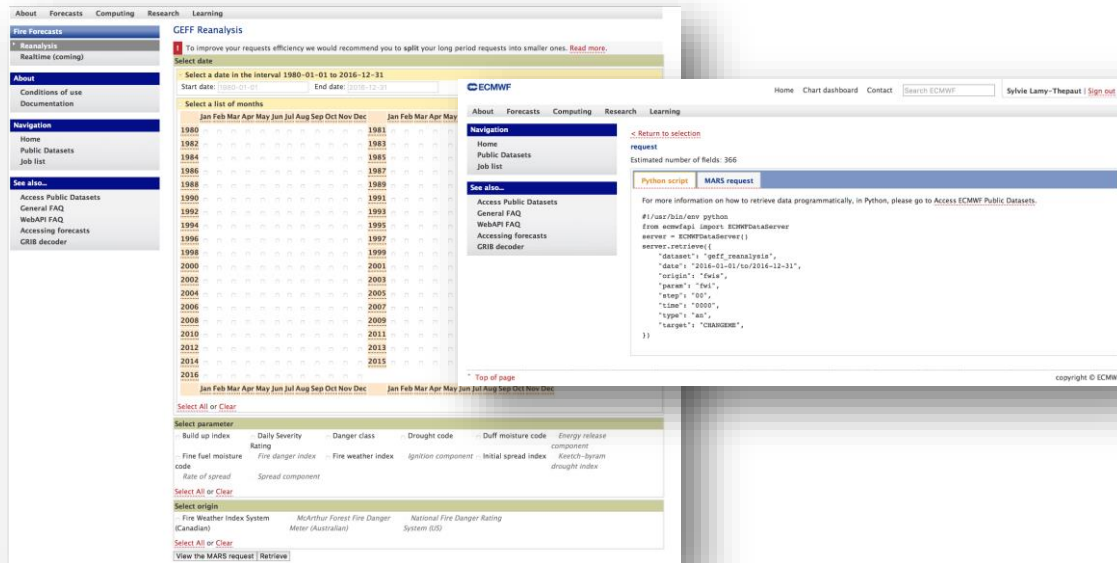
Step	Level	Parameter
0	70	Divergence
1	100	Geopotential
2	150	Ozone mass mixing ratio
3	200	Potential vorticity
4	250	Relative humidity
5	300	Specific humidity
6	400	Temperature
7	800	U component of wind
8	600	V component of wind
9	700	Vertical velocity

id	user	status	name	service	client	started	duration	result
58b42ad231d47286965ab0f4	cgs	queued	netcdf	catalogue	web	27/02 13:34:10		
58b1949a1f47286a35abd91	cgs	complete	netcdf	cera20c_edmm	web	25/02 14:28:42	00:34:18	download (228.7 MB)
58b17b95d5e9f4fac3633f	cgs	complete	mars	s2s	web	25/02 12:43:33	00:00:01	download (1.0 MB)

- Available to all the Members States and Commercial users
- Access to ECMWF archive data
- Retrieve data in GRIB and NetCDF format, BUFR, ODB and ODBASCII
- Forecasts are available as soon as they are archived.

Web API – Access data programmatically

- Simple REST API
- Token used for authentication
- The logic has been encapsulated in a simple package



- The download point can be found at <https://software.ecmwf.int/wiki/display/WEBAPI/Downloads>

```
from ecmwfsapi import ECMWFDataServer
```

```
server = ECMWFDataServer(  
    url = "https://api.ecmwf.int/v1",  
    key = "XXXXXXXXXX",  
    email = myemail@mail.com  
)
```

```
request = {  
    "dataset": "geff_reanalysis",  
    "date": "2016-12-01/to/2016-12-31",  
    "origin": "fwis",  
    "param": "fwi",  
    "step": "00",  
    "time": "0000",  
    "type": "an",  
    "target": "geff.nc",  
}
```

```
server.retrieve(request)  
# Data will be retrieved and store in the target file geff.nc
```

WebAPI : New Meteogram service coming

```
import requests
```

```
url = 'https://api.ecmwf.int/v1/services/to-be-confirmed/'  
token = "XXXXXXXXX"
```

```
#Getting 2-metre temperature data ...
```

```
request = { "meteogram": "10days",  
            "param": "2t",  
            "location": "50/-1",  
            "date": "201700301",  
            "time": "1200" }
```

```
#Posting the request
```

```
response = requests.post(url, json=request, params={"token": token })
```

```
if response.status_code == 200:
```

```
    # Saving the data in a file
```

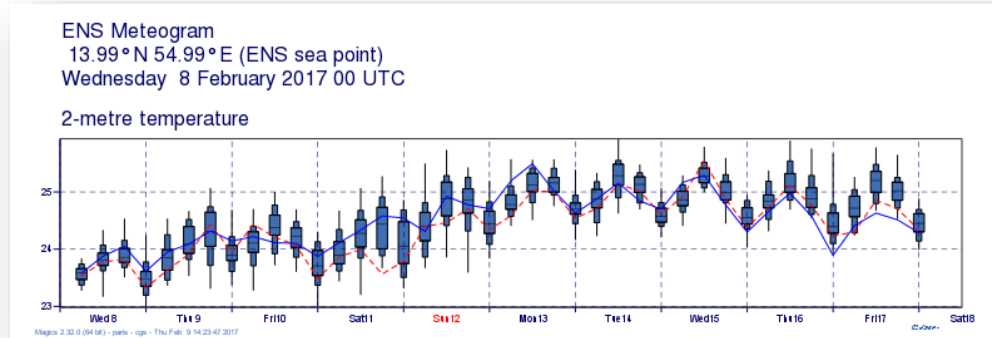
```
    input = "2t-10days.json"
```

```
    with open(input, "w") as data :
```

```
        data.write(json.dumps(response.json(), indent=4, sort_keys=True))
```

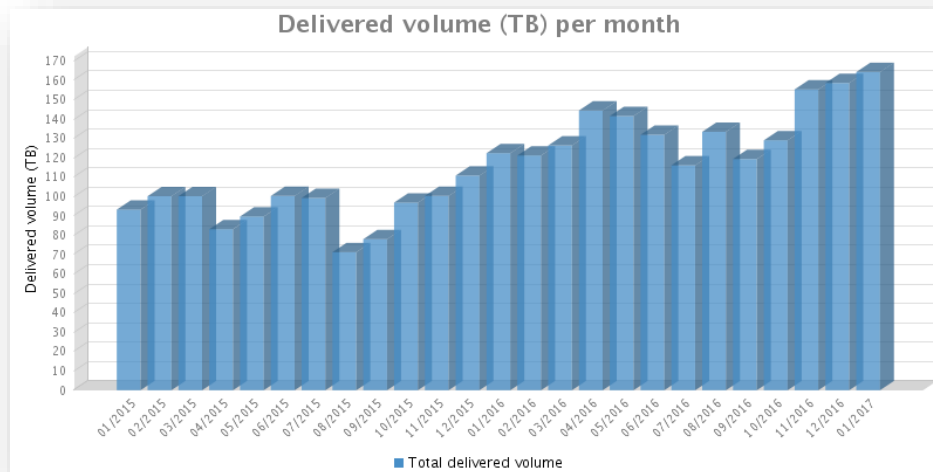
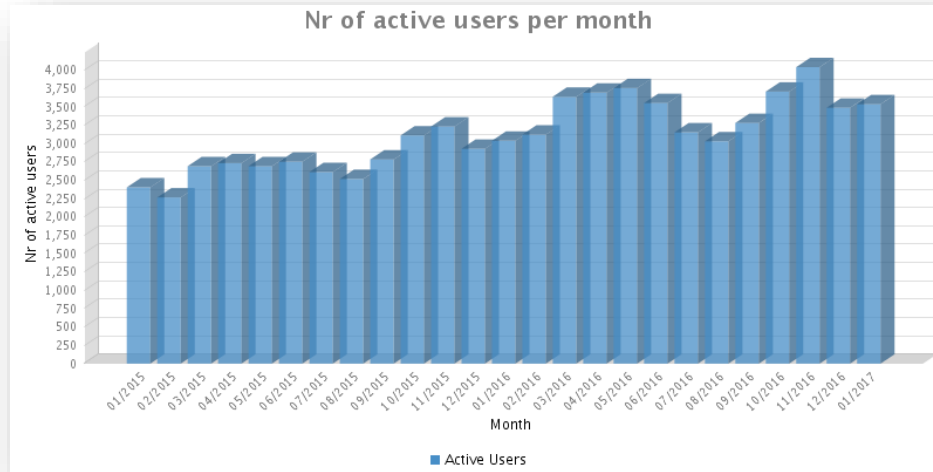
```
else:
```

```
    print response.text
```



```
"hres": [ 296.581573486, 296.878845215, ... ],  
"max": [ 296.839111328, 297.334838867, ... ],  
...  
"seventy_five": [ 296.659210205, 296.932373047, ... ],  
"steps": ["6", "12", ... ],  
},  
"date": "20170208",  
"time": "0000",  
"ens_height": -2.49784851074,  
"ens_location": { "latitude": 13.98, "longitude": 54.99 },  
"user_location": { "latitude": 14.0, "longitude": 55.0 },  
"expver": "0001",  
"hres_height": -0.52978515625,  
"land_sea_mask": 0.0,  
"points_along_meridian": 1280,  
": 55.0  
}  
}
```

The service is successful !



- Constant increase in the number of active users and Terabytes of data served.
- Monitoring closely the system to reduce the queuing time.
- The actual limit of active requests is 100. Each user is allowed 3 simultaneous active requests.
- We recommend our users to consider the size and the efficiency of their requests before submitting them in the interest of everybody.

Graphical products: Static, On-Demand, Interactive

- Static Charts are presented in catalogue with faceted search.
- More than 650 000 charts
- Download facilities through a simple API

copernicus Climate Change Service

ABOUT C3S NEWS & MEDIA EVENTS TENDERS PRODUCTS SERVICES HELP & SUPPORT

C3S seasonal charts

28 matching items
No filters applied

Filters
Show All

Parameters
 MSLP (4)
 SST (8)
 T2m (4)
 T850 (4)
 geopotential height 50
 precipitation (4)

Plot type
 Maps (24)
 Time series (4)

Centres
 C3S multi-system (7)
 ECMWF (7)
 Met Office (7)
 Meteo-France (7)

ECMWF MSLP

Base time - Map type (forecasts and skill measures) - Area - Product results

Filters
Show All

Parameters
 MSLP (4)
show 5 more

Centres
 C3S multi-system (1)
 ECMWF (1)
 Met Office (1)
 Meteo-France (1)

C3S ECMWF contribution
Mean MSLP anomaly
Normal period: 1993-2017
Ensemble size: 15, (95% csi = 36)

MAM 2017

Subsidiary at 7% significance level

vt: |

(Produced by the Copernicus Climate Change Service, using Copernicus data.)
These products are under development, in a proof of concept phase. The quality control of input data and outputs is not guaranteed.

Ensemble mean anomalies
The charts display the ensemble mean anomalies, relative to the model's climate over the reference period. The hindcast period is 1993-2015 for ECMWF and Met Office and 1993-2014 for Meteo-France. In the case of each provider, data is from the current version of the operational seasonal forecast system.

ECMWF

About Forecasts Computing Research Learning Library Search site Go Sylvie Lamy-Thépaut

SWFDP project for Bay of Bengal

23 matching items
No filters applied

Filters
Show All

Product type
 ENS (5)
 Extreme forecast index (1)
 HRES (18)

Temperature and
CAPE
Mean wave period and

2m temperature
K index/MSLP
Total swell:
Mean wave

2m maximum temperature
TT index/MSLP
Wind waves:
Mean wave

2m minimum temperature
Relative vorticity and
Total precipitation

500-1000 thickness
Multi parameter
Wind speed probability

ECMWF

About Forecasts Computing Research Learning Library Search site Go Sylvie Lamy-Thépaut

500-1000 hPa thickness and MSLP

Thickness from 1000-500 hPa / Mean sea level pressure
Tuesday 28 Feb, 00 UTC T+6 Valid: Tuesday 28 Feb, 06 UTC

Chart results

Filters
Show All

Product type
 ENS (5)
 Extreme forecast index (1)
 HRES (18)

vt: |

Final 5 thickness 2
Mean sea level pressure
Thickness from 1000-500 hPa

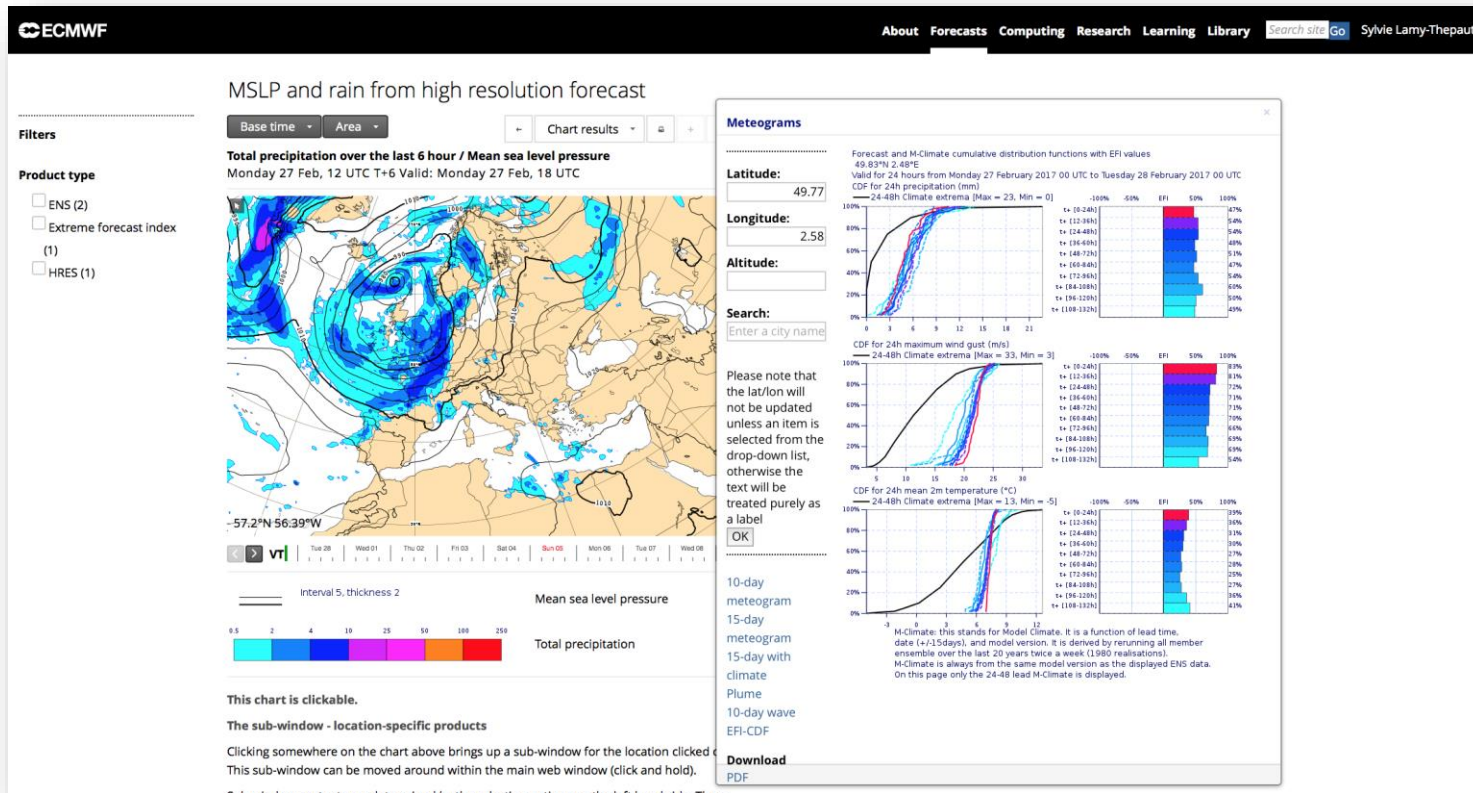
Chart permanent link

The following URL can be used to download charts automatically

```
https://apps.ecmwf.int/plots/product-download/mofc_multi/mofc_multi_verification_probability_family_rpssmap/?time=2017012600&parameter=Precipitation&ek=Day1205-11487624&date=2017012600
```

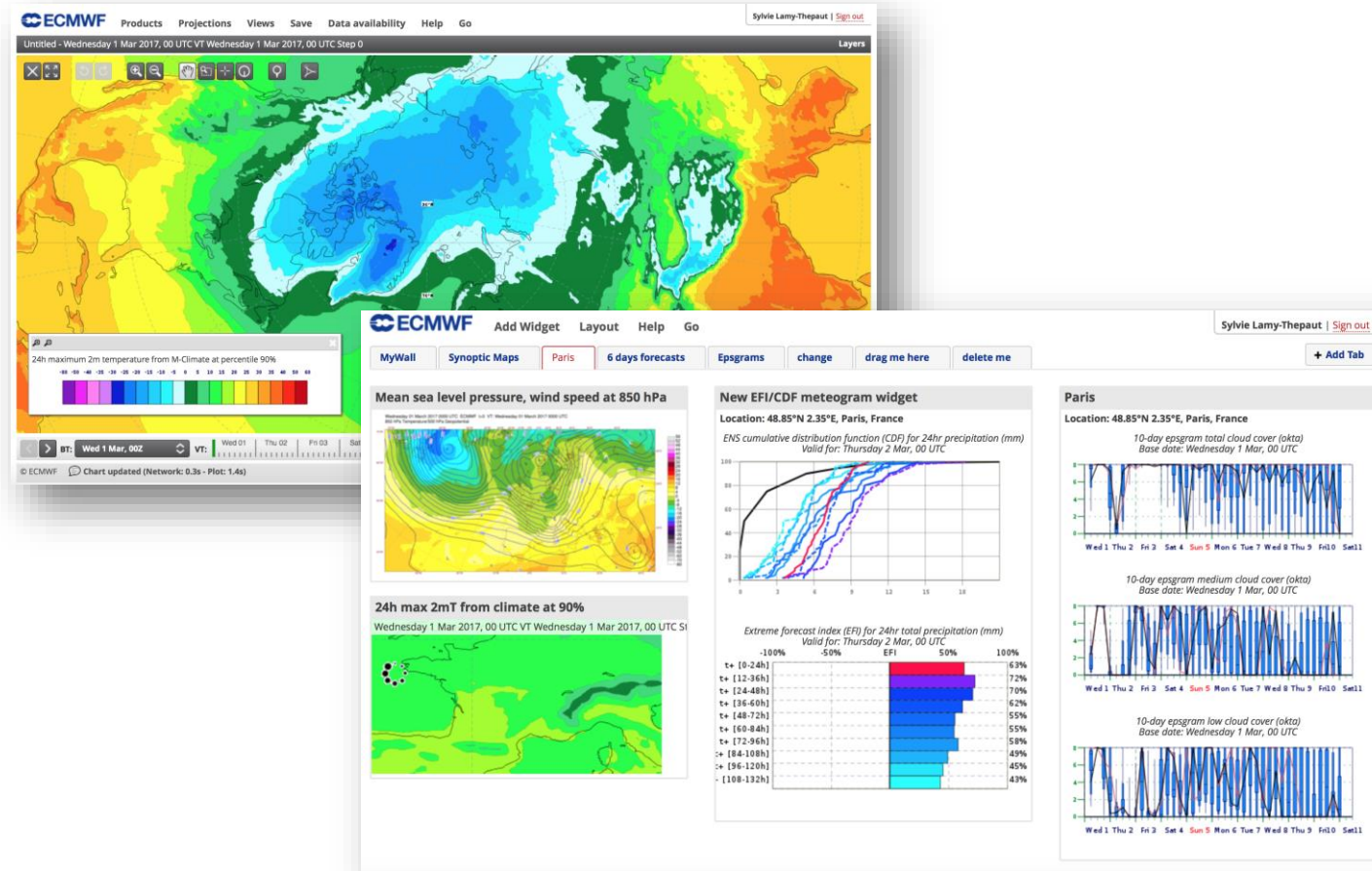
Add '&format=pdf' to the end of URL if you wish to download PDF version.

Dynamic graphical products : Clickable maps



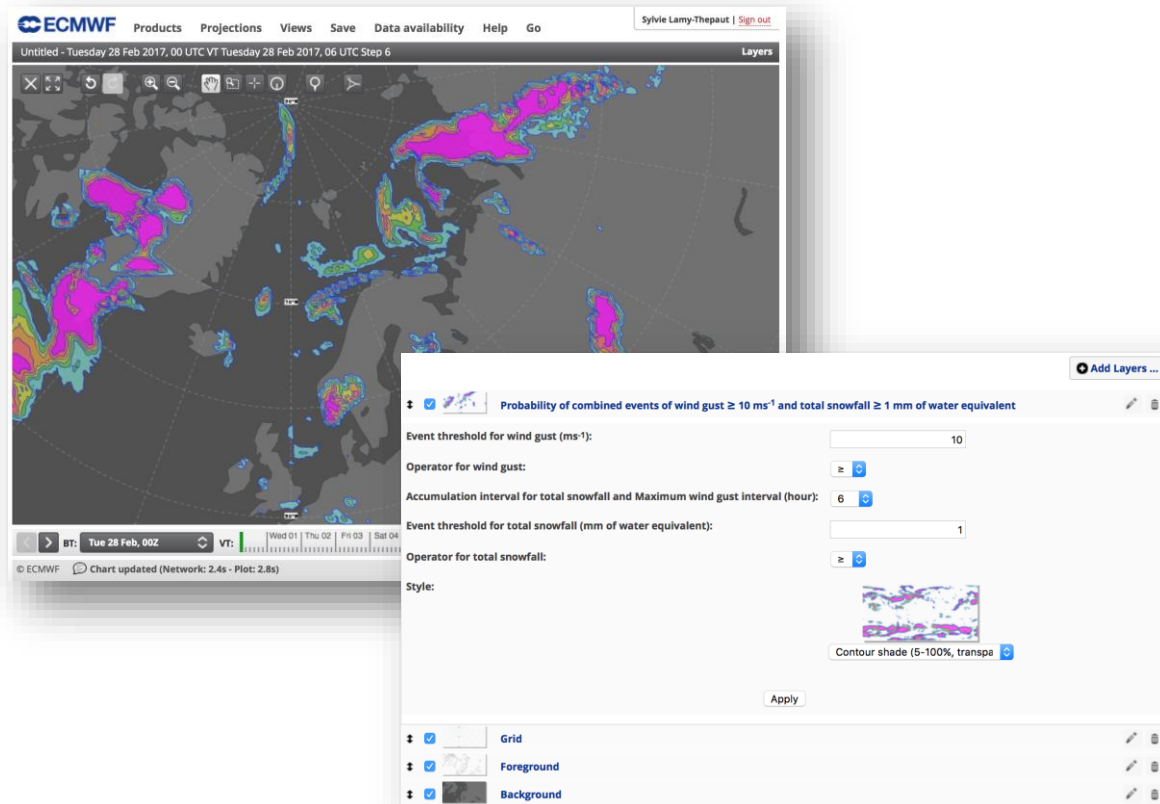
- Produced from the ecCharts data.
- Ensure consistent look and feel.
- Allow geo-referenced clickable features.
- E-Suite enabled

Highly interactive application: ecCharts



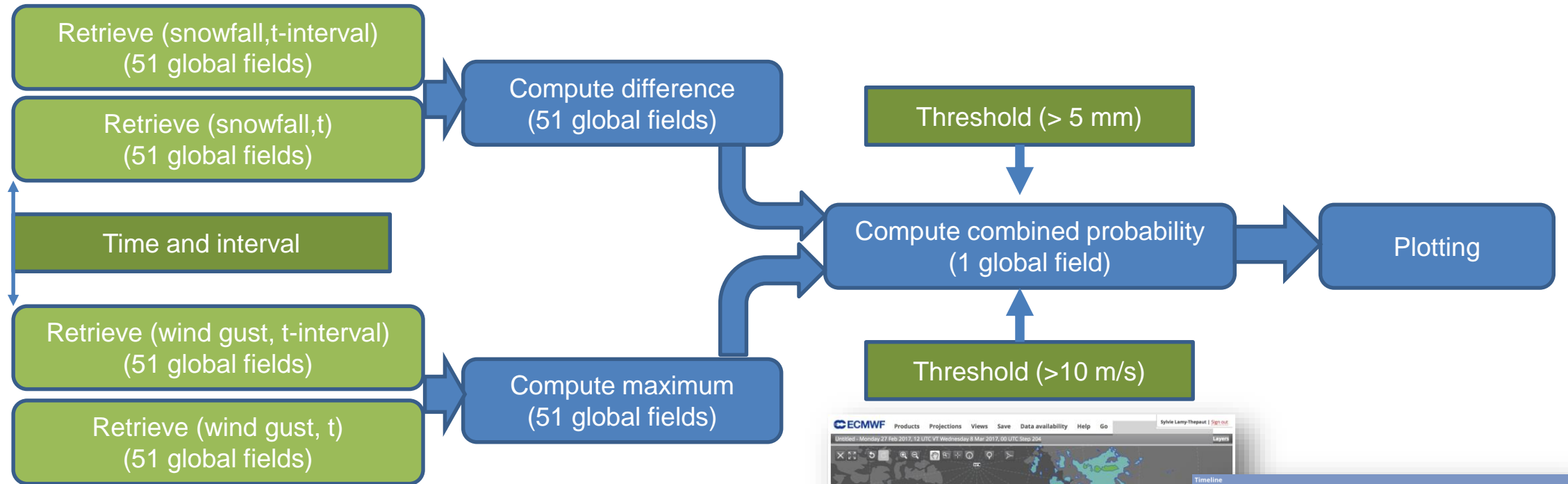
- ENS and HRES operational forecast.
- 431,000 fields (1.5 TB) disseminated to the system everyday.
- 10 cycles retention (15 TB)
- Around 230 layers
- e-suite layers when e-suite available
- Computation on the fly
- Dashboard

ecCharts : a simple example of visualisation

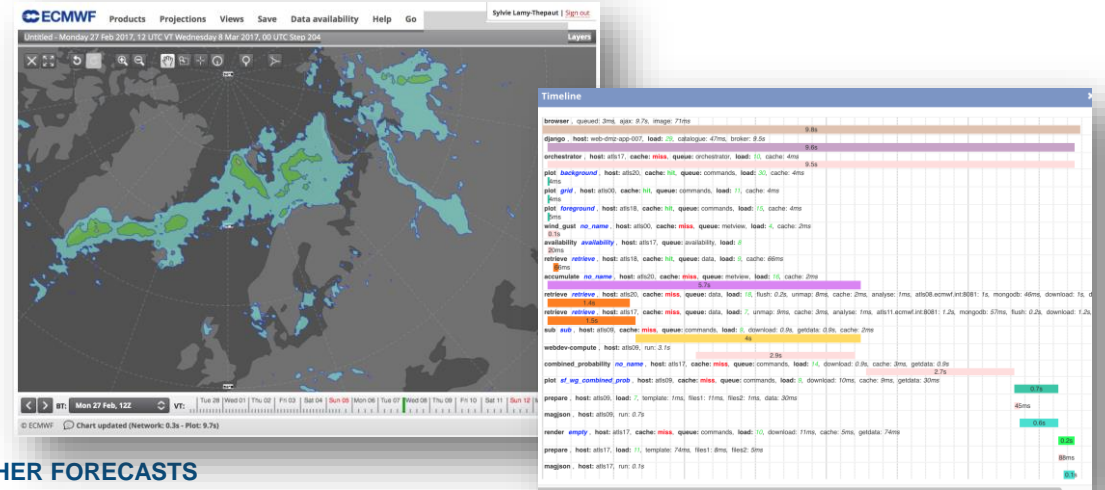


- Here : Probability of combined events of 10m wind gust $>10 \text{ m/s}$ and total snowfall $> 5 \text{ mm}$ in the last 6 hours.
- Probabilities of combined events: involves several parameters.
- Full control to the user

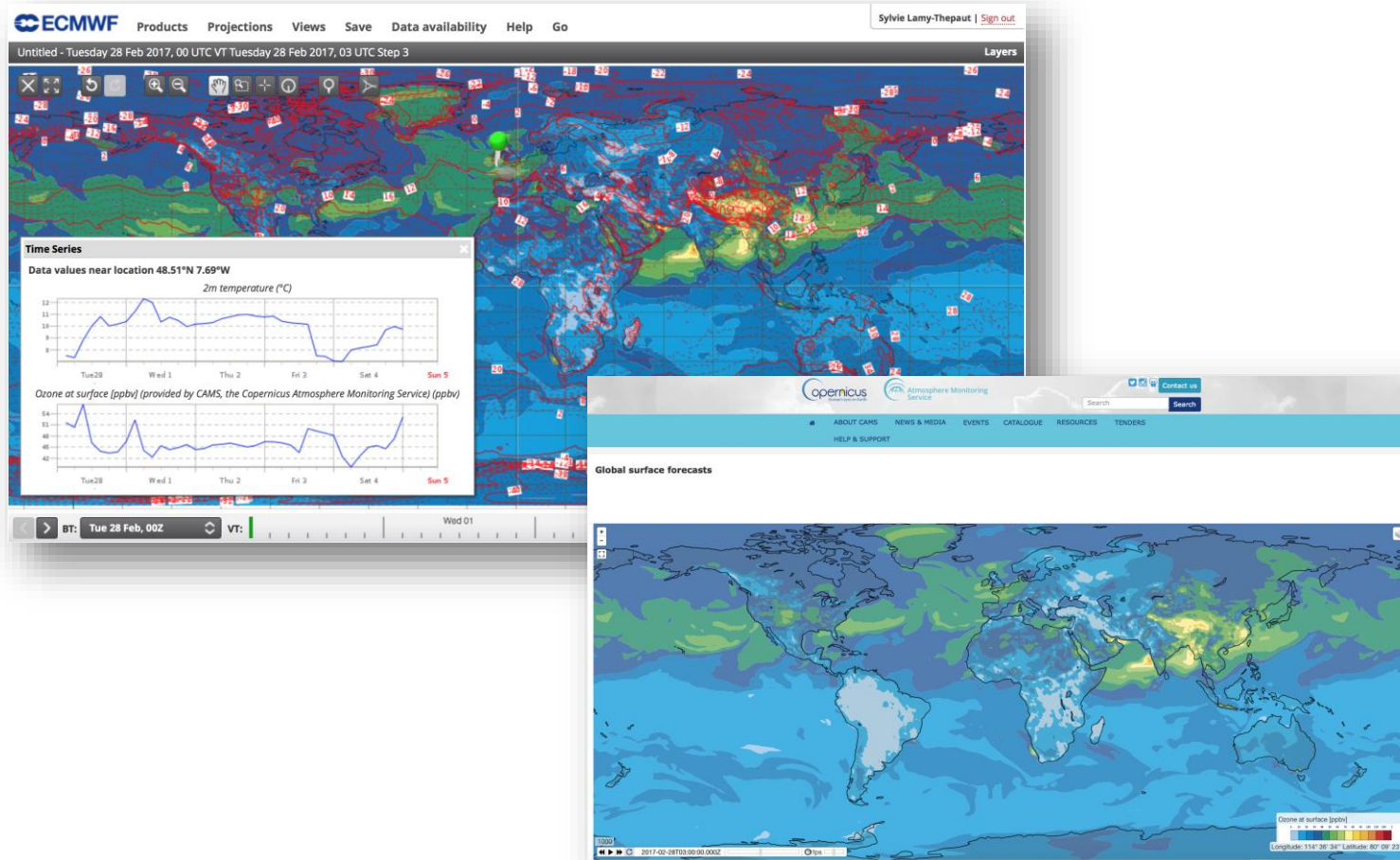
ecCharts : simple visualisation ?



- At least 204 fields in input
- 102 Operations

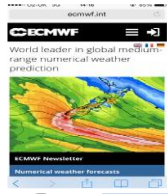


Graphical products through OGC/WMS



- Around 230 layers, most of them also available via WMS.
- WMS is available to MS/CS and commercial customers.
- A set of public layers is available for our public registered users.

What is happening in the background



Web

- Charts
- Static catalogue
- Tropical cyclones
- ENSgrams
- Faceted Search



Apps and API

- WebMars
- Public Datasets (GEFF, CAMS...)
- WMO scores
- Costing
- Sub license



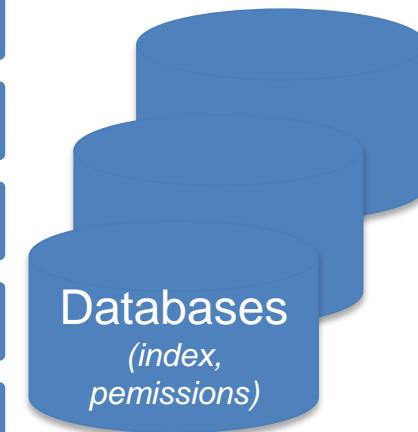
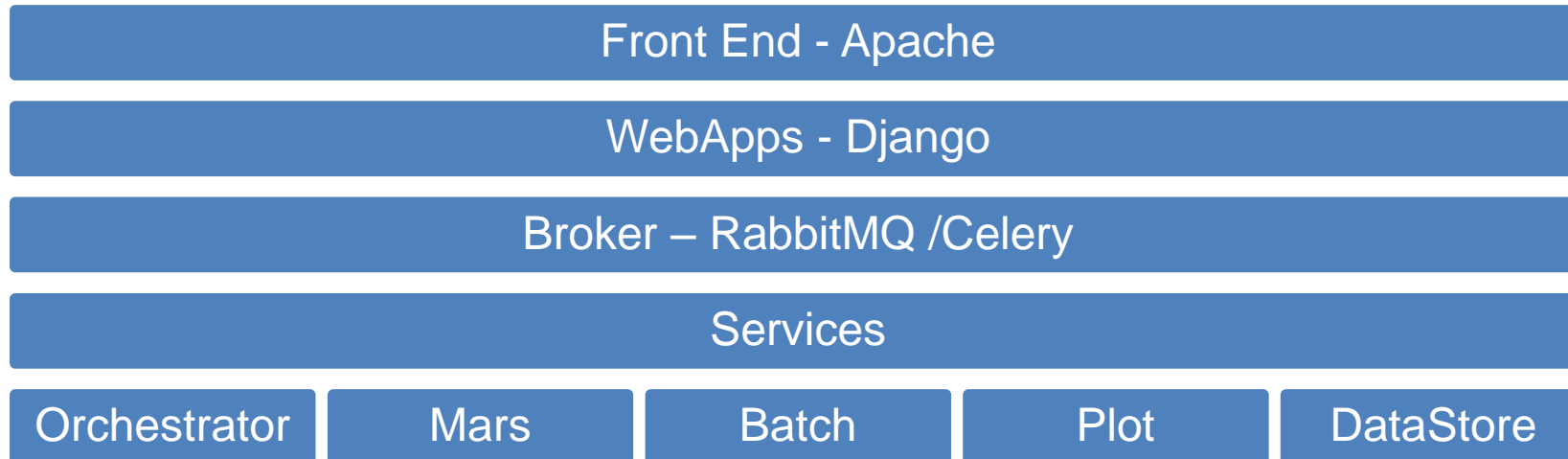
Wall

- Web charts
- Eccharts products
- Videos
- External web sites
- Metview Link

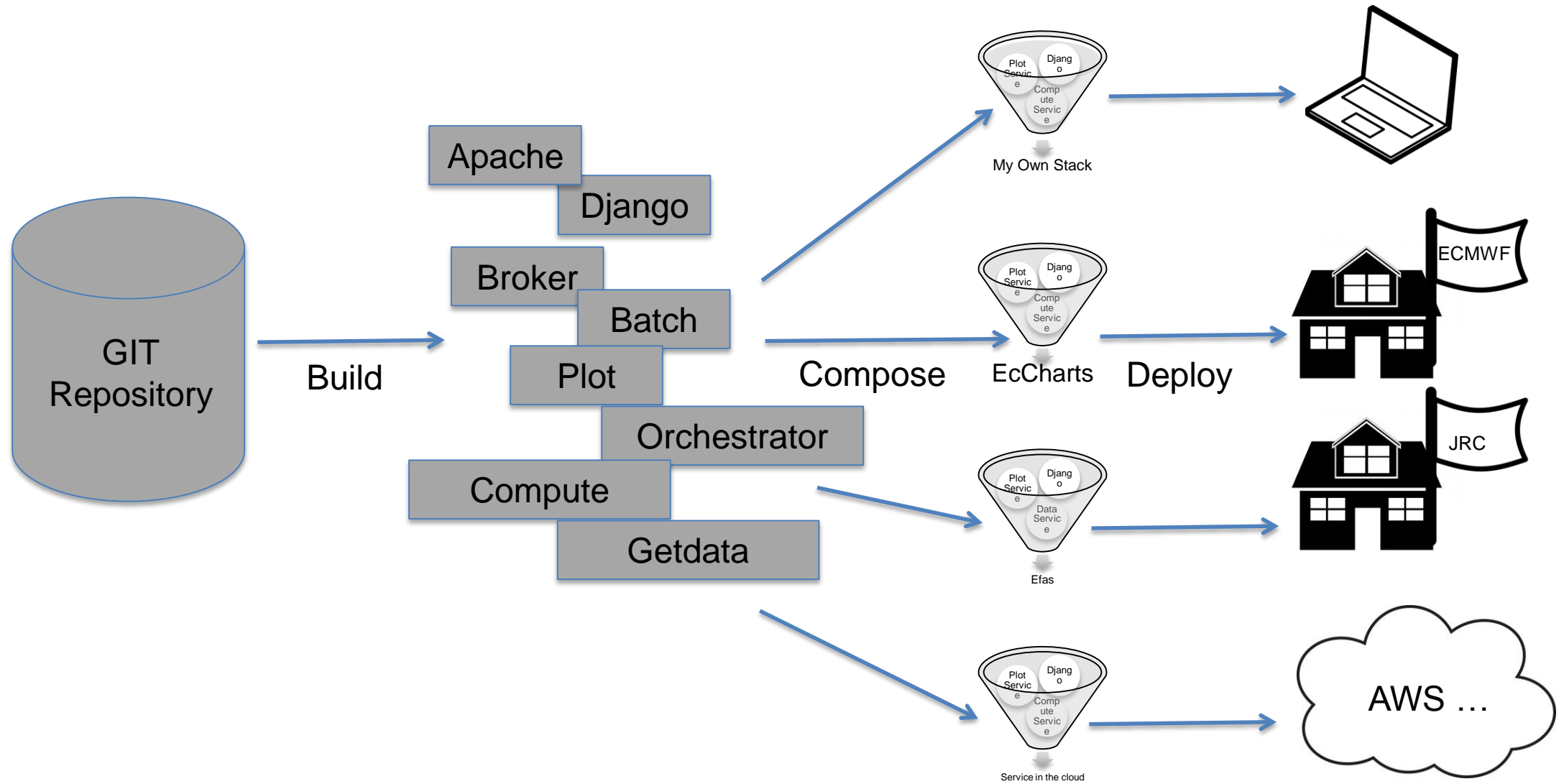


ecCharts

- Forecaster
- Dashboard
- WMS
- Clickable charts



Deployment



Future plans

- Optimisation, optimisation...
- Continuous integration and deployment
- Actively investigate the use of Docker to deploy, configure and scale our web stacks.
- Offers more tools to the explore our data and forecasts.

- Improve the user experience on ECMWF Web sites