



How to access EFAS data through MARS



MARS

Emergency
Management

MARS is ECMWF's **M**eteorological **A**rchival and **R**etrieval **S**ystem. The system have the following features:

- Facilities to Archive and Retrieve environmental data
- MARS is a 24/7 service
- Batch and interactive modes are supported
- Large amount of data, both in size and number of items stored
- Large number of users with different requirements.



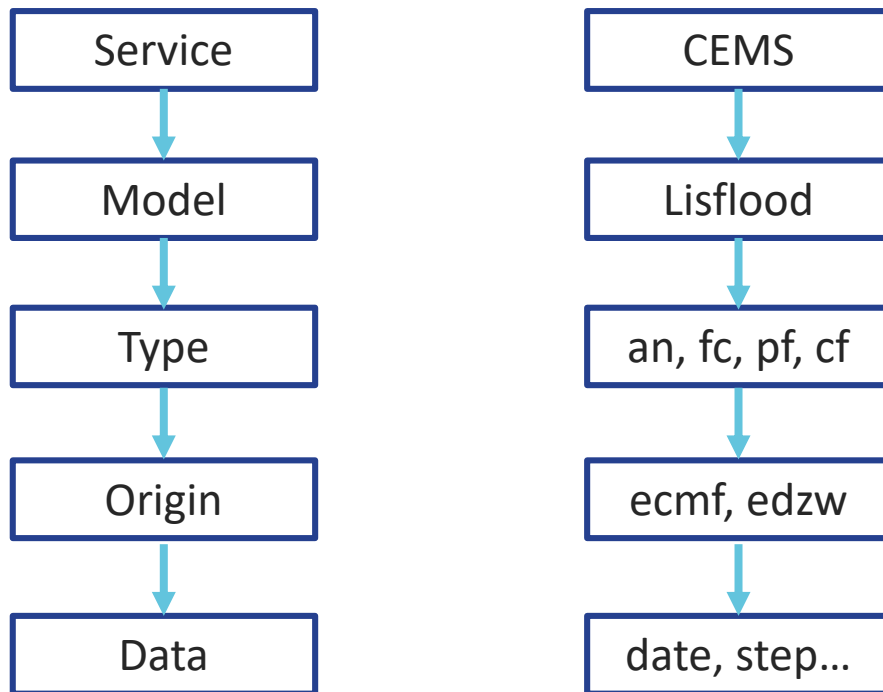
MARS actions

- **retrieve** to extract data from MARS or from a source file
- **compute** will perform mathematical operations on retrieved grid point fields in GRIB format
- **list** queries MARS about the data availability for a given request, without actually retrieving the data. It is suitable for interactive or batch use to check availability of certain datasets and its collocation in the archive
- **read** can be used to filter or manipulate data already retrieved into a file
- **write** is mainly used to save data from fieldsets, a temporary storage, into files,



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MARS tree

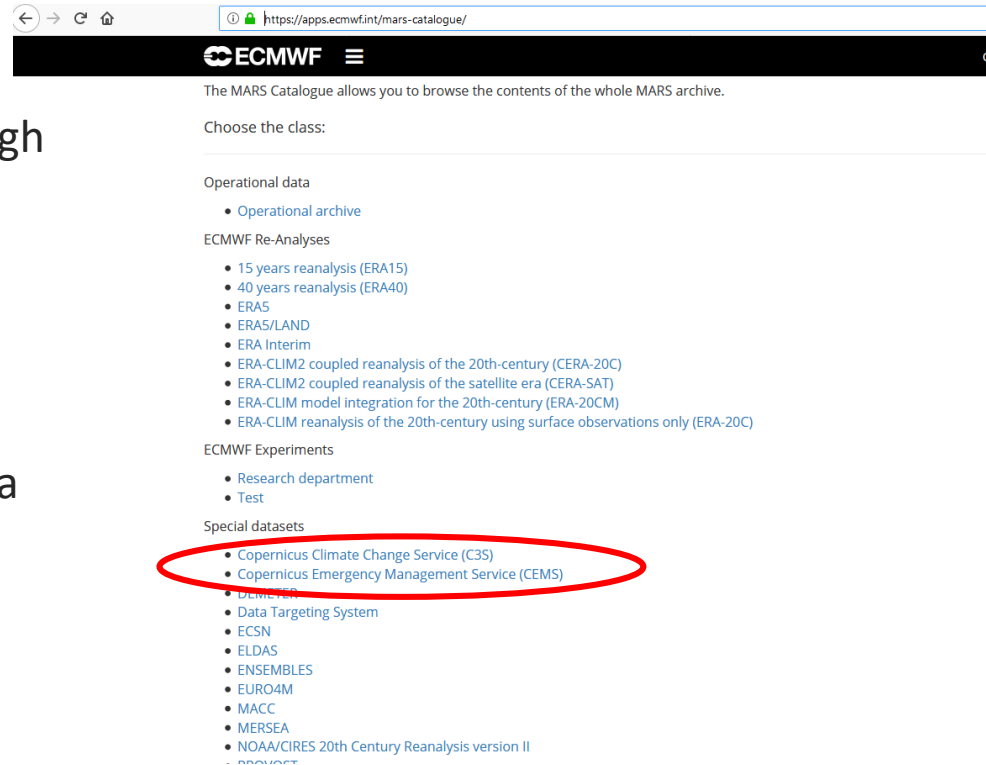




You can access the data through the adress

<https://apps.ecmwf.int/mars-catalogue/>

You will then see all available datasets. Select the CEMS data by clicking on the link





Here you see the two main streams of EFAS data, the **climatology** and the **operational model**. The climatology is the full set of runs from 1990-2018, the operational model are the real-time forecasts.

Click on operational model

ECMWF

MARS Catalogue Current activity

MARS Catalogue

Copernicus Emergency Management Service (CEMS)

Choose the stream:

European Flood Awareness System

- Climatology
- Operational model**

Current selection

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, ti, to, tr, uk, ur, yp, yt



When you make selections you can see them as **bold** under the “Current selection”. You can always alter your selection by clicking on an alternative choice.

We now see the version 1, which is the operational model version, and 9001 which is the test version.

Click on “9001”

ECMWF

MARS Catalogue Current activity

MARS Catalogue

Operational model

Choose the version:

- 1 (Operational version)
- 9001

Current selection

stream: **efas**, efcl

class: at, be, c3, **ce**, ch, co, cs, de, dk, dm, dt, e2, e4, ea, ei, el, em, en, ep, er, es, et, fr, ie, it, l5, la, lw, mc, me, ms, nl, te, ti, to, tr, uk, ur, yp, yt



At this stage we can see the different types of data available, and the main types are either Forecasts (deterministic), Ensembles (control and perturbed) and Observations. You will see the type “Simulation forced with observation”. These are what are also known as the “water balance run”. Fillup is used to bridge the gap between observations and forecasts in real-time.

The screenshot shows the ECMWF MARS Catalogue web interface. At the top, there is a navigation bar with the ECMWF logo, a hamburger menu, and links for 'Contact' and 'Fredrik Wetterhall'. Below this is a secondary bar with 'MARS Catalogue' and 'Current activity'. The main heading is 'MARS Catalogue'. Underneath, it says 'lisflood' and 'Choose the type:'. There are three sections: 'Assimilations' with a bullet point for 'Fill Up'; 'Forecasts' with a bullet point for 'Forecast'; and 'Ensembles' with bullet points for 'Control forecast' and 'Perturbed forecast'. Below these is the 'Observations' section with bullet points for 'Gridded observations' and 'Simulation forced with observations'. At the bottom, the 'Current selection' section shows 'model: lisflood', 'expver: 1, 9001', 'stream: efas, efcl', and a 'class:' field with a long list of codes including 'at, be, c3, ce, ch, co, cs, de, dk, dm, dr, e2, e4, ea, el, em, en, ep, er, es, et, fr, ie, it, is, la, lw, mc, me, ms, nl, no, nr, od, pt, pv, rd, rm, s2, se, te, tl, to, tr, uk, ur, yp, yt'.



In this example I selected fc and can then see the available years in the archive. I click on the latest, 2019

The screenshot shows the ECMWF MARS Catalogue web interface. The header includes the ECMWF logo and navigation links for 'MARS Catalogue', 'Current activity', 'Contact', 'Fredrik Wetterhall', and 'Help'. The main content area is titled 'MARS Catalogue' and 'Forecast'. It prompts the user to 'Choose the year:' and displays a list of years: 2018 and 2019. Below this, the 'Current selection' is shown with the following parameters: type: cf, fu, go, pf, sfo; model: lisflood; expver: 1, 9001; stream: efas, efdl. The 'class' parameter lists a wide range of codes including at, be, c3, ce, ch, co, cs, de, dk, dm, dt, e2, e4, ea, ei, 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, te, ti, to, tr, uk, ur, yp, yt.

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MARS Catalogue Current activity

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Help

MARS Catalogue

Forecast

Choose the year:

- 2018
- 2019

Current selection

type: cf, fu, go, pf, sfo

model: lisflood

expver: 1, 9001

stream: efas, efdl

class: at, be, c3, ce, ch, co, cs, de, dk, dm, dt, e2, e4, ea, ei, 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, te, ti, to, tr, uk, ur, yp, yt



In the next step I can see the two types of models that were used as forcing data, ECMWF and DWD. For this exercise I select ECMWF

The screenshot shows the ECMWF MARS Catalogue web interface. The header includes the ECMWF logo and navigation links for 'MARS Catalogue' and 'Current activity'. The main content area is titled 'MARS Catalogue' and 'Surface'. It features a 'Choose the origin:' section with a list of options: 'DWD' and 'ECMWF'. Below this, the 'Current selection' section displays various parameters: 'levtype: sfc', 'month: jan', 'year: 2018, 2019', 'type: cf, fc, fu, go, pf, sfo', 'model: lisflood', 'expver: 1, 9001', 'stream: efas, efd', and 'class: at, be, c3, ce, ch, co, cs, de, dk, dm, dt, e2, e4, ea, ei, 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, te, ti, to, tr, uk, ur, yp, yt'.

ECMWF

Contact Fredrik Wetter

MARS Catalogue Current activity

MARS Catalogue

Surface

Choose the origin:

- DWD
- ECMWF

Current selection

levtype: sfc

month: jan

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, ei, 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, te, ti, to, tr, uk, ur, yp, yt



Finally, I get to the point where I can see the available parameters and can make the final choices. I can here also choose to either check if the data is available, download the data directly, or to see the MARS request as code.

 Contact Fredrik Wetterhall 

MARS Catalogue Current activity Help

Date (9 values)	Time (2 values)	Step (41 values)	Parameter (3 values)
2019-01-01	00:00:00	0	Mean discharge in the last 6 hours
2019-01-02	12:00:00	6	Snow depth water equivalent
2019-01-03		12	Total precipitation in the last 6 hours
2019-01-04		18	
2019-01-05		24	
2019-01-06		30	
2019-01-07		36	
2019-01-08		42	
2019-01-09		48	
		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 levels or all forecast time steps. Before retrieving data you may want to check the availability of the requested fields. For that, follow the [Check for availability](#) link.

Retrieving

In order to retrieve data, you must select at least one item in the lists above. You can select more than one item in each list.



Here, I selected a number of forecast dates, the 12 forecast and the first 5 steps for the parameter snow depth water equivalent.



MARS Catalogue

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Retrieving

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The retrieval looks like this in MARS language. This code can be altered, for example through a script to automatize retrievals and to customize the requests.

The screenshot displays the ECMWF MARS web interface. At the top, there is a black header with the ECMWF logo and a hamburger menu icon. Below this is a grey navigation bar containing links for 'MARS Catalogue', 'Current activity', 'Contact', 'Fredrik Wetterhall', and 'Help'. The main content area has a light blue background. It starts with a '< Return to selection' link. Below that is the label 'request' and the text 'Estimated number of fields: 54'. There are two tabs: 'MARS request' (active) and 'Metview macro'. The 'MARS request' tab contains a text area with the following MARS request code:

```
retrieve,  
class=ce,  
date=2019-01-01/to/2019-01-09,  
expver=9001,  
levtype=sfc,  
model=lisflood,  
origin=ecmf,  
param=228141,  
step=0/6/12/18/24/30,  
stream=efas,  
time=12:00:00,  
type=fc,  
target="output"
```



Conclusions

MARS is a very reliable and efficient tool to download data, but it requires some effort in terms of understanding how the mechanics work.

However, once a MARS retrieval is setup it is very easy to monitor and check that the transfers are being made.

MARS retrievals are most suitable for operational work and research.