



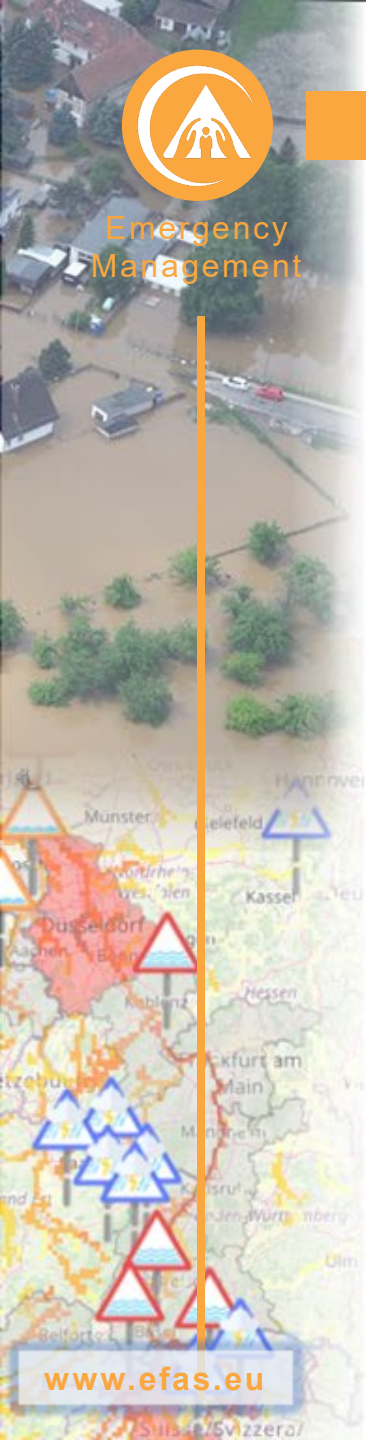
Global Flood Monitoring (GFM)

Layers and Functionalities

Copernicus Emergency Management System
European Flood Awareness System
17th EFAS annual meeting 2022



Emergency
Management



GFM in a nutshell

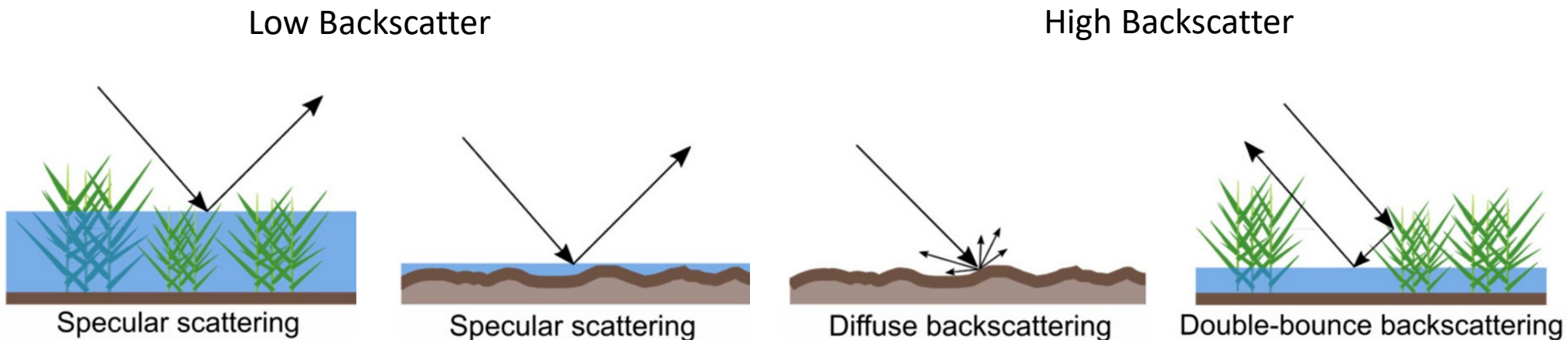
www.efas.eu



Emergency
Management

What is GFM?

- Copernicus **Sentinel-1** Synthetic Aperture Radar (SAR)
- Detection of **water surfaces** based on radar backscatter data

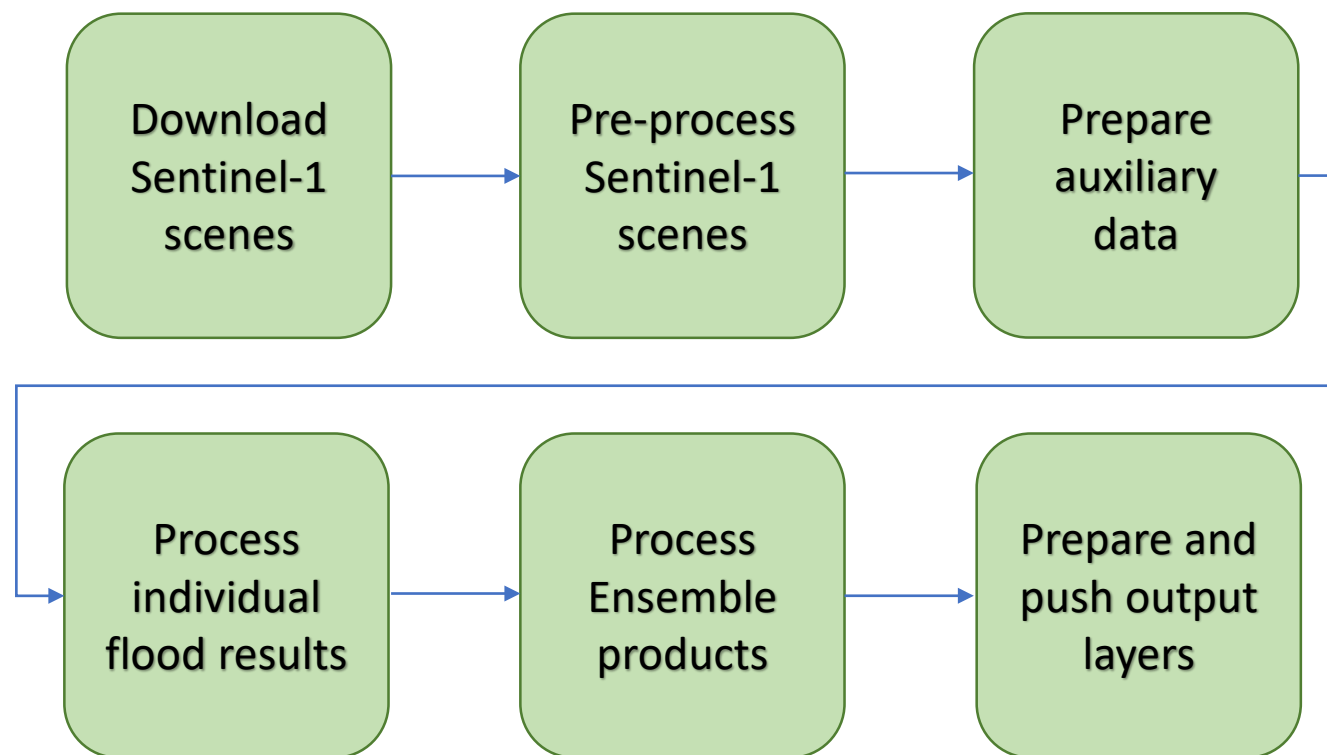




Emergency
Management

What is GFM?

- **Fully automatic** processing chain from downloading to visualization





Emergency
Management

What is GFM?

- **Ensemble** of three flood mapping algorithms
- **10 output layers** including
 - Flood extent
 - Likelihoods
 - Exclusion Mask
 - Advisory flags
 - Sentinel-1 footprint
 - ...



Emergency
Management

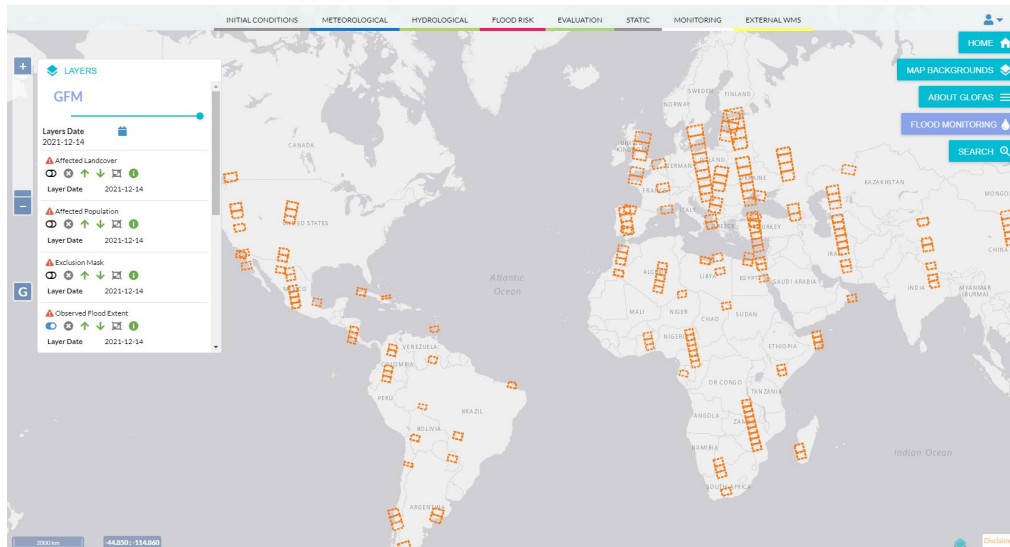
Data access

www.efas.eu



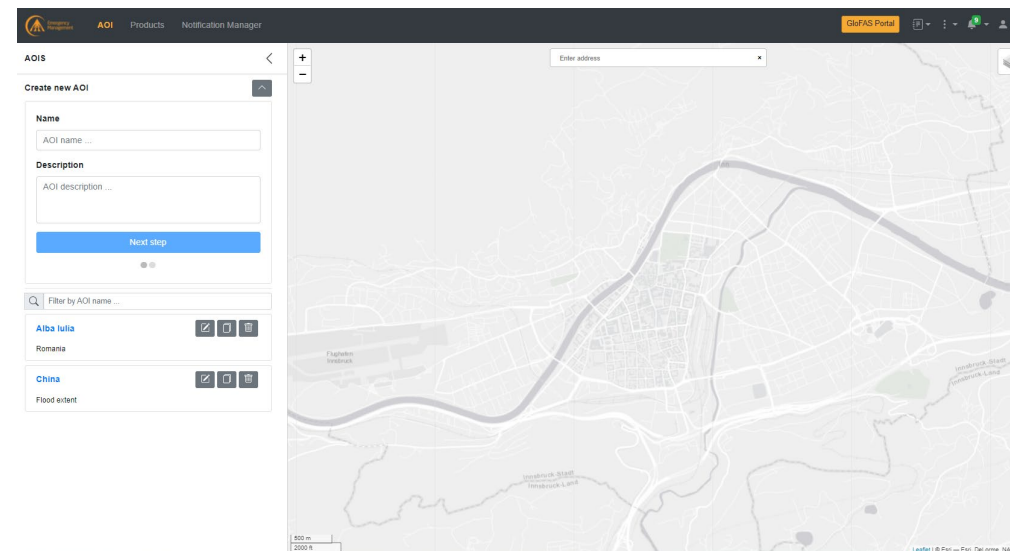
Emergency
Management

Data access



Web Map Service with temporal
layers (WMS-T)
(GloFAS, soon EFAS)

Web application for product
download and configurations







Emergency
Management

Data access

- GloFAS
www.globalfloods.eu/glofas-forecasting/
- EFAS (soon)
- Product Download
portal.gfm.eodc.eu
- One login for all components and functionalities
(synchronised in the backends)

www.efas.eu

Implemented by the European Commission as part of the Copernicus Programme Log In

  Home About Products Data Access Resources Forecast Wiki Monitoring Wiki

Log In

Please sign in with one of your existing third party accounts.

[Login with Google](#)

Sign in manually

Username


Password

[Forgot your password?](#)

Keep me logged in

[Log in](#)

[Create an account](#)



Login
Enter your GFM credentials to login

E-mail

Password

[Login](#)

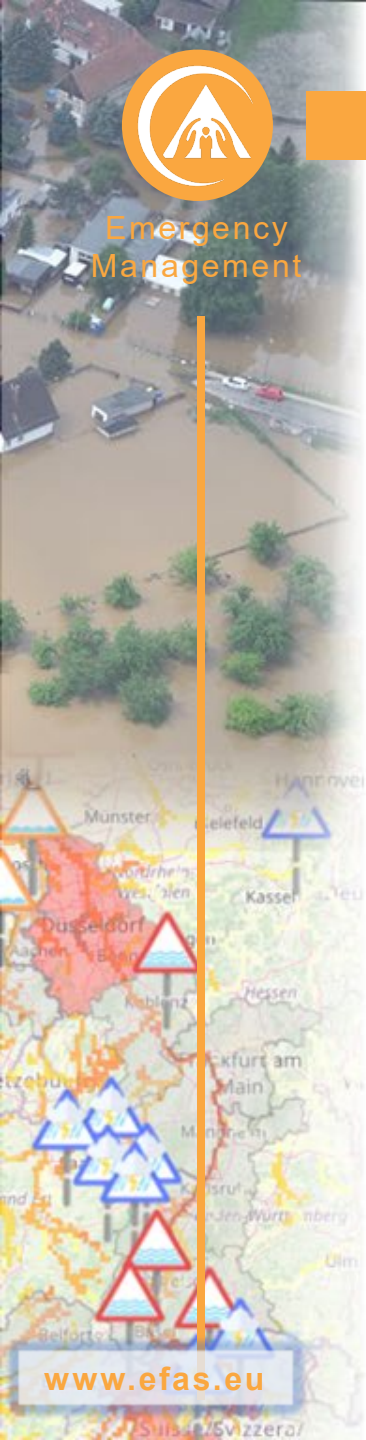
[Forgot Password? or Register](#)

or

[Sign in with GloFAS](#)



Emergency
Management



Visualize GFM data

www.globalfloods.eu/glofas-forecasting

www.efas.eu





LAYERS

GFM

Layers Date 2022-09-22

Affected Landcover Layer Date 2022-09-22

Affected Population Layer Date 2022-09-22

Exclusion Mask Layer Date 2022-09-22

Observed Flood Extent Layer Date 2022-09-22

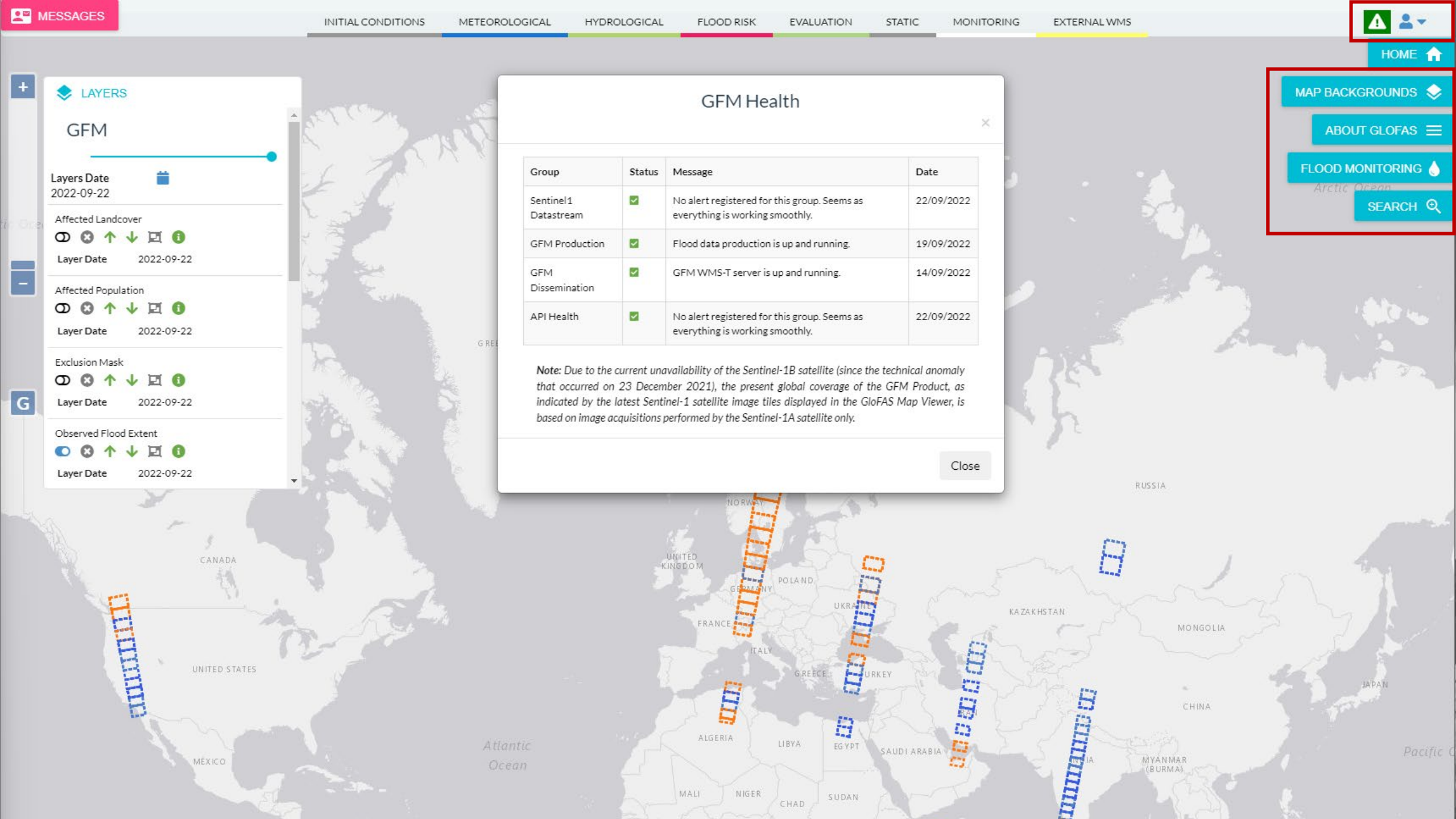
GFM Health

| Group | Status | Message | Date |
|----------------------|--------|--|------------|
| Sentinel1 Datastream | ✓ | No alert registered for this group. Seems as everything is working smoothly. | 22/09/2022 |
| GFM Production | ✓ | Flood data production is up and running. | 19/09/2022 |
| GFM Dissemination | ✓ | GFM WMS-T server is up and running. | 14/09/2022 |
| API Health | ✓ | No alert registered for this group. Seems as everything is working smoothly. | 22/09/2022 |

Note: Due to the current unavailability of the Sentinel-1B satellite (since the technical anomaly that occurred on 23 December 2021), the present global coverage of the GFM Product, as indicated by the latest Sentinel-1 satellite image tiles displayed in the GloFAS Map Viewer, is based on image acquisitions performed by the Sentinel-1A satellite only.

Close

- MAP BACKGROUNDS
- ABOUT GLOFAS
- FLOOD MONITORING
- SEARCH



LAYERS

GFM

Layers Date 2022-09-22

Affected Population
Layer Date 2022-09-22

Exclusion Mask
Layer Date 2022-09-22

Observed Flood Extent
Layer Date 2022-09-22

Reference Water Mask
Layer Date 2022-09-22

2022

Thu, Sep 22

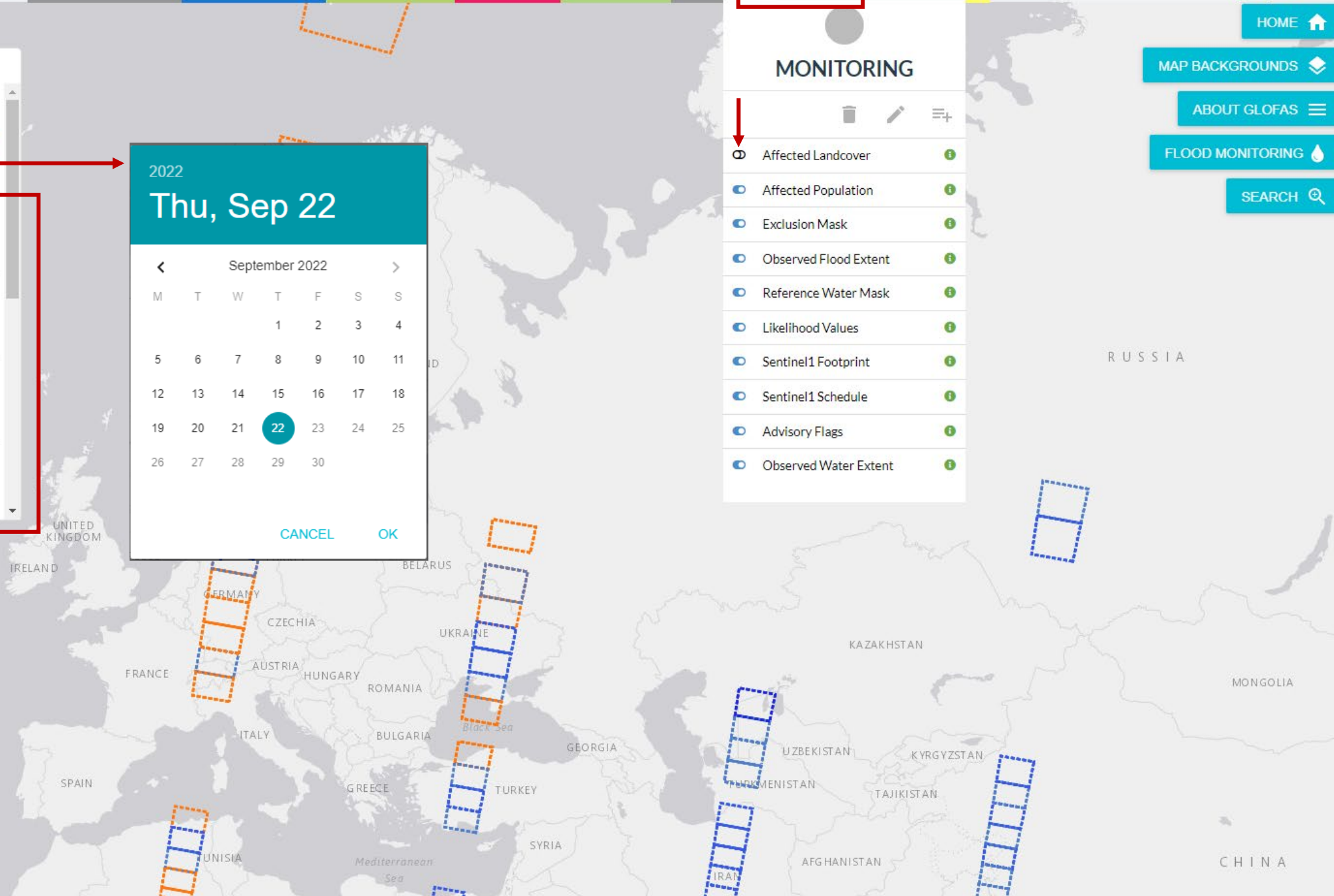
September 2022

| M | T | W | T | F | S | S |
|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

CANCEL OK

MONITORING

- Affected Landcover
- Affected Population
- Exclusion Mask
- Observed Flood Extent
- Reference Water Mask
- Likelihood Values
- Sentinel1 Footprint
- Sentinel1 Schedule
- Advisory Flags
- Observed Water Extent





LAYERS

GFM

Layers Date 2022-09-20

Exclusion Mask
Layer Date 2022-09-20

Observed Flood Extent
Layer Date 2022-09-20

Reference Water Mask
Layer Date 2022-09-20

Likelihood Values
Layer Date 2022-09-20

MAP BACKGROUNDS

- Bing Road**
Road view is the default map view and displays...
- Bing Aerial**
Aerial view overlays satellite imagery onto th...
- Bing Aerial with labels**
Bing Aerial with labels
- openStreetMap**
OpenStreetMap (OSM) is a collaborative project t...
- Grey Map**
- Empty Map**

LAYERS

GFM

Layers Date 2022-09-20

Exclusion Mask
Layer Date 2022-09-20

Observed Flood Extent
Layer Date 2022-09-20

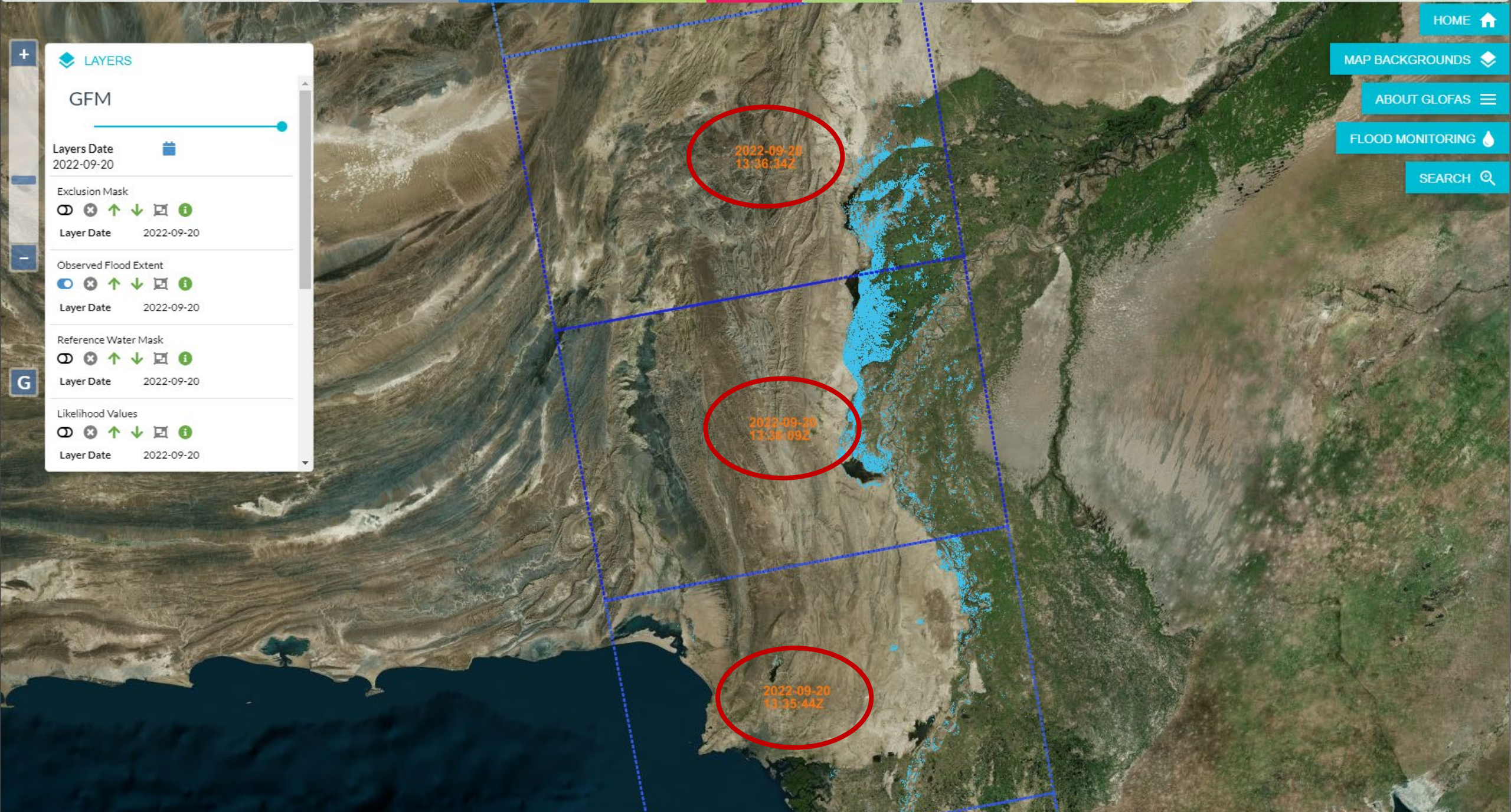
Reference Water Mask
Layer Date 2022-09-20

Likelihood Values
Layer Date 2022-09-20

2022-09-20
13:36:44Z

2022-09-20
13:36:09Z

2022-09-20
13:35:44Z



LAYERS

GFM

Layers Date
2022-09-20

Exclusion Mask
[Icons]

Layer Date
2022-09-20

Observed Flood Extent
[Icons]

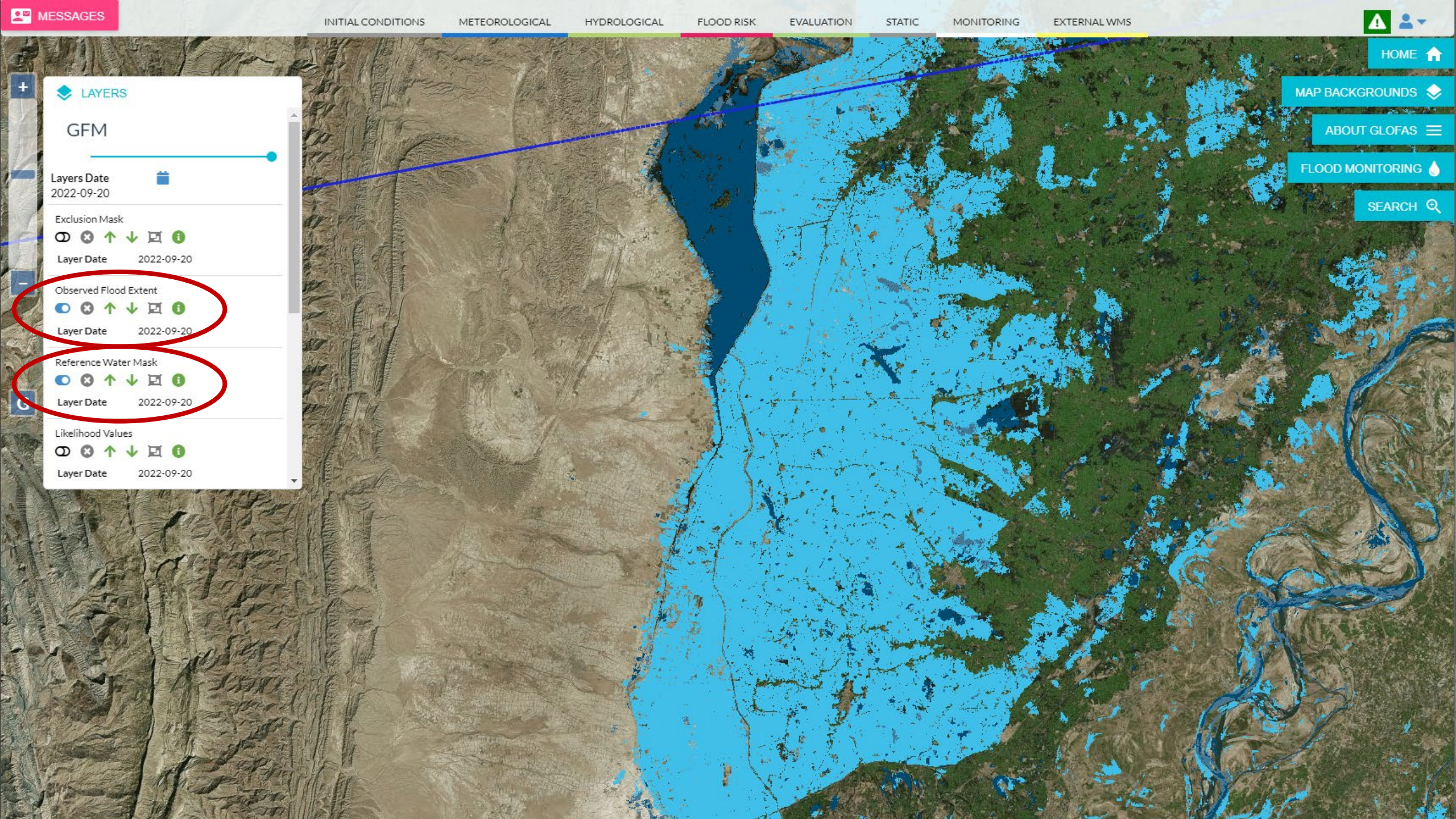
Layer Date
2022-09-20

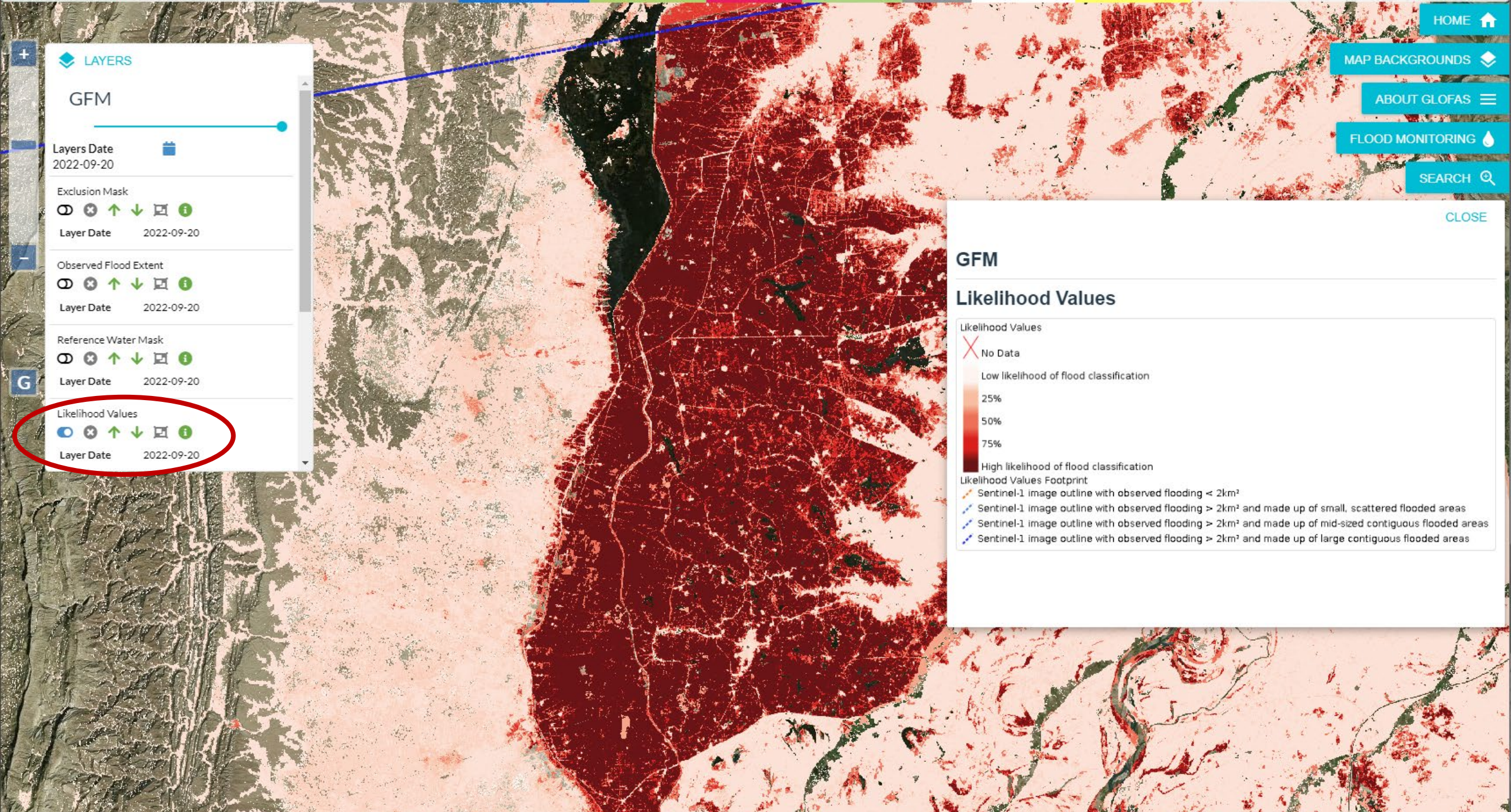
Reference Water Mask
[Icons]

Layer Date
2022-09-20

Likelihood Values
[Icons]

Layer Date
2022-09-20





MAP BACKGROUNDS

ABOUT GLOFAS

FLOOD MONITORING

SEARCH

CLOSE

LAYERS

GFM

Layers Date 2022-09-20

Exclusion Mask
Layer Date 2022-09-20

Observed Flood Extent
Layer Date 2022-09-20

Reference Water Mask
Layer Date 2022-09-20

Likelihood Values
Layer Date 2022-09-20

GFM

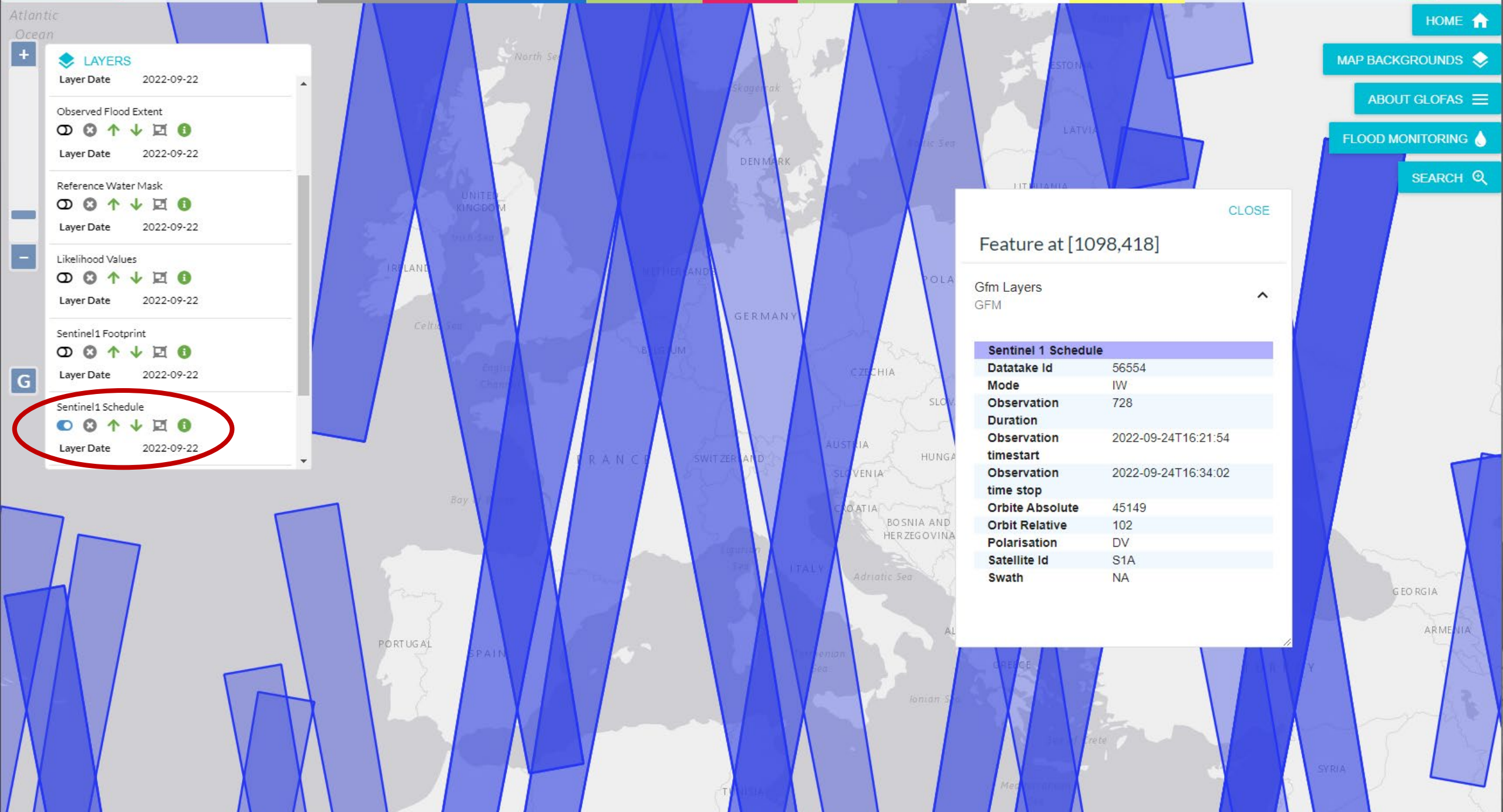
Likelihood Values

Likelihood Values

- No Data
- Low likelihood of flood classification
- 25%
- 50%
- 75%
- High likelihood of flood classification

Likelihood Values Footprint

- Sentinel-1 image outline with observed flooding < 2km²
- Sentinel-1 image outline with observed flooding > 2km² and made up of small, scattered flooded areas
- Sentinel-1 image outline with observed flooding > 2km² and made up of mid-sized contiguous flooded areas
- Sentinel-1 image outline with observed flooding > 2km² and made up of large contiguous flooded areas



MAP BACKGROUNDS

ABOUT GLOFAS

FLOOD MONITORING

SEARCH

LAYERS

Layer Date 2022-09-22

Observed Flood Extent
Layer Date 2022-09-22

Reference Water Mask
Layer Date 2022-09-22

Likelihood Values
Layer Date 2022-09-22

Sentinel1 Footprint
Layer Date 2022-09-22

Sentinel1 Schedule
Layer Date 2022-09-22

Feature at [1098,418]

Gfm Layers
GFM

Sentinel 1 Schedule

| | |
|------------------------------|---------------------|
| Datatake Id | 56554 |
| Mode | IW |
| Observation | 728 |
| Duration | |
| Observation timestart | 2022-09-24T16:21:54 |
| Observation time stop | 2022-09-24T16:34:02 |
| Orbite Absolute | 45149 |
| Orbit Relative | 102 |
| Polarisation | DV |
| Satellite Id | S1A |
| Swath | NA |

LAYERS

GFM

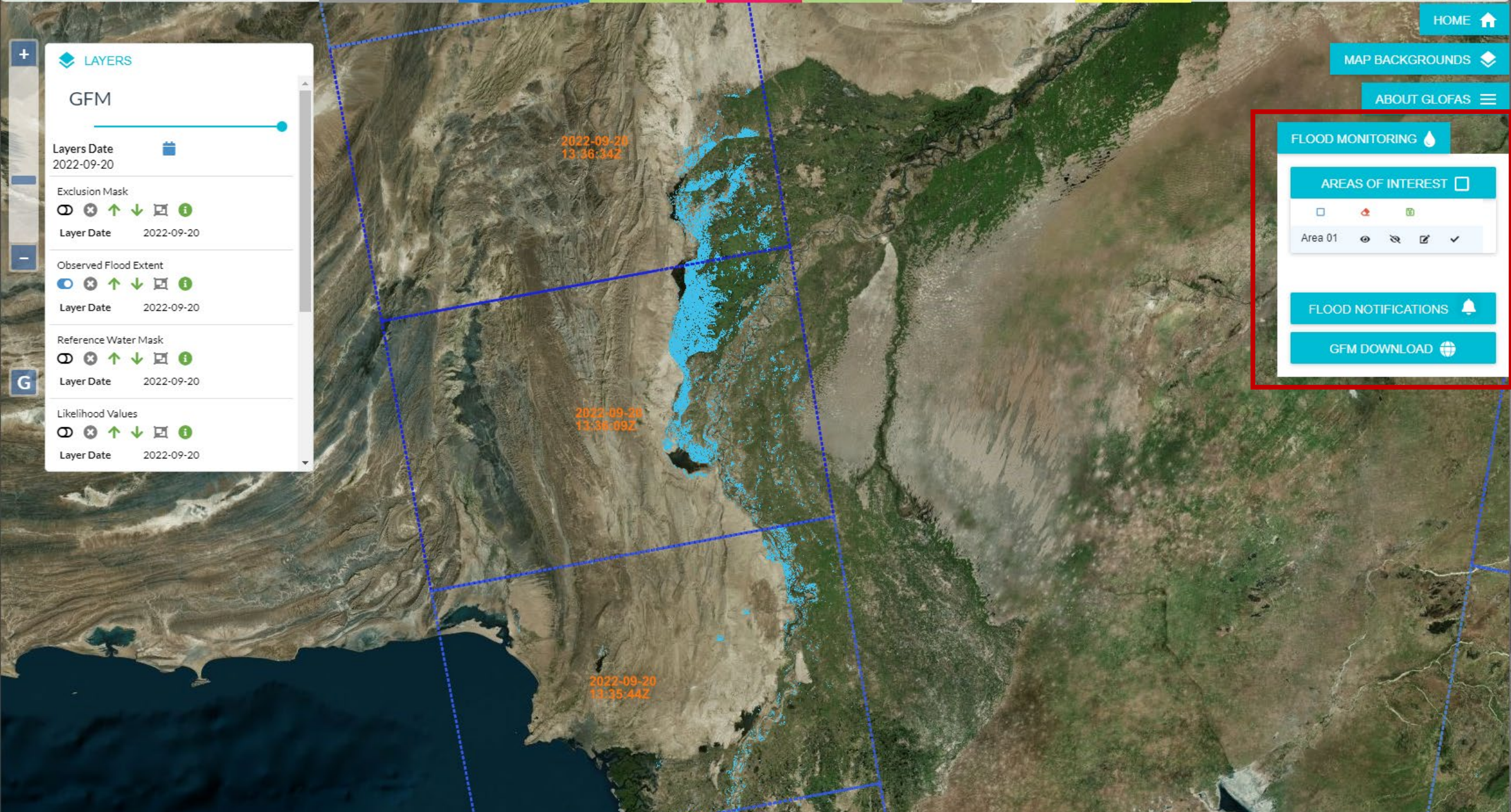
Layers Date 2022-09-20

Exclusion Mask
Layer Date 2022-09-20

Observed Flood Extent
Layer Date 2022-09-20

Reference Water Mask
Layer Date 2022-09-20

Likelihood Values
Layer Date 2022-09-20



FLOOD MONITORING

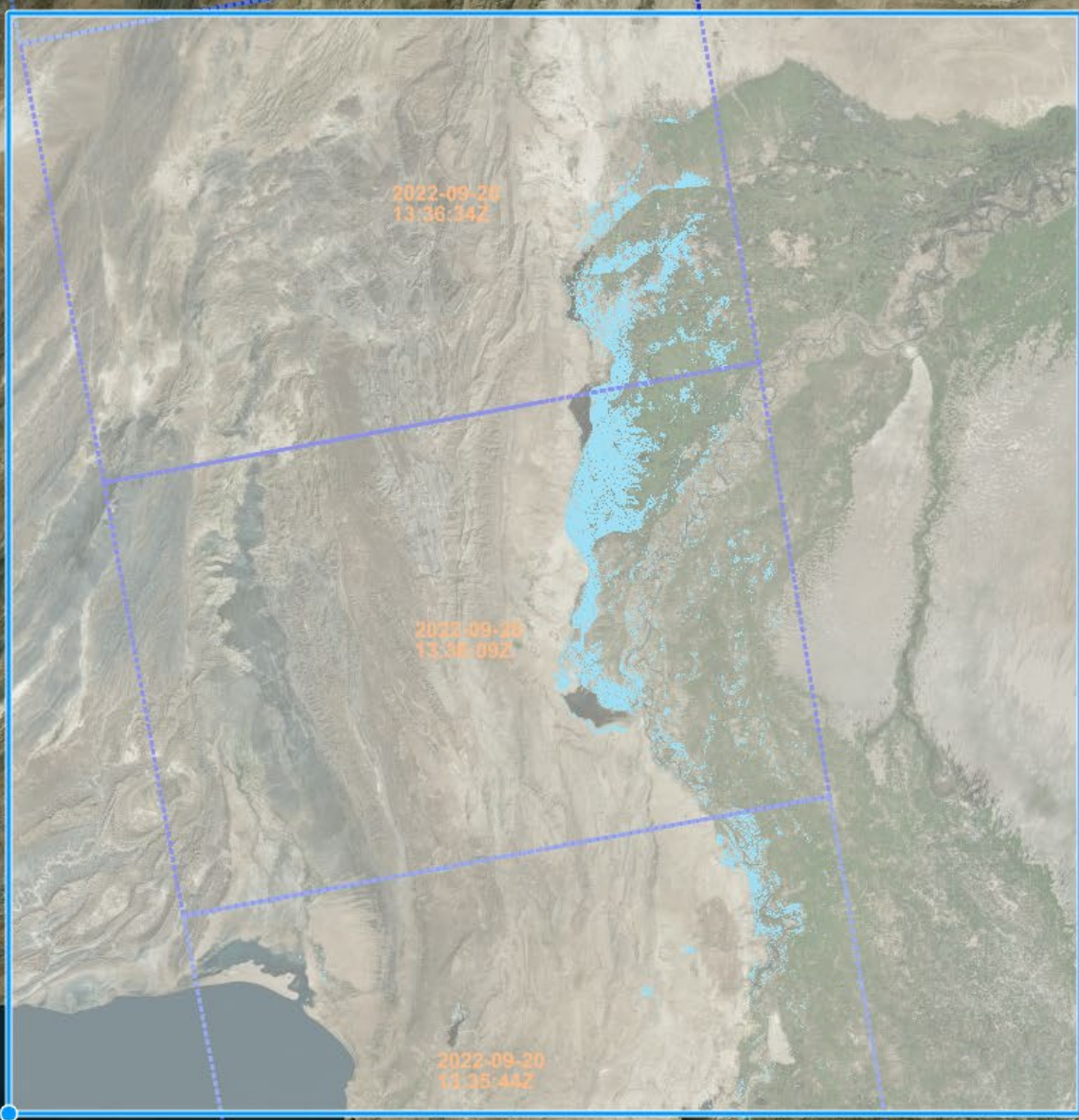
AREAS OF INTEREST

Area 01

FLOOD NOTIFICATIONS

GFM DOWNLOAD

| | | | | | |
|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Area 01 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|---------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|



LAYERS

GFM

Layers Date 2022-09-20

Exclusion Mask 2022-09-20

Observed Flood Extent 2022-09-20

Reference Water Mask 2022-09-20

Likelihood Values 2022-09-20



LAYERS

GFM

Layers Date 2022-09-20

Exclusion Mask 2022-09-20

Observed Flood Extent 2022-09-20

Reference Water Mask 2022-09-20

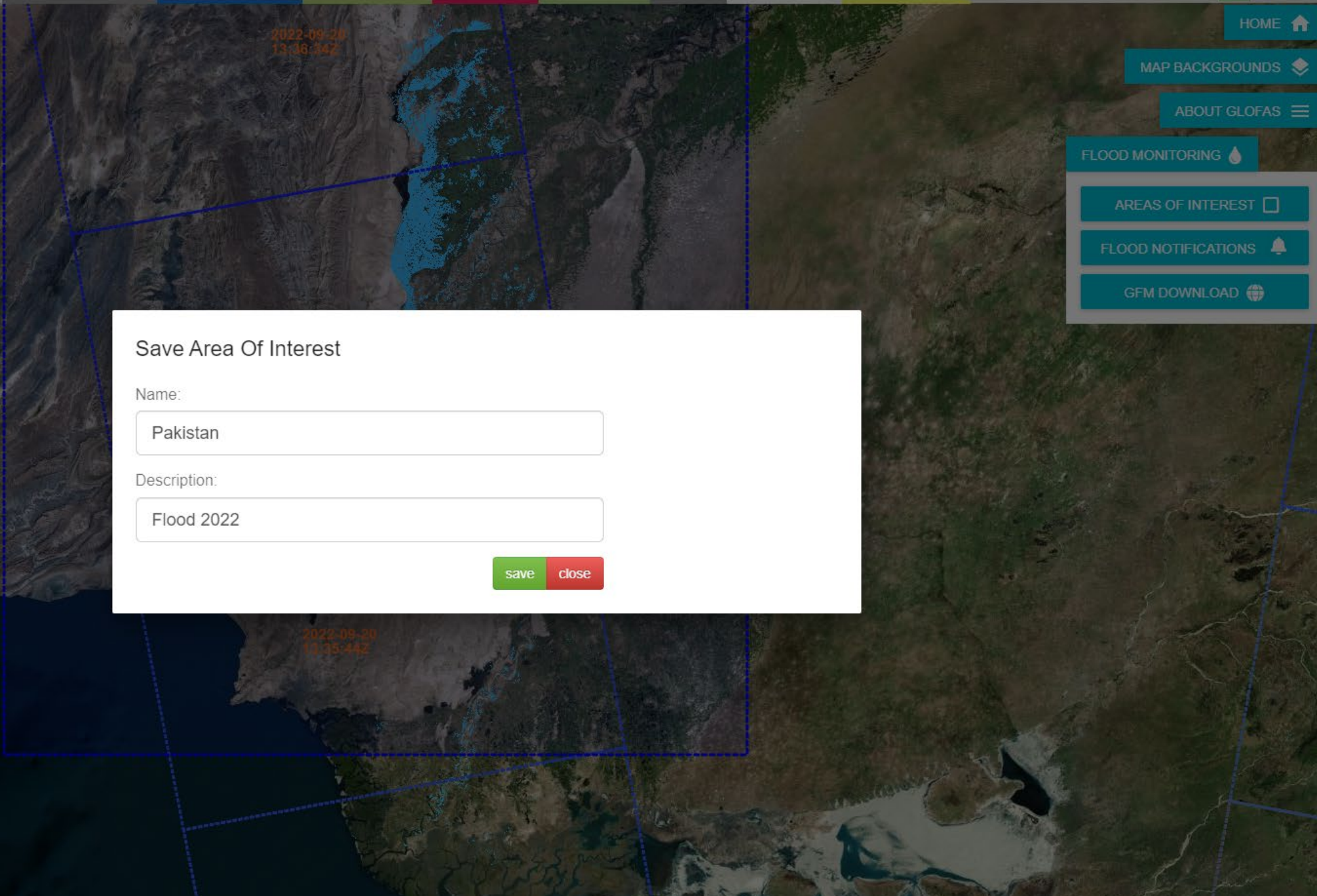
Likelihood Values 2022-09-20

FLOOD MONITORING

AREAS OF INTEREST

FLOOD NOTIFICATIONS

GFM DOWNLOAD



Save Area Of Interest

Name:

Description:

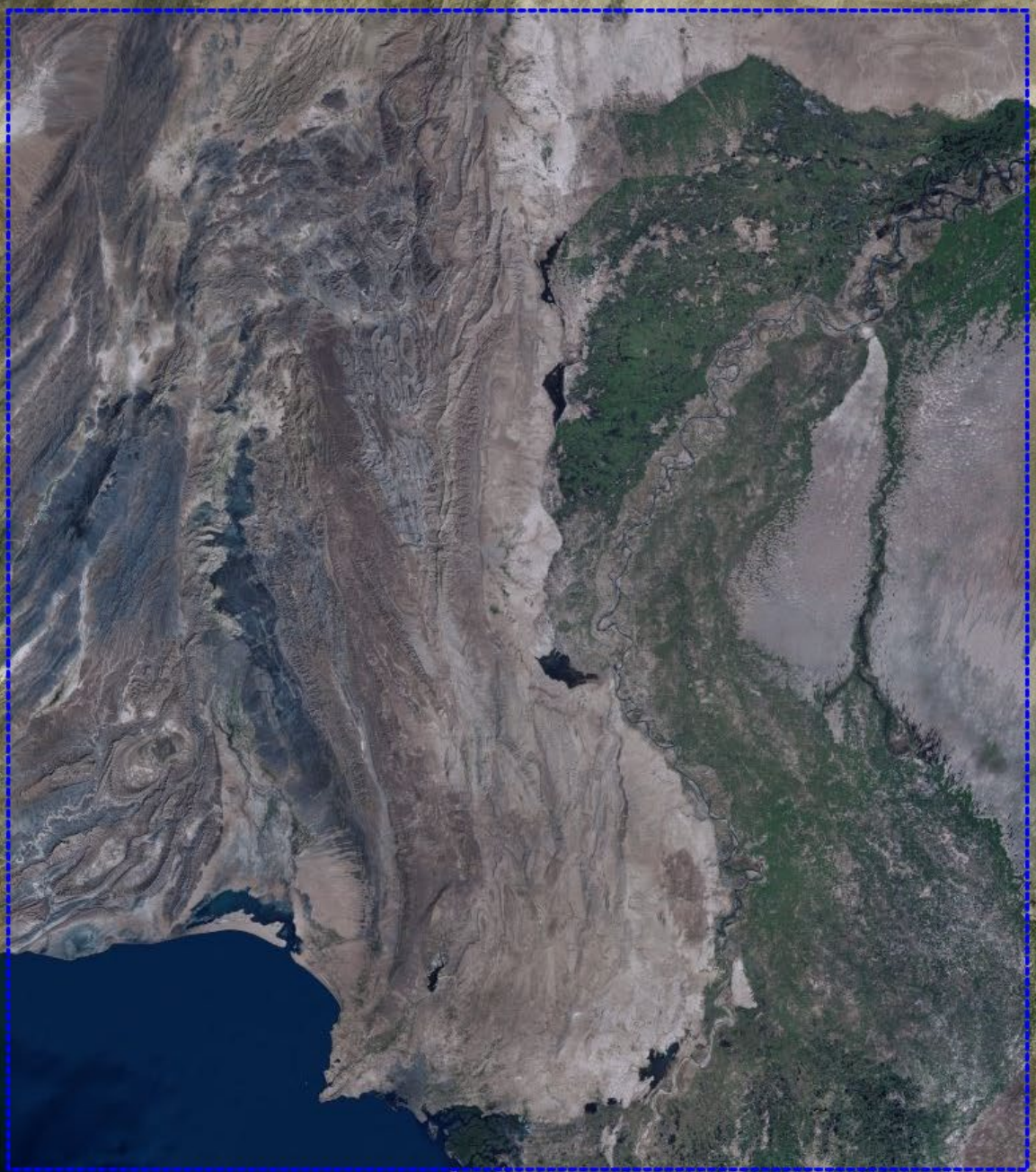
FLOOD MONITORING

AREAS OF INTEREST

| | | | | | |
|----------|-------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Area 01 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Pakistan | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

FLOOD NOTIFICATIONS

GFM DOWNLOAD



LAYERS

GFM

Layers Date 2022-09-22

Exclusion Mask
Layer Date 2022-09-22

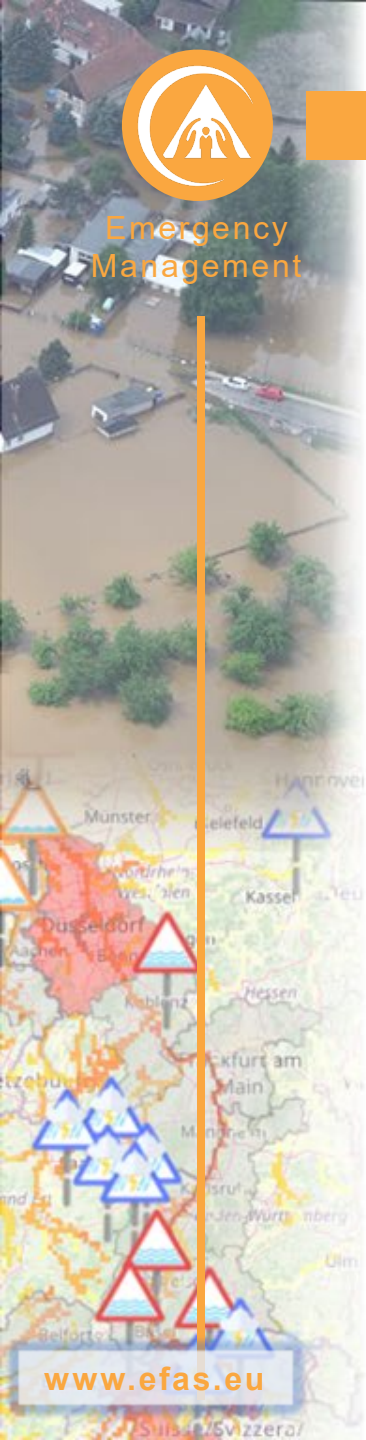
Observed Flood Extent
Layer Date 2022-09-22

Reference Water Mask
Layer Date 2022-09-22

Likelihood Values
Layer Date 2022-09-22



Emergency
Management



Download GFM data

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www.efas.eu



FLOOD MONITORING

AREAS OF INTEREST

| | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Area 01 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Pakistan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

FLOOD NOTIFICATIONS

GFM DOWNLOAD

LAYERS

GFM

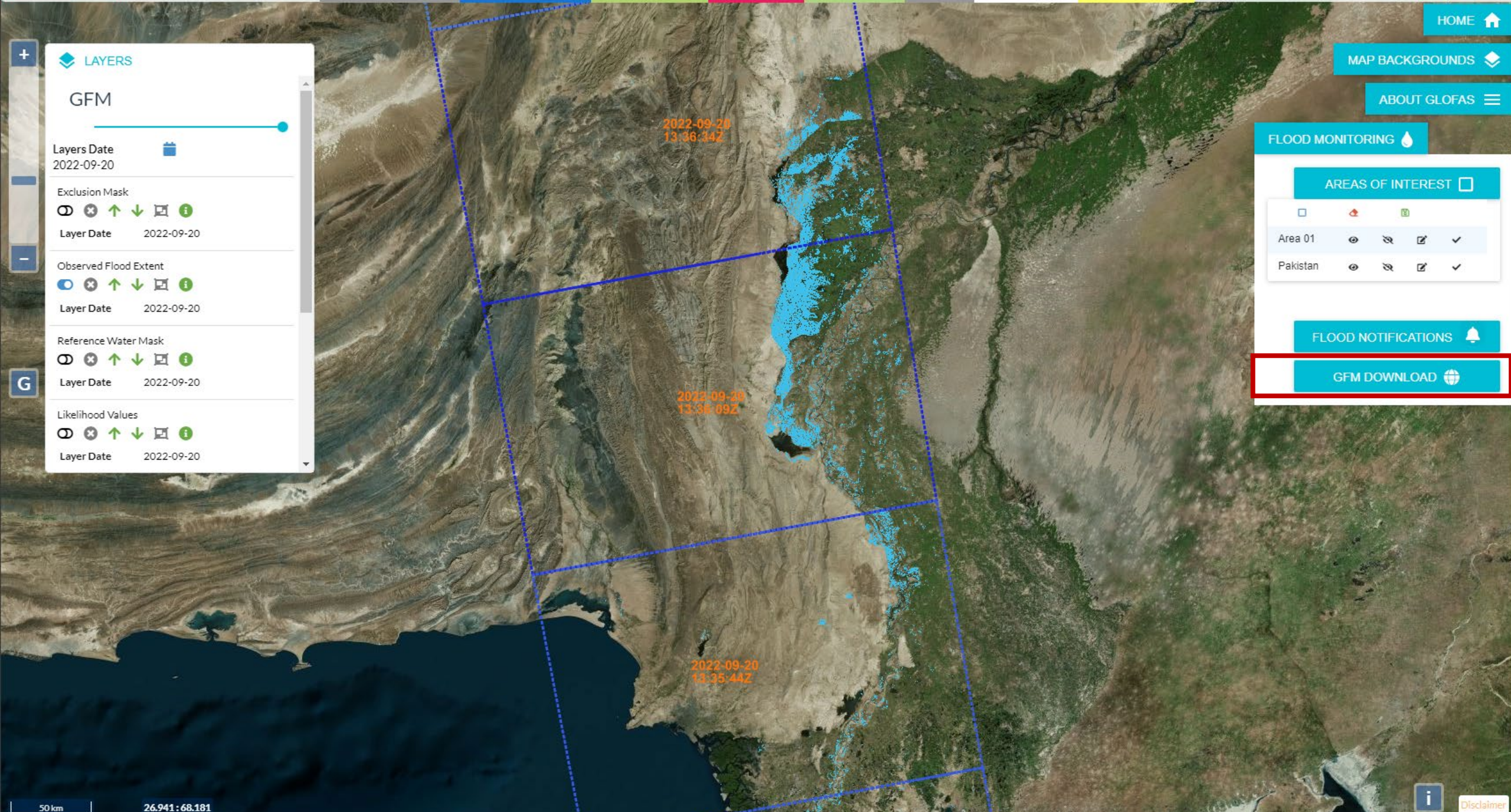
Layers Date 2022-09-20

Exclusion Mask
Layer Date 2022-09-20

Observed Flood Extent
Layer Date 2022-09-20

Reference Water Mask
Layer Date 2022-09-20

Likelihood Values
Layer Date 2022-09-20



AOIS



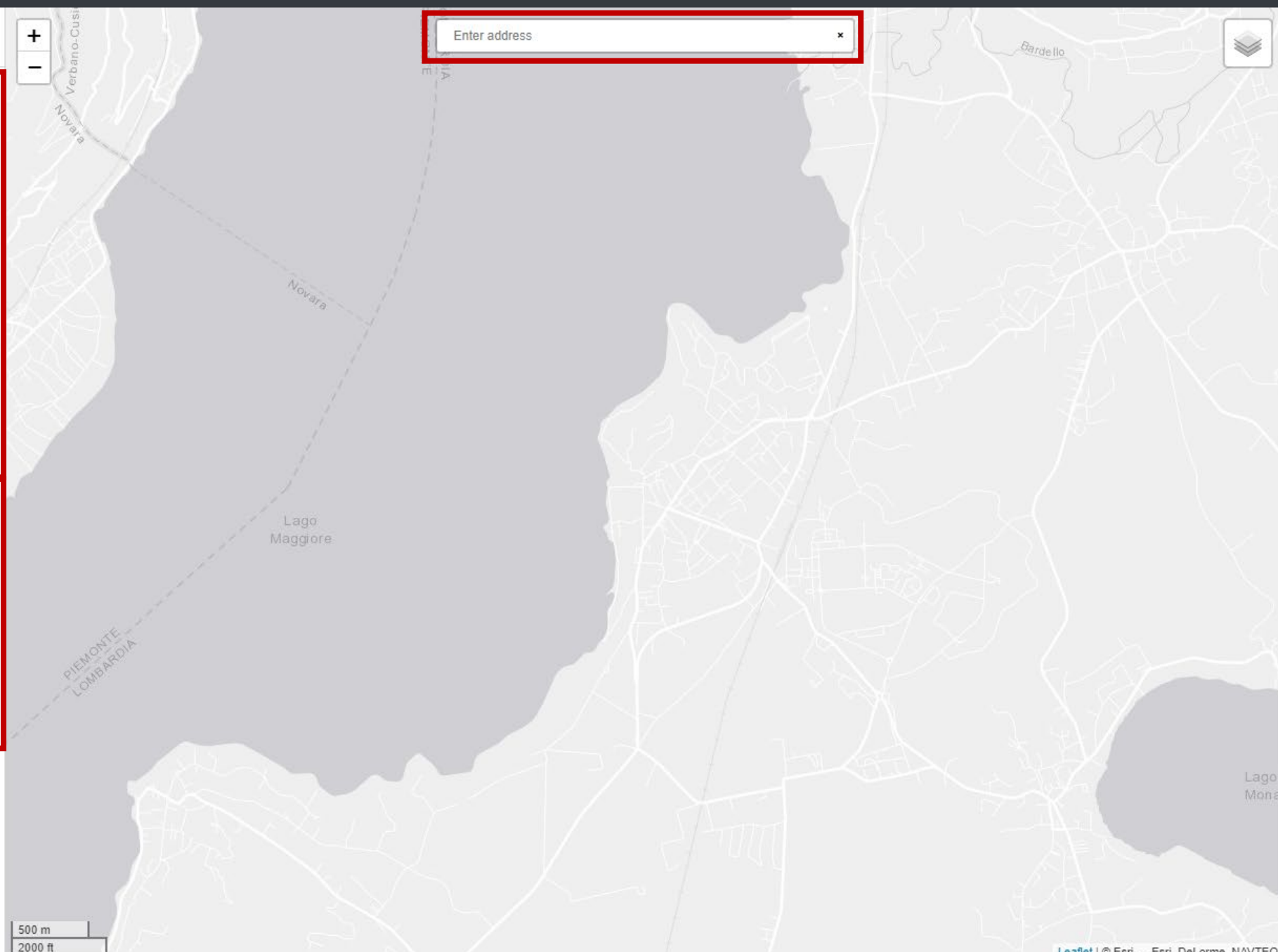
Create new AOI

Name

Description

Next step

- Filter by AOI name ...
- Area 01**
Austria + North Italy
 - Pakistan**
Flood 2022



500 m
2000 ft

PRODUCTS <

Area of Interest (AOI)

Select AOI

Filter options

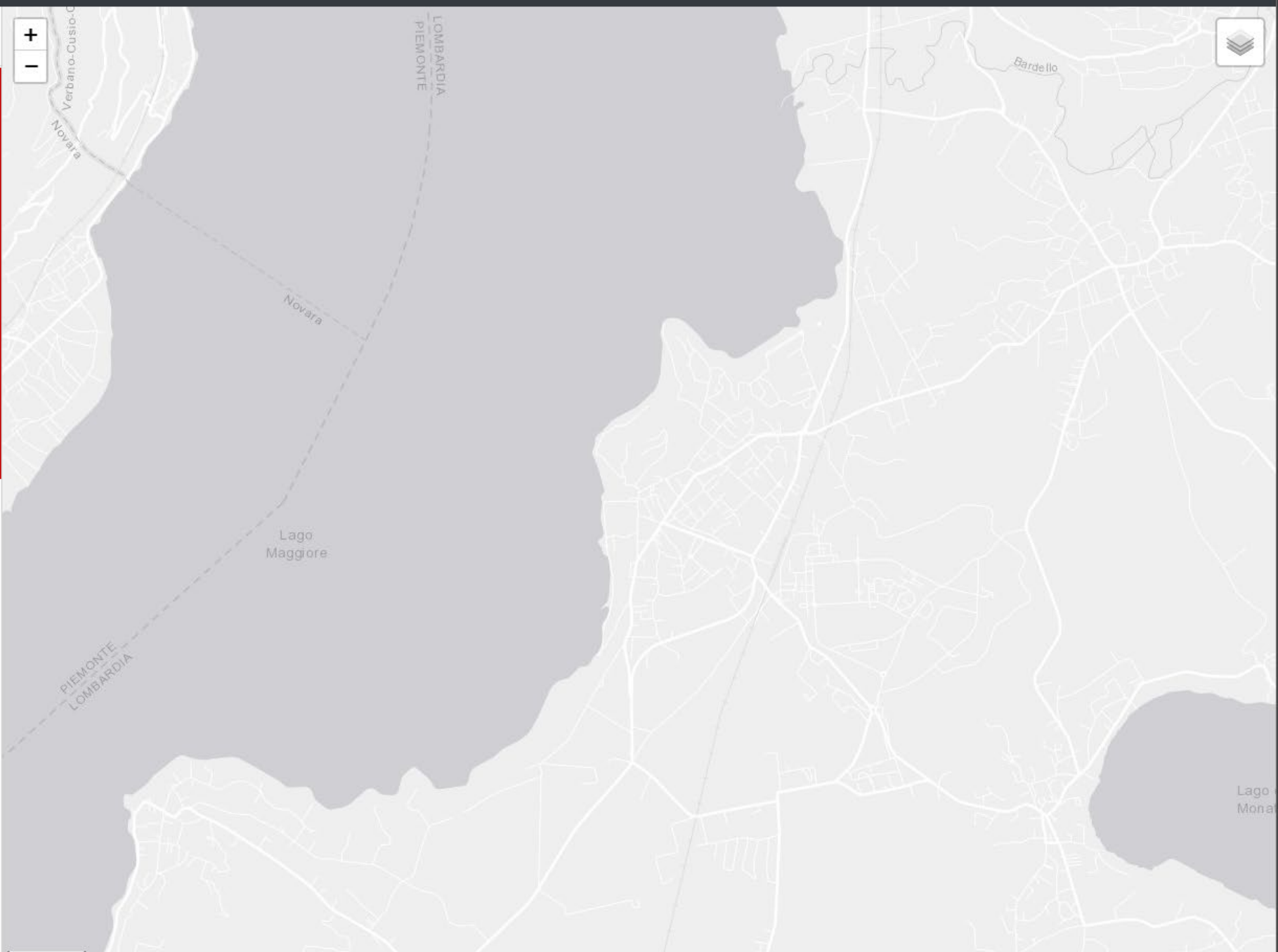
Start

End

Latest Retrieve latest product

[Clear filter](#)

Load products



PRODUCTS



Area of Interest (AOI)

Pakistan



Filter options

Start



Tuesday, 20 September 2022

End



Tuesday, 20 September 2022

Latest



Retrieve latest product

[Clear filter](#)[Load products](#)

Number of products: 13



Sort products:

Sort products by date descending (default)



2022-09-20

Pakistan

2022-09-20T13:36:59

[Latest products](#)

2022-09-20

Pakistan

2022-09-20T13:36:59

[Latest products](#)

2022-09-20

Pakistan

2022-09-20T13:36:59

[Latest products](#)

PRODUCTS



















2022-09-20



Pakistan

2022-09-20T13:36:34

- Observed Flood Extent 
- Observed Water Extent 
- Reference Water Mask 
- Exclusion Mask 
- Likelihood Values 
- Advisory Flags 
- Sentinel-1 Metadata  
- Sentinel-1 Footprint  
- Sentinel-1 Schedule  
- Affected Population 
- Affected Landcover 

 Download layers 

2022-09-20



Pakistan

2022-09-20T13:36:34

2022-09-20



Pakistan


2022-09-20T13:36:09

2022-09-20



Pakistan

2022-09-20T13:36:09



Your download is being prepared

This process may take some time

Observed Flood Extent
Floodwater

PRODUCTS



Area of Interest (AOI)

Pakistan



Filter options

Start



Tuesday, 20 September 2022

End



Tuesday, 20 September 2022

Latest



Retrieve latest product

[Clear filter](#)[Load products](#)

Number of products: 13



Sort products:

Sort products by date descending (default)



2022-09-20



Pakistan

2022-09-20T13:36:59

[Latest products](#)

2022-09-20



Pakistan

2022-09-20T13:36:59

[Latest products](#)

2022-09-20



Pakistan

2022-09-20T13:36:59

[Latest products](#)

Download all products



Do you want to start the download for all products?

As soon as the files have been prepared, you will be informed by mail. This process may take some time.

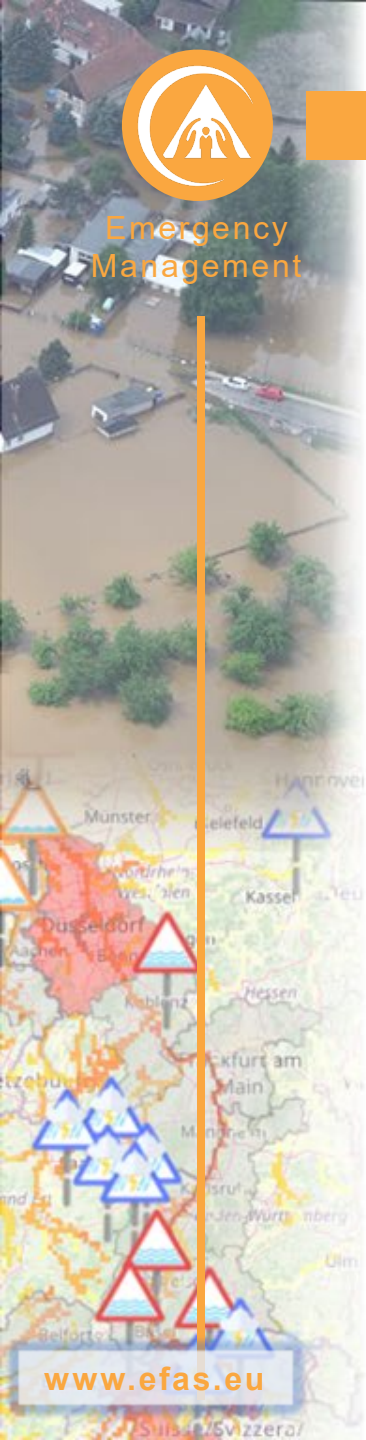
Start date: 2022-09-20

End date: 2022-09-20

[Cancel](#)[Start download](#)



Emergency
Management



Get GFM notifications

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www.efas.eu



PRODUCTS

Area of Interest (AOI)

Pakistan

Filter options

Start

End

Latest Retrieve latest product

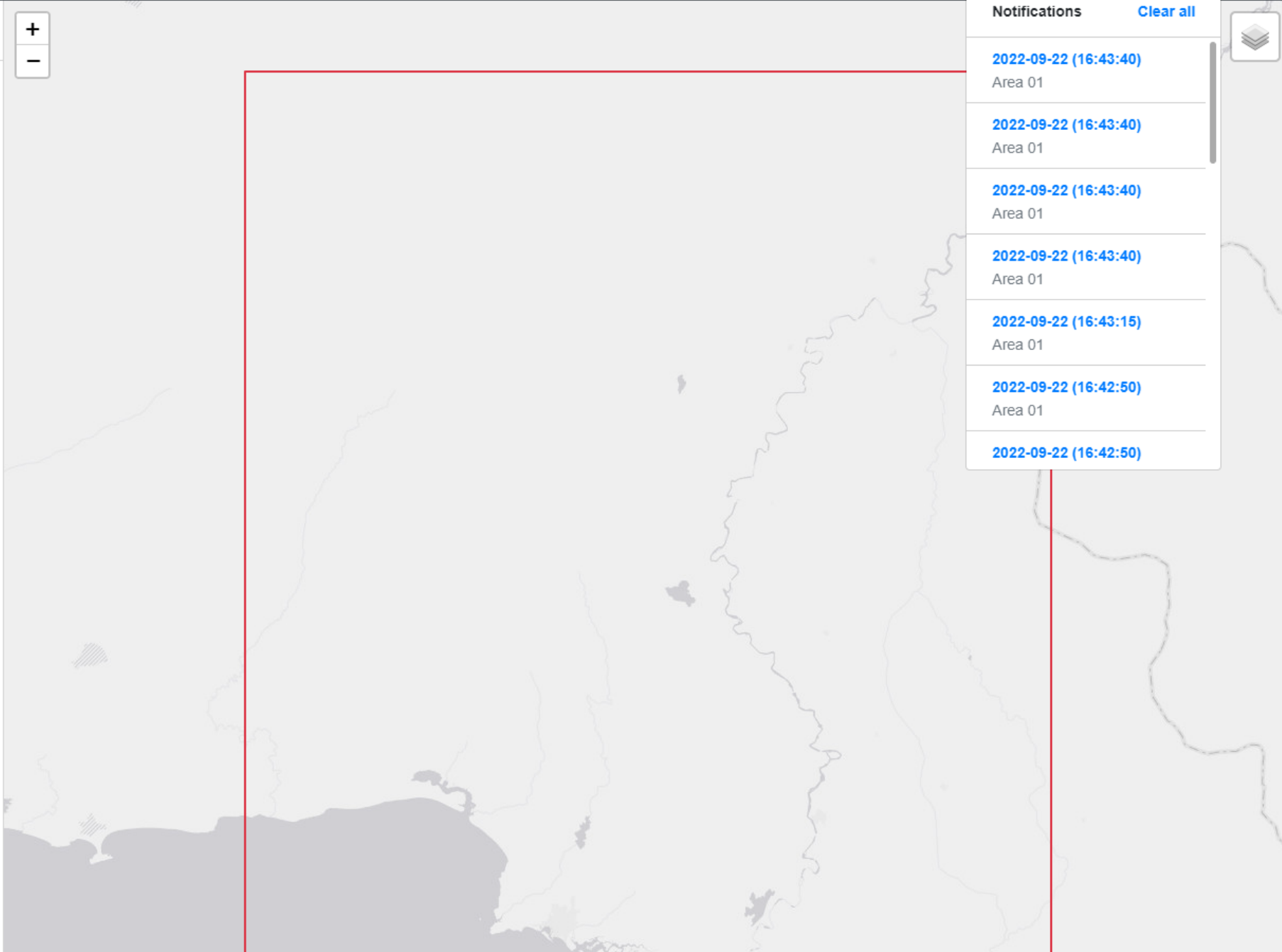
[Clear filter](#)

[Load products](#)

Number of products: 4

Sort products:

- 2022-09-22**
Pakistan
2022-09-22T13:20:15
[Latest products](#)
- 2022-09-22**
Pakistan
2022-09-22T13:20:15
[Latest products](#)
- 2022-09-22**
Pakistan
2022-09-22T13:20:15
[Latest products](#)



Notifications [Clear all](#)

- 2022-09-22 (16:43:40)**
Area 01
- 2022-09-22 (16:43:40)**
Area 01
- 2022-09-22 (16:43:40)**
Area 01
- 2022-09-22 (16:43:40)**
Area 01
- 2022-09-22 (16:43:15)**
Area 01
- 2022-09-22 (16:42:50)**
Area 01
- 2022-09-22 (16:42:50)**
Area 01

FLOOD MONITORING

AREAS OF INTEREST

| | | | | | |
|----------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Area 01 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Pakistan | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

FLOOD NOTIFICATIONS

GFM DOWNLOAD

LAYERS

GFM

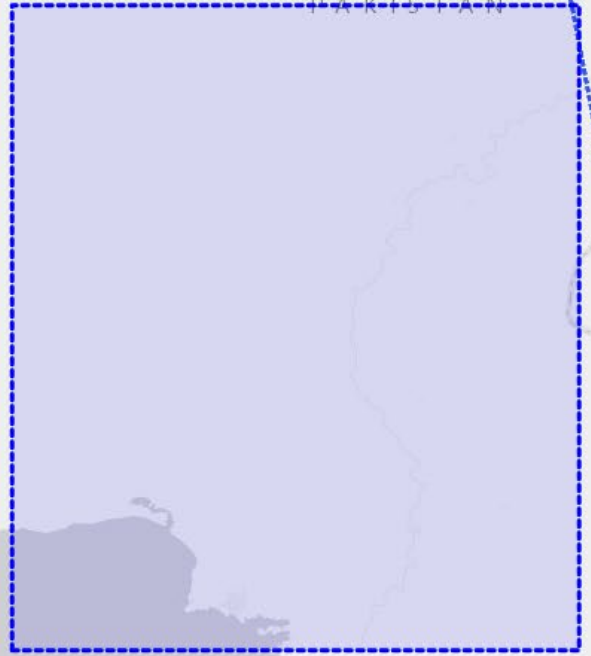
Layers Date 2022-09-22

Exclusion Mask Layer Date 2022-09-22

Observed Flood Extent Layer Date 2022-09-22

Reference Water Mask Layer Date 2022-09-22

Likelihood Values Layer Date 2022-09-22



2022-09-22 13:20:40Z

2022-09-22 13:20:15Z

2022-09-22 13:19:50Z

2022-09-22 13:19:21Z

PAKISTAN

RAJASTHAN

GUJARAT

Gulf of Oman

SOUTH

- ← Area 01 on 2022-09-22
- ← Pakistan on 2022-09-22

LAYERS

GFM

Layers Date 2022-09-22

Exclusion Mask
Layer Date 2022-09-22

Observed Flood Extent
Layer Date 2022-09-22

Reference Water Mask
Layer Date 2022-09-22

Likelihood Values
Layer Date 2022-09-22



2022-09-22 13:20:40Z

2022-09-22 13:20:15Z

2022-09-22 13:19:50Z

2022-09-22 13:19:21Z

Gulf of Oman

PAKISTAN

RAJASTHAN

GUJARAT

SOUTH



Emergency
Management

Global Flood Awareness System

www.globalfloods.eu/glofas-forecasting

GFM portal

portal.gfm.eodc.eu

Product User Manual

extwiki.eodc.eu/GFM/PUM

www.efas.eu

Thank you!

