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European



### **18th EFAS annual meeting**

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# COPERNICUS EMERGENCY MANAGEMENT SERVICE



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- Quick Start Guides
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  - GFM REST API
  - WMS in QGIS
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## **Available products**

- S-1 Observed Flood Extent (ENSEMBLE)
- S-1 Reference Water Mask (permanent & seasonal water)
- S-1 Observed Water Extent (ENSEMBLE + reference water mask)
- Exclusion Mask
- Likelihood Values
- Advisory Flags
- Affected Population
- Affected Landcover
- S-1 Metadata
- S-1 Footprint
- S-1 Schedule





### Visualizing via GloFAS / EFAS

# GloFAS: tinyurl.com/efas23glofas EFAS: tinyurl.com/efas23efas





### **Quick Start Guide**





Welcome to the quick start guide of the Global Flood Monitoring service

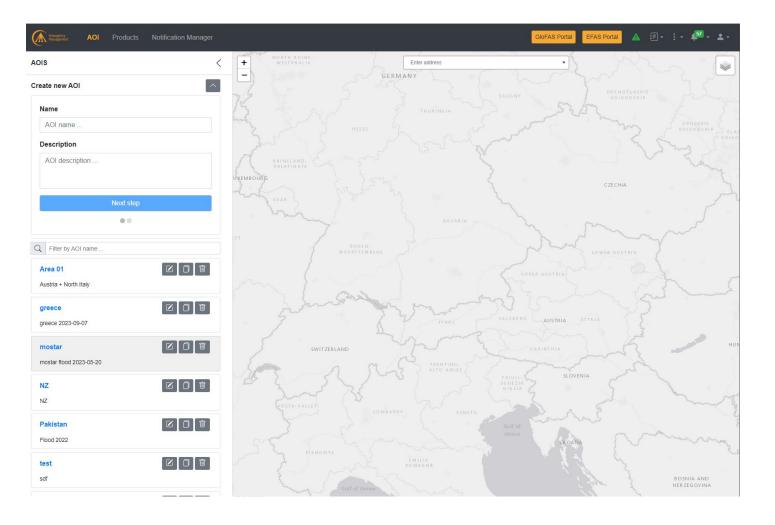
₽	What is the Global Flood Monitoring (GFM) Product?	
Ŧ	How to use GFM data in GLOFAS	
₽	How to use GFM data in EFAS	
₽	How to use GFM's REST-APIs	
F	How to use GFM's WMS-T	
₽	How to get GFM data through the webportal	



### tinyurl.com/efas23qsg



### **GFM Portal**





### portal.gfm.eodc.eu



### **GFM REST API**

GFM JRC API<sup>22.01</sup>

[ Base URL: /v2 ] /v2/swagger.json

### GFM JRC Service API based on a Microservice architecture auth Endpoint specification related to authentication operations $\sim$ $\sim$ USERS Endpoint specification related to users operations download Endpoint specification related to the GFM product download $\sim$ legends Endpoint specification related to product legends $\sim$ notifications Endpoint specification related to the notification service $\sim$ $\sim$ products Endpoint specification related to the GFM products $\sim$ reporting Endpoint specification related to the GFM report generation aoi Endpoint specification related to the area of interest $\sim$ $\sim$ support Endpoint specification related to support requests utils Endpoint specification for general operations $\sim$ Models $\sim$



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### api.gfm.eodc.eu/v2/



# **GFM REST API - Summary**

- Register via EFAS or GloFAS
- Retrieve access token via:
  - EFAS / GIoFAS UI
  - username/password via /auth/login
- Find aoi\_id of desired AOI via /aoi/user/{user\_id}
- Find product\_id of desired product via /aoi/{aoi\_id}/products
- Download products via /download endpoints







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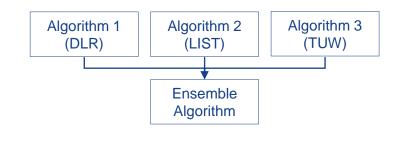


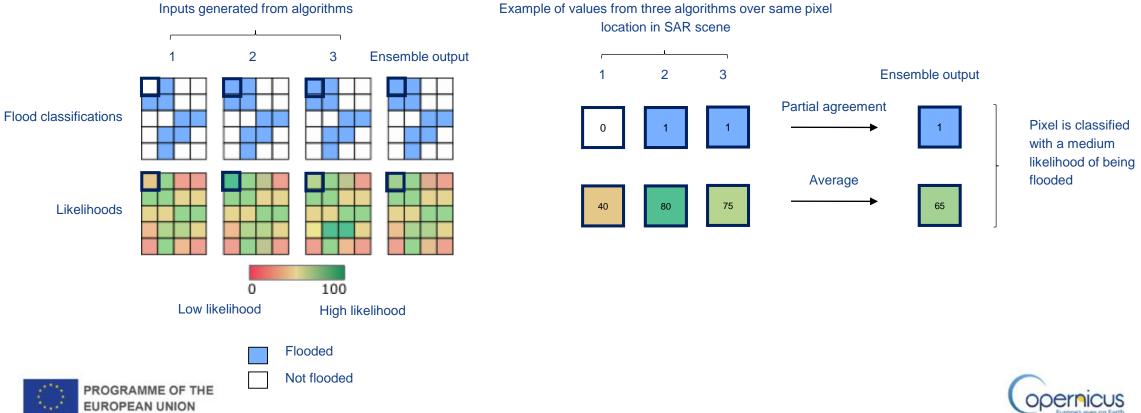
European Commission

> Flood algorithm details

### **Ensemble flood mapping algorithm**

- Combining flood & likelihood values of all three flood algorithms
- · Majority vote decides if a pixel is marked as flood or non-flood
- Final likelihood layer is the arithmetic mean of all likelihoods





# **Flood algorithms**

### Algorithm 1 (DLR)

• Fuzzy logic-based approach enabling a post-classification and region-growing, taking advantage of topography-derived indices in addition to SAR backscatter.

### Algorithm 1 (LIST)

- Hierarchical split-based approach enabling re-calibration of parameters in NRT based on the most recent pair of S-1 images.
- Uses a highly innovative sequence of hierarchical image splitting, statistical modelling and region-growing to delineate and classify areas that changed their flooding-related backscatter response between two image acquisitions from the same orbits.

### Algorithm 1 (TUW)

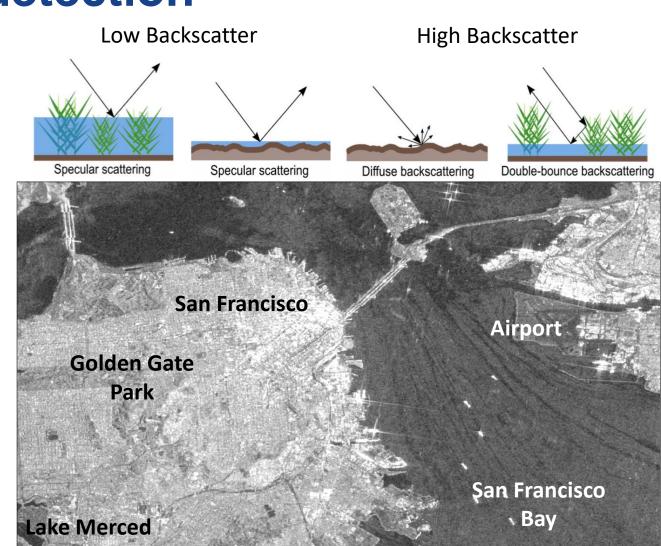
- A fully automatic, pixel-based flood extent mapping workflow which exploits per-pixel full Sentinel-1 signal history in a data cube (time-series) of backscatter measurements;
- Enables a very fast, scalable production of flood and water extent maps through precomputed global parameters at high quality.





## **Sentinel-1 & water detection**

- Specular (i.e. mirror-like) scattering over calm water bodies
- Water look-alikes
  - Tarmacs
  - Dry soil
  - Wet snow
  - Agricultural fields
- Rough water surfaces disturb specular scattering
- Double-bounce backscattering in urban areas
- Diffuse backscatter over dense vegetation



### **Product Evolution**

- Update exclusion mask
  - No sensitivity, i.e. refinement of parameters
  - Refinement of Non-water low backscatter over arid areas
  - Radar shadow, i.e. integration of CopDEM simulated radar shadow
- Computing the reference water mask for a period of 5 years (instead of 2 years)
- Flag scenes as flooded with anomaly detection
- Reprocessing of the flood archive
- Incorporate Sentinel 1-C
- Adding new GHSL data for flood impacts

