



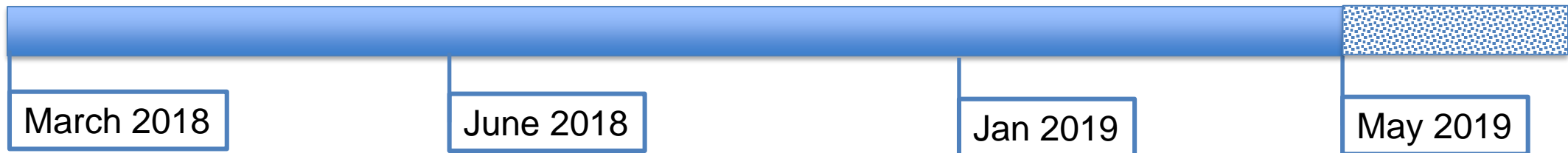
## Status of EFAS operation 18-19: experience, issues, challenges

EFAS-Comp team

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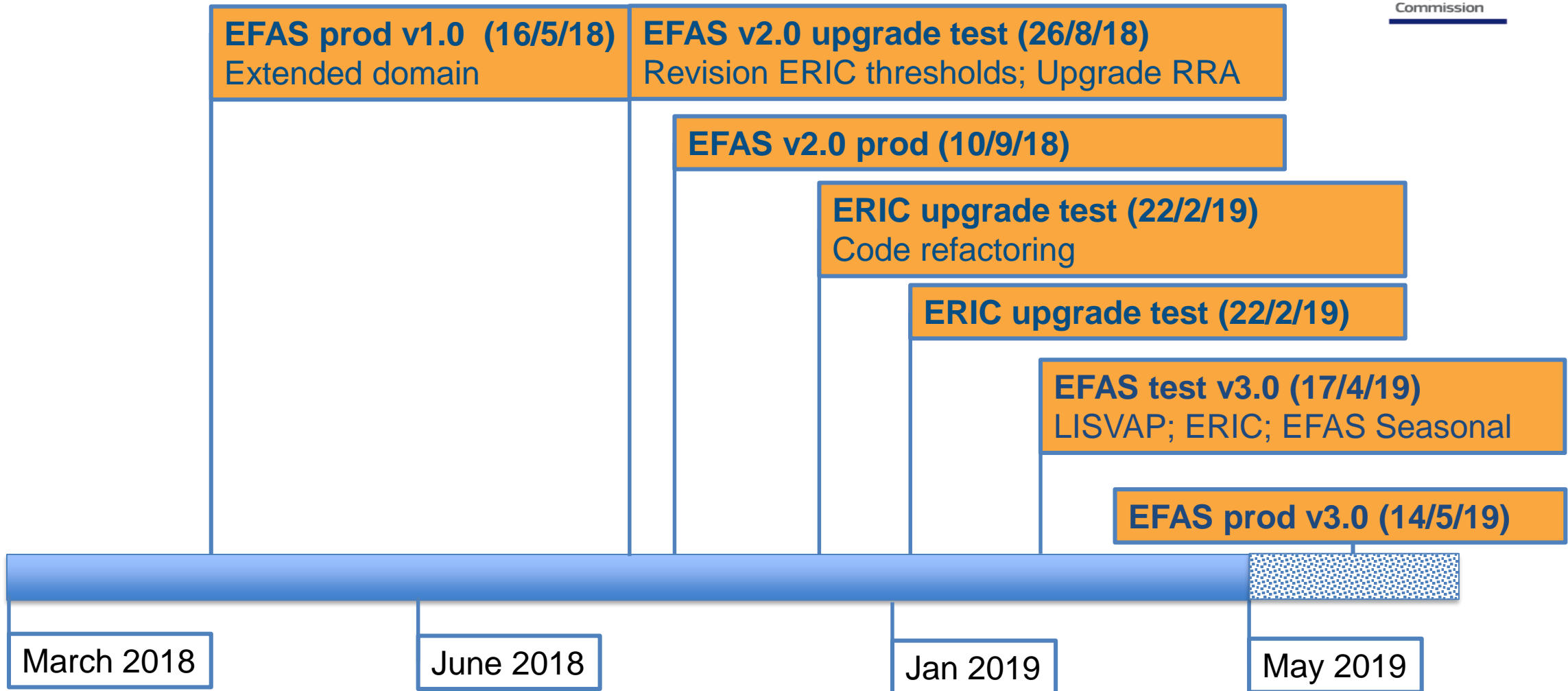


# EFAS-COMP key activities in 2018-19





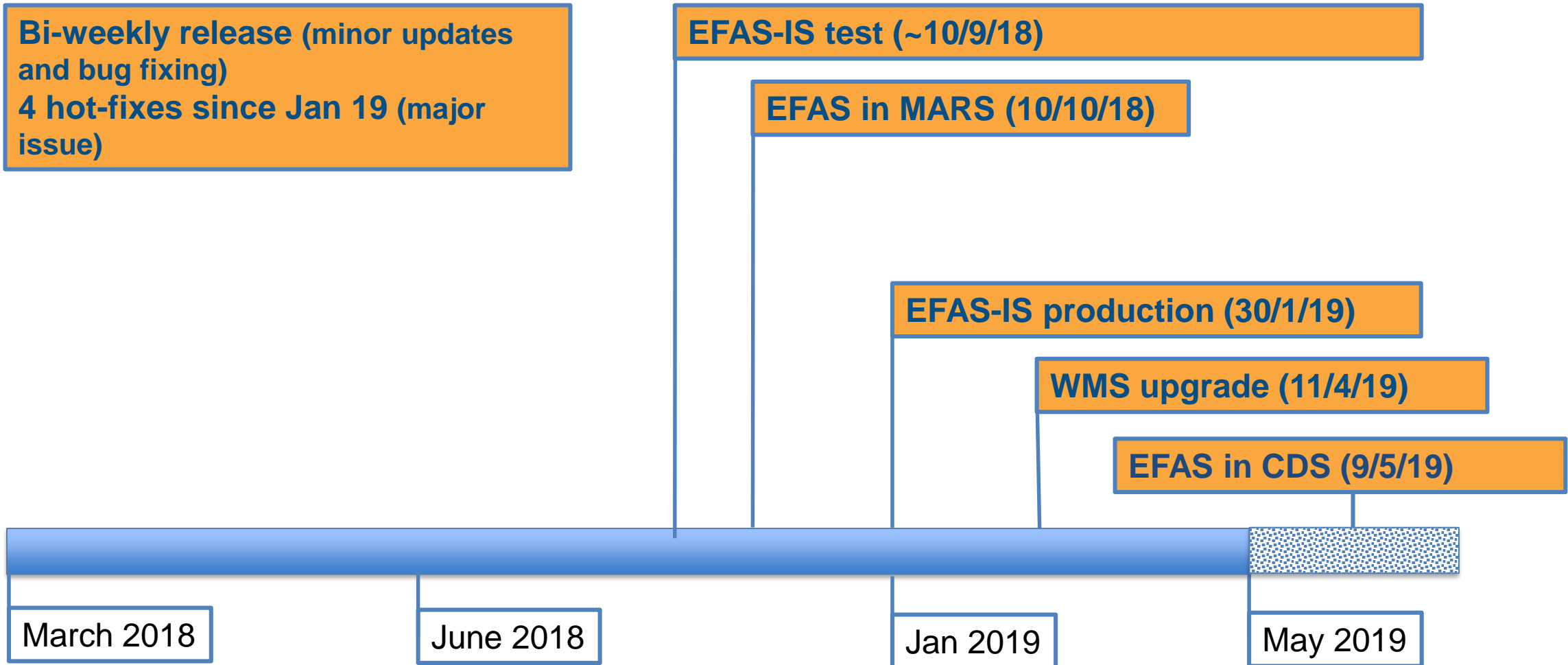
# EFAS-COMP key activities in 2018-19: model upgrade



<https://confluence.ecmwf.int/display/COPSRV/CEMS-Floods>



# EFAS-COMP key activities in 2018-19: system upgrade





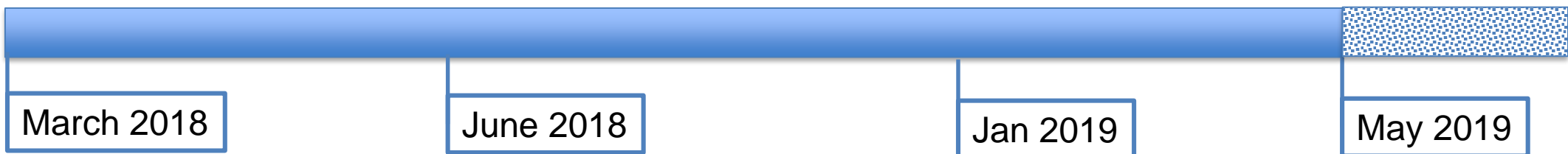
# EFAS-COMP key activities in 2018-19: service failure



22 ECMWF 'change freeze requests' system sessions  
(equivalent to 'high risk periods')  
No impact on EFAS release

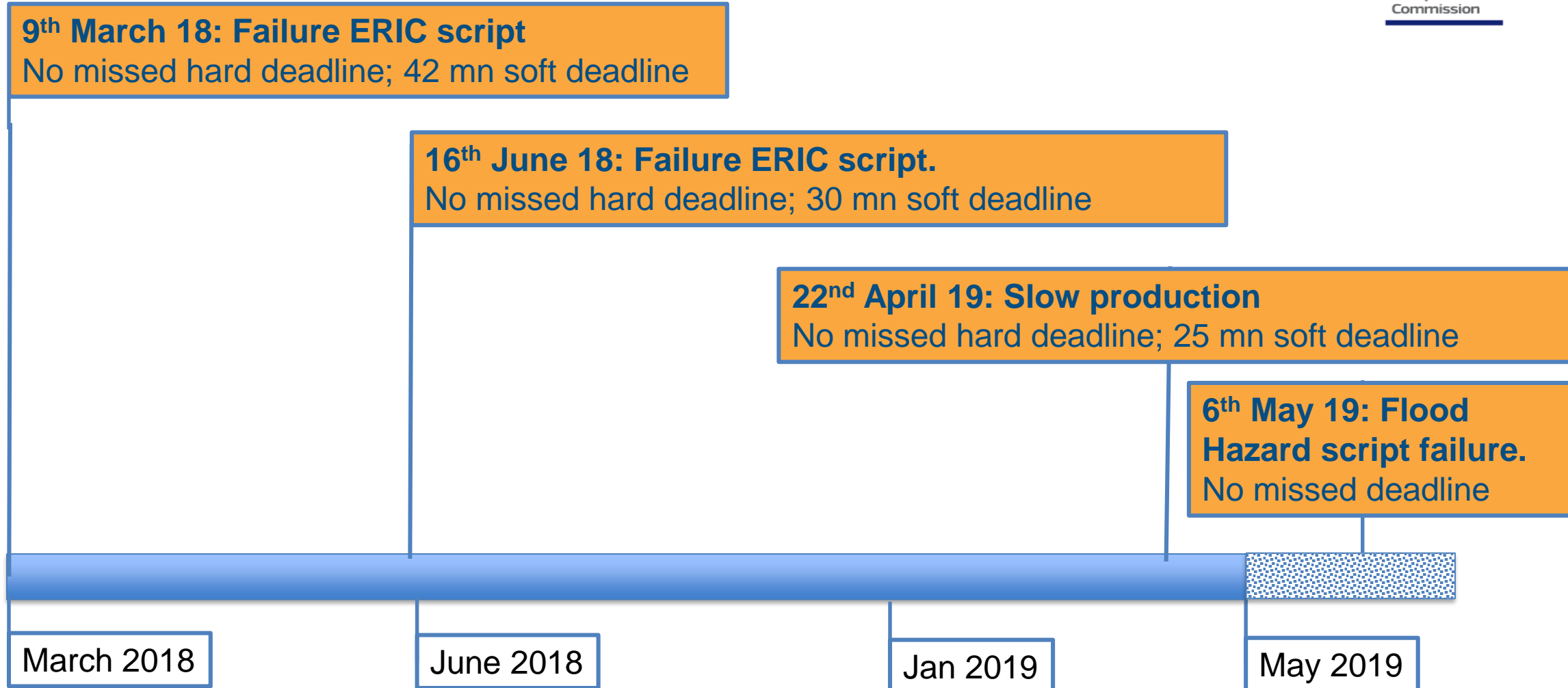
No cases of missed  
hard deadlines  
(02:00; 14:00)

3 cases of missed soft  
deadlines  
(11:00; 23:00)





# EFAS-COMP key activities in 2018-19: service failure





# Operational transfer from development: New web interface



- An improved **user experience**
- New **functionalities** – e.g. dashboard; feedback form; missed events
- **Accessible** for users and the public – public access to non restricted forecasts
- New interface with **more flexibility** for development
- New **deployment technology** for faster release cycle

More detail during the workshop on data access

The screenshot shows the homepage of the European Flood Awareness System (EFAS). The header includes the 'Emergency Management' logo, a search bar, and navigation links for 'About', 'Products', 'Data access', 'Collaborate', 'News and events', 'Resources', 'Partners', and 'Notifications'. The main banner features a large image of a bridge over water with the text 'European Flood Awareness System'. Below the banner, there are three sections: 'Latest events' with a 'Hydrological reformation' icon and a 'Live map' section; 'Access the map viewer' with a map thumbnail; and 'Latest news' with a 'Welcome to the Climate Data Store' article. A news item at the bottom states 'EFAS v3.0 was released on 13 May 2019'.

The screenshot displays the Copernicus Emergency Management System (CEM) interface. The top navigation bar includes 'Home', 'Viewer', 'Dashboard', 'Feedback', and 'Cart'. The main area shows a map of Europe with various flood forecast layers. A 'Feature Info' window is open, displaying a 'Forecast return period of ERIC' graph. The graph shows a distribution of return periods with a peak at 100 years. The 'LAYERS' panel on the right lists several forecast layers: 'ECMWF-ENS Prob. Pr > 50mm', 'Acc. Precip. Det. ECMWF', 'ECMWF-ENS > 5-year RP', 'ECMWF-ENS > 20-year RP', and 'ERIC - Reporting Points'. The bottom of the interface shows a scale bar from 0 to 500km and the text 'Europe's eyes on Earth'.



# Operational transfer from development: Archiving EFAS data



## EFAS data archiving

- **ECMWF MARS** archive (from 10 October 2018)
- Copernicus Climate Change Service **C3S Climate Data Store** (from 9 May 2019)
- Required defining parameters for archiving and setting up a new data stream to CDS

## Archived data include:

- **Forecasts** from 2018-10-10 – NRT
- **Long-term run** from 1991-2018, driven by observations
- Discharge, soil moisture and snow water equivalent

## More detail during the workshop on data access

mf.int/mars-catalogue/?origin=ecmf&stream=efas&levtype=sfc&expver=1&month=apr&year=2019&model=lisflood&type=fc&class=ce



### MARS Catalogue

Date (12 values)	Time (2 values)	Step (41 values)	Parameter (3 values)
2019-04-01	00:00:00	0	Mean discharge in the last 6 hours
2019-04-02	12:00:00	6	Snow depth water equivalent
2019-04-03		12	Total precipitation in the last 6 hours
2019-04-04		18	
2019-04-05		24	
2019-04-06		30	
2019-04-07		36	
2019-04-08		42	
2019-04-09		48	
2019-04-10		54	

- [Check for availability](#)
- [View the MARS request](#)
- [Estimate download size](#)
- [Retrieve the selection in GRIB](#)
- [Retrieve the selection in NetCDF](#)

#### Note about availability

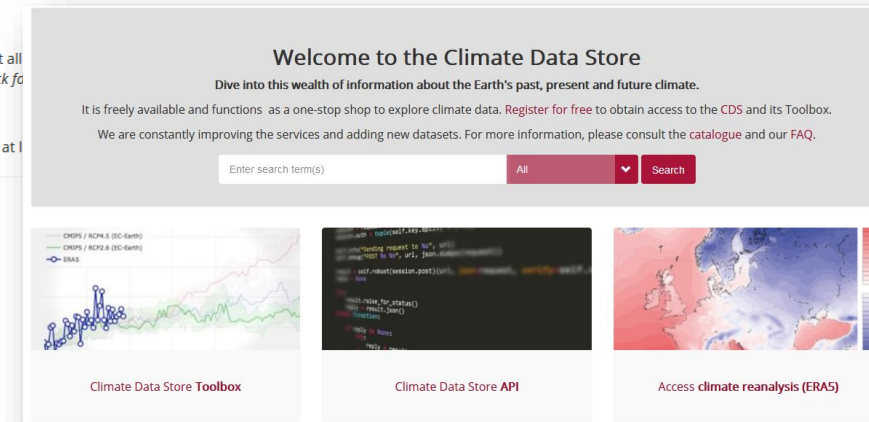
Some of the fields may not be archived at all requested fields. For that, follow the [Check for availability](#) link.

#### Retrieving

In order to retrieve data, you must select at least one parameter.

#### Current selection

origin: **ecmf**, edzw  
 levtype: **sfc**, sol  
 month: jan, feb, mar, **apr**  
 year: 2018, **2019**  
 type: cf, **fc**, fu, go, pf, sfo  
 model: **lisflood**  
 expver: 1, 9001  
 stream: **efas**, efd  
 class: at, be, c3, **ce**, ch, co, cs, de, dk, dm, dt, e2, e4, ea, el, em, en, ep, er, es, et, fr, ie, it, l5, la, lw, mc, me, ms, nl, no, nr, od, pt, pv, rd, rm, s2, se, to, tl, tr, uk, us, vt







# System upgrade: Web Map Service – Time (WMS-T)



## WMS service reinstated

- **Real-time** data access to authorised users
- Access to **archived forecast** to general public (new)

## Functionalities:

- Direct import of layers into **external software**
- Direct display of layers into **external web application**

## Instructions and guide

<https://confluence.ecmwf.int/display/COPSRV/CEM+S-Floods>

Service Type	Credentials
WMS	https://www.efas.eu/api/wms/ Non authenticated users have access to non-realtime forecasts only (older than a month)
SOS	This functionality is only available to EFAS partners and third party users. See <a href="#">become an EFAS Partner</a> section for more information.

**Attention:** Access to EFAS real-time products is currently restricted to EFAS partners only. EFAS archived products (forecasts older than one month) are freely accessible.

The EFAS web services are subject to the Copernicus Emergency Management Service – flood early warning and monitoring systems [Terms and conditions](#).

**Forecast return period of ERIC**  
COSMO-LEPS 2019-03-28 00:00 UTC

Return Period [years]

Area = 55 km<sup>2</sup>

P(T > 5) = 18 %

P(T > 2) = 47 %

--- LEPS mean  
--- 25% - 75%

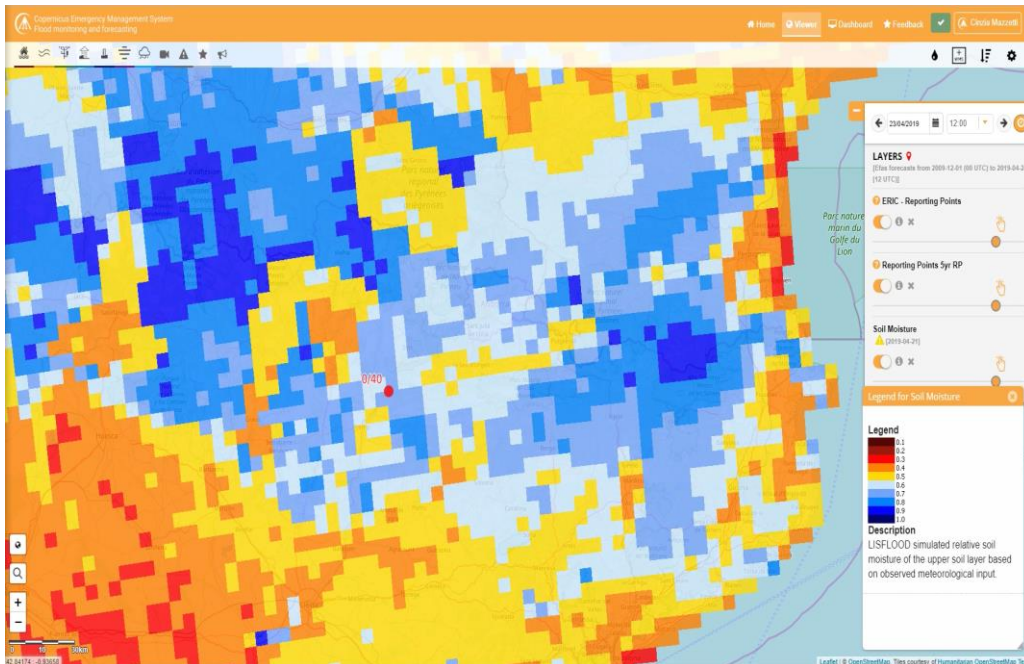


# Model upgrade: EFAS v3.0

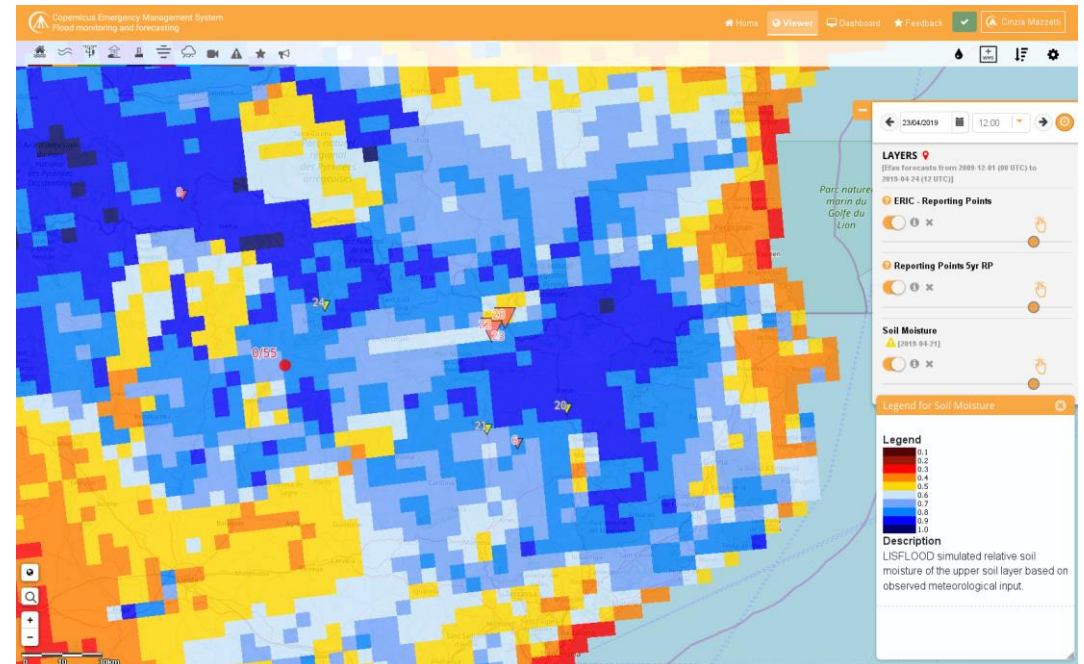


- Upgraded **Evaporation** module (Penman-Montieth) introduced (LISVAP)
- New ecFlow suite
- Evaluation of **ERIC** thresholds
- Upgraded **Seasonal** forecast suite (new climatology)

EFAS 2.0



EFAS 3.0





# Model upgrade: ERIC code Refactoring

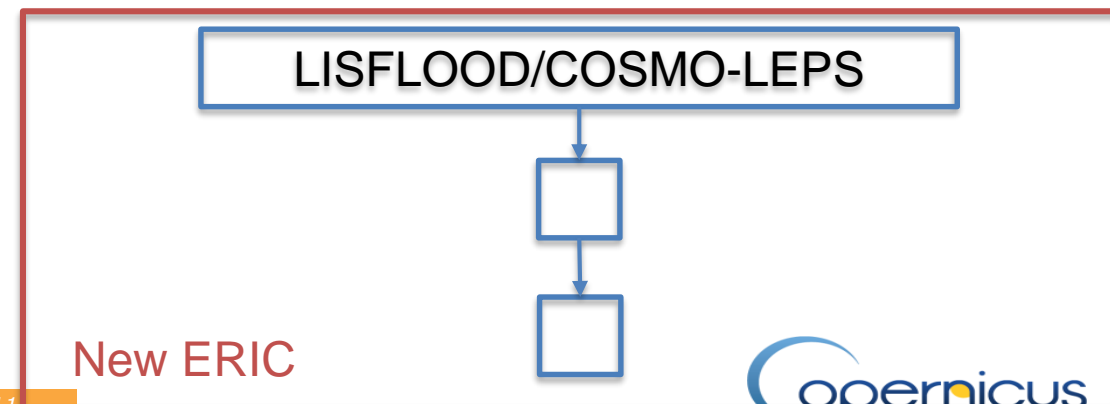
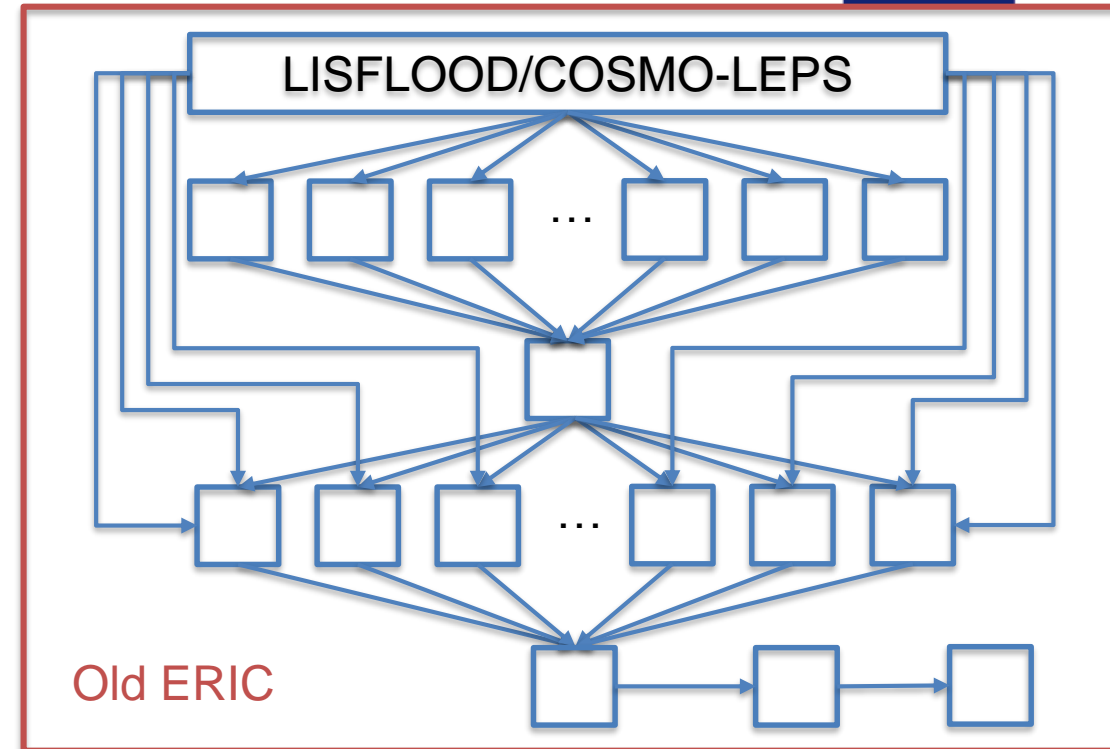


## Original workflow

- **Mixed** PCRaster, bash, R and python scripts
- Communication **only** through **filesystem**

## New workflow: **python framework**:

- Better **flexibility**: modular framework, all the parameters can be gathered in one place, etc.
- Better **efficiency**: allowing parallelism, keep data in memory as much as we can, etc.
- New approach implemented on ERIC:
  - Workflow **simplified**: two main tasks, redundant code/tasks removed (interpolation done twice, etc.)
  - **Faster** simulations: depending on the resources available (8-32 cores), runs in 5-20 minutes vs several hours originally depending on disk load



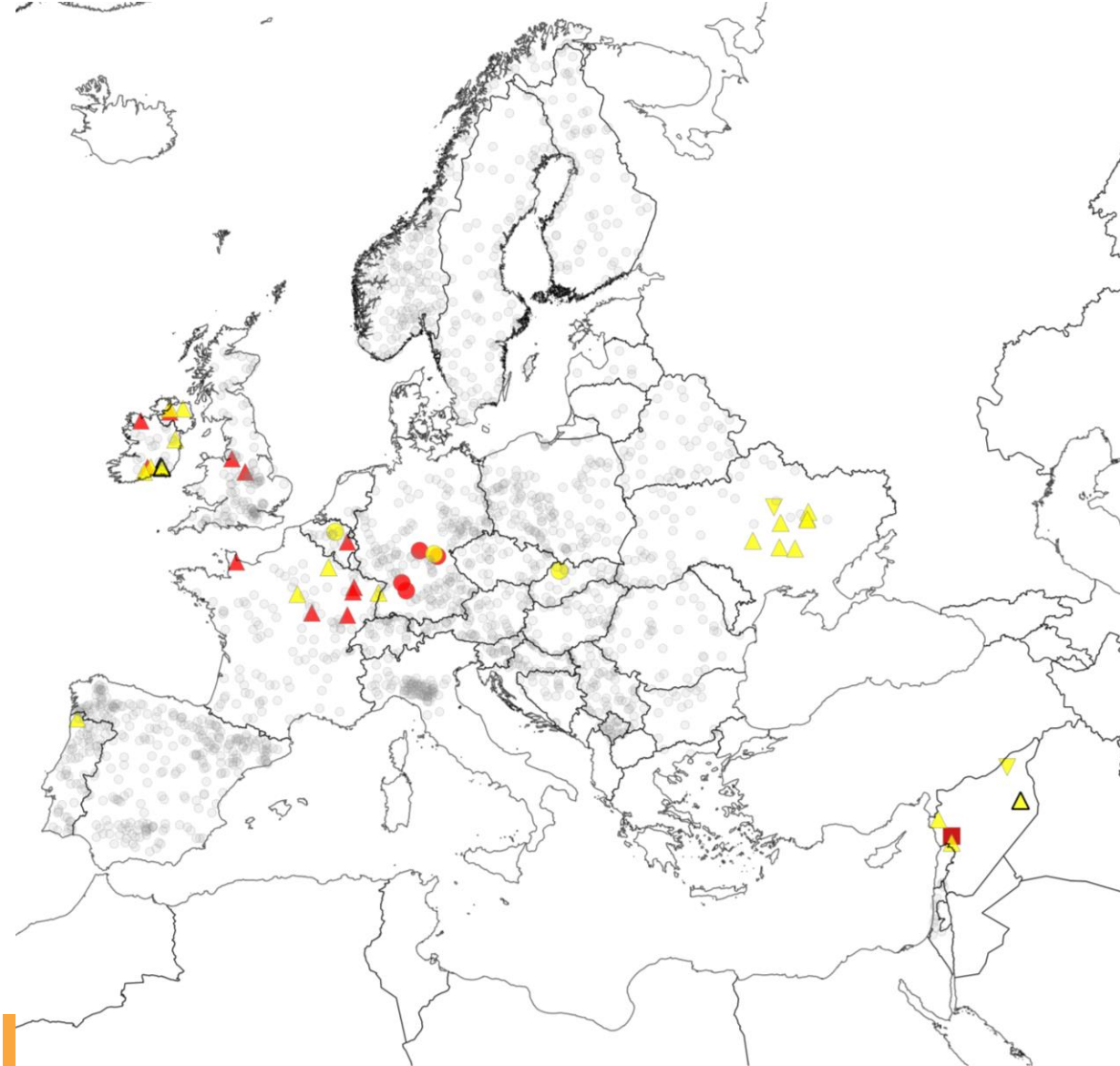


## Improvements behind the scene:

- ❑ Improved performance of product generation
- ❑ Review methodology behind Reporting Points (refactoring of scripts and optimization)
- ❑ Link product generation to the Geo-Spatial database

## Improvements to EFAS-IS:

- ❑ Rationalization of EFAS layers
- ❑ Introducing fixed reporting points:
  - Located at river gauges
  - Can be queried at any time
  - Display all available information in one window using different tabs





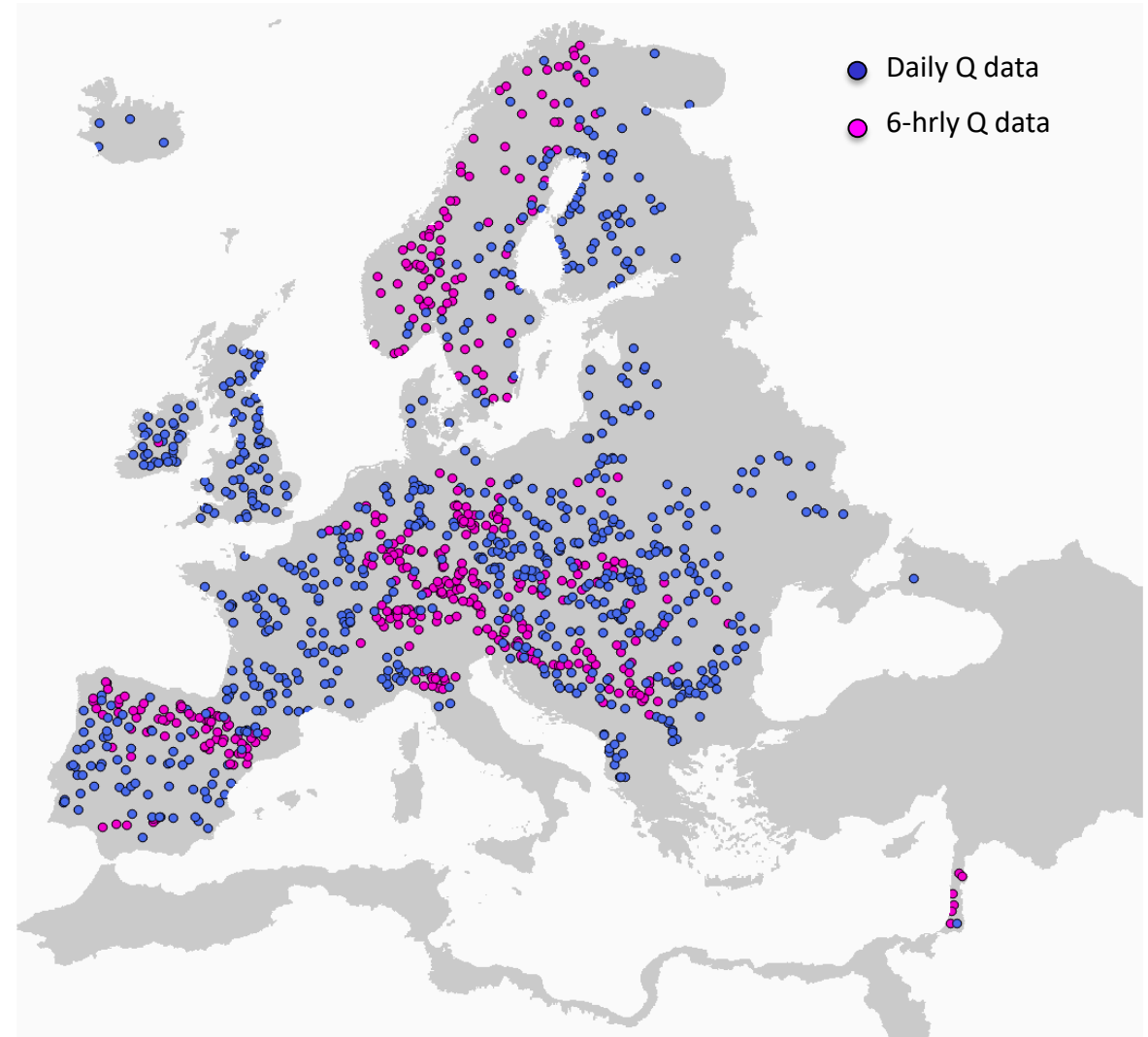
# On going development EFAS 6-hourly calibration



- ❑ Selection of calibration stations
- ❑ Quality assessment of calibration forcings and Qts
- ❑ Implementation of ecFlow suite for calibration management
- ❑ Porting of codes to ECMWF IT infrastructure and HPC

Total number of calibration stations (quality checked)	1150 [715]
Number of stations with 6hrs data within calibration stations	359 [128]
Calibration-Validation period	1990-2017

*[EFAS 2.0 calibration in brackets]*





Thank you

