GloFAS for Global Flood Monitoring - GFM

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Flood Forecasting

Predicting when and where a flood might happen

How

Uses data and models

Analyzes rainfall, river levels and weather patterns

Purpose

Warn people in advance so they can prepare

Flood Monitoring

Keeping an eye on floods as they happen

How

Uses sensors, **satellites**, and other tools

Tracks the current state of a flood

Purpose

Provide real-time information for emergency response

Global Flood Monitoring (GFM)

Microwave **satellite** imagery

Flood Map provision **within 8 hours** after data acquisition

High spatial resolution with **20-meter pixel sampling**

Global coverage (except poles)

Full flood archive **from 2015 to ongoing**

Why Microwave Satellite imagery?

Day and night

All weather conditions

Effective to discriminate water on ground

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Copernicus Sentinel-1 SAR for flood mapping

- Sentinel-1 is an **active** microwave sensor
  - Day and night
  - All weather conditions
  - Effective to discriminate water on ground

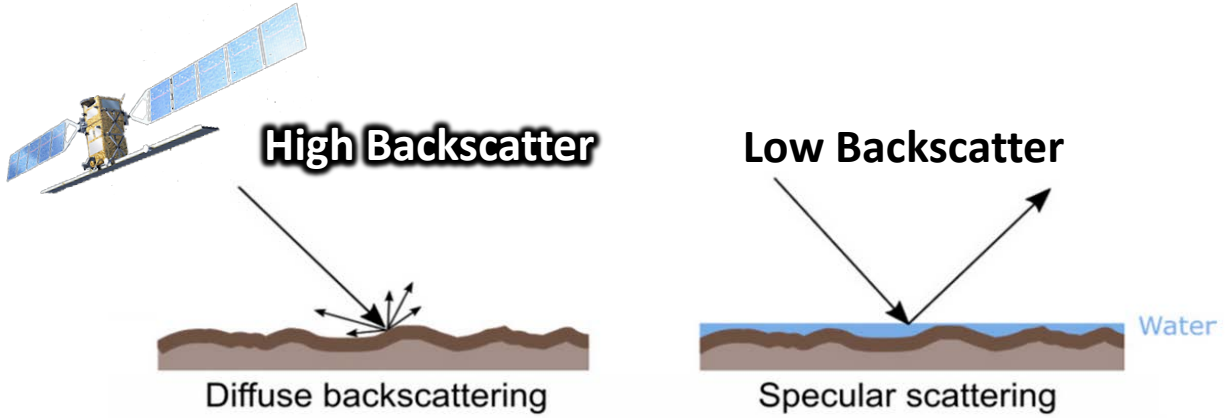
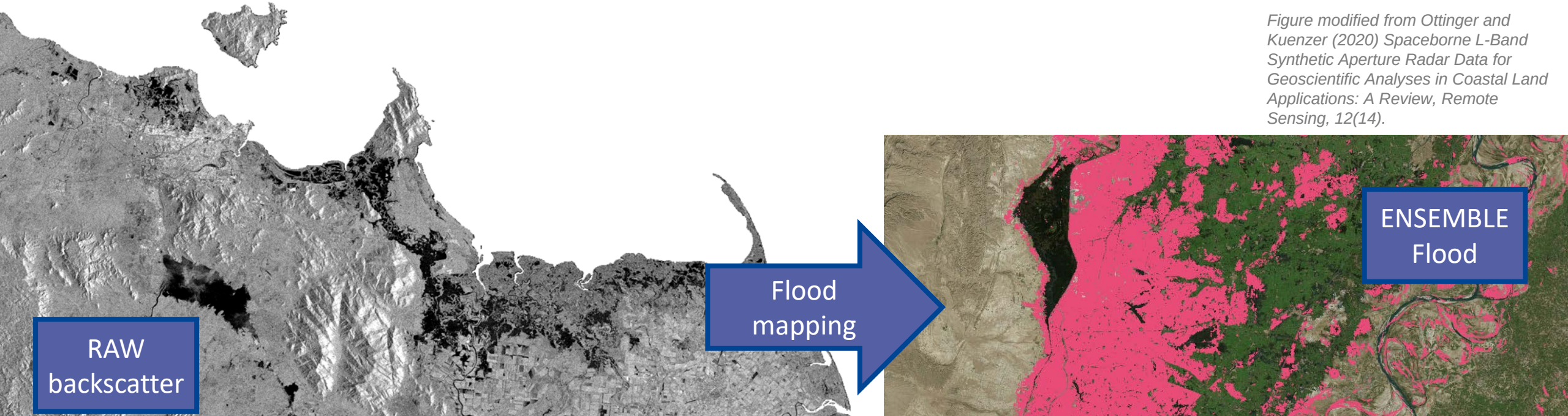


Figure modified from Ottinger and Kuenzer (2020) Spaceborne L-Band Synthetic Aperture Radar Data for Geoscientific Analyses in Coastal Land Applications: A Review, Remote Sensing, 12(14).



Limitations

False alarms

Very dry or sandy soils

Frozen ground

Wet snow

Flat impervious areas (e.g. tarmac-covered roads)

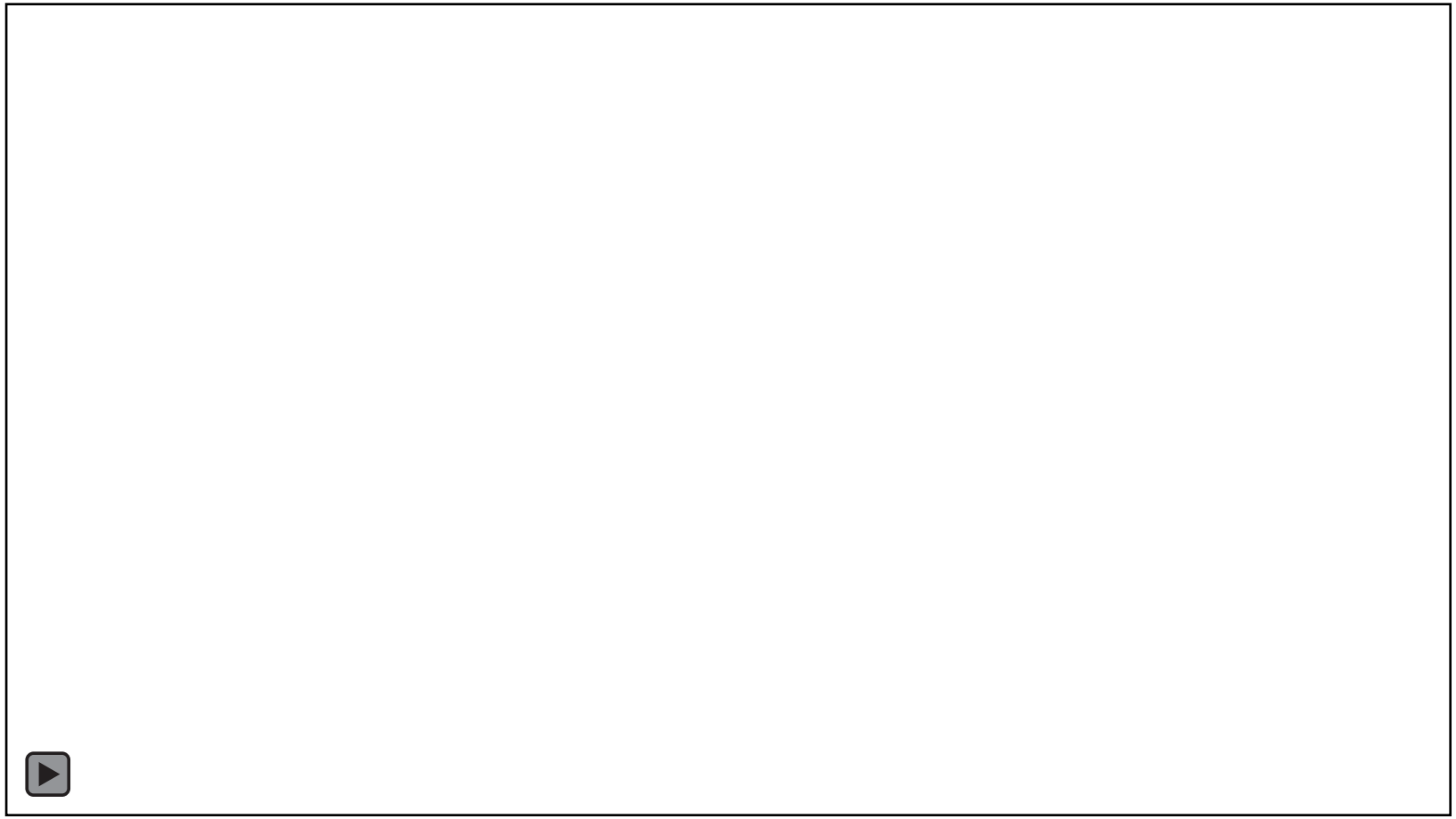
Missed alarms

Urban areas

Densely vegetated areas

Strong winds on water surfaces

Copernicus Sentinel-1 SAR for flood mapping



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How to visualize GFM in GloFAS webviewer

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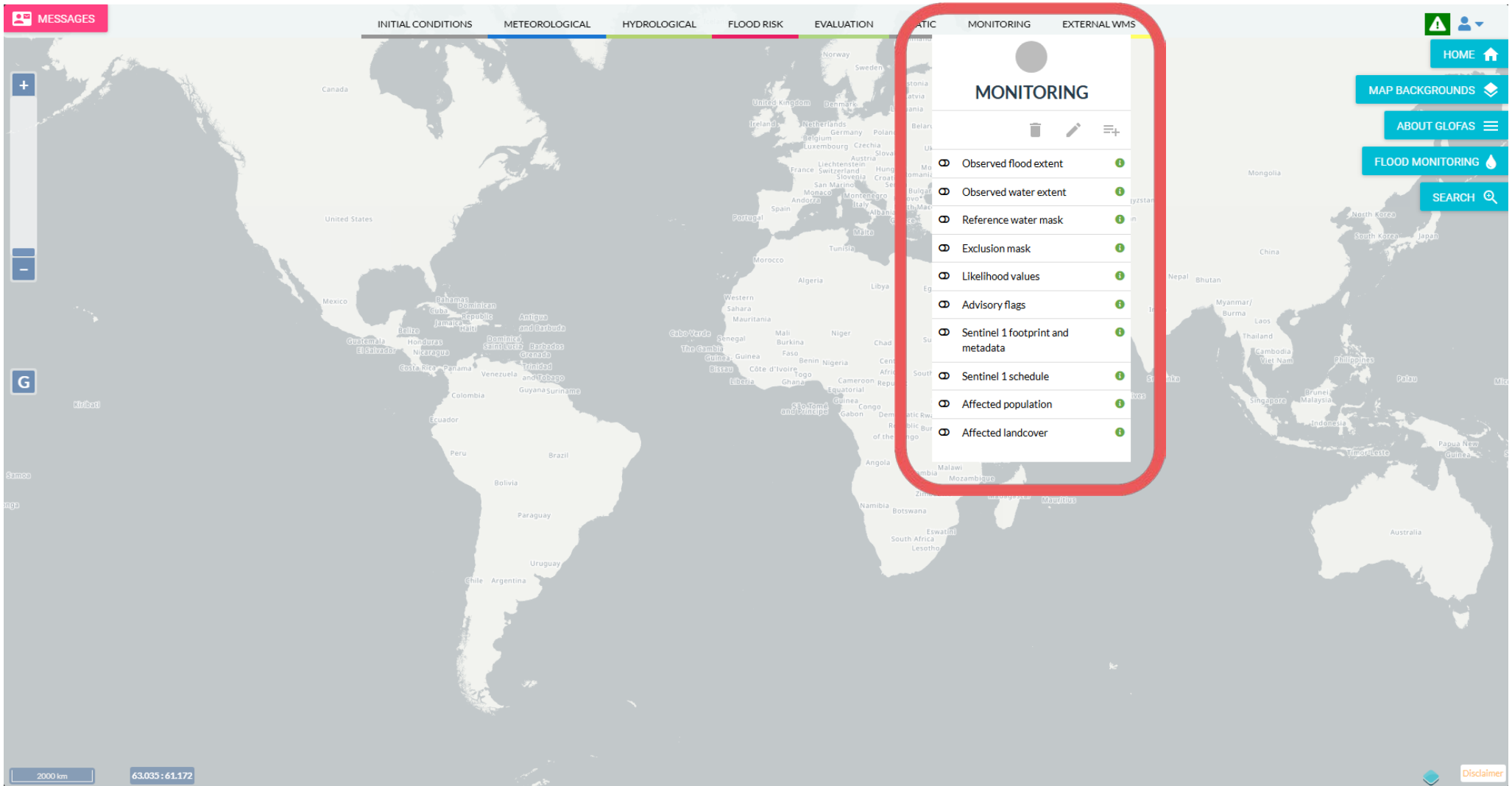
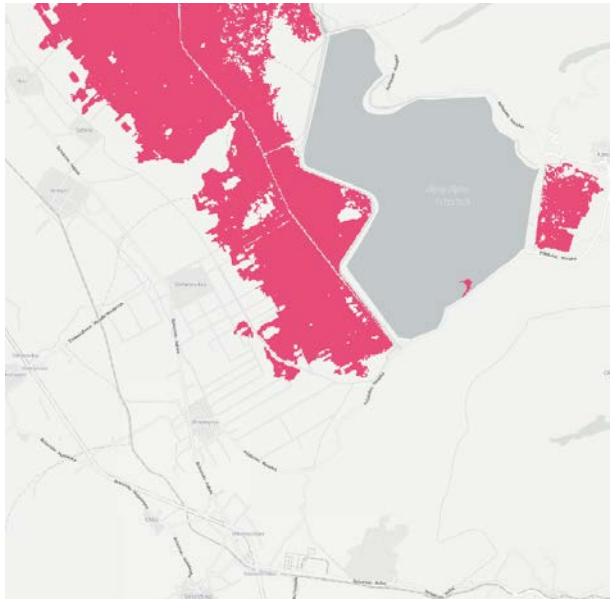
GFM in GloFAS



Product output layers – Water observations

S-1 observed flood extent

Ensemble flood extent

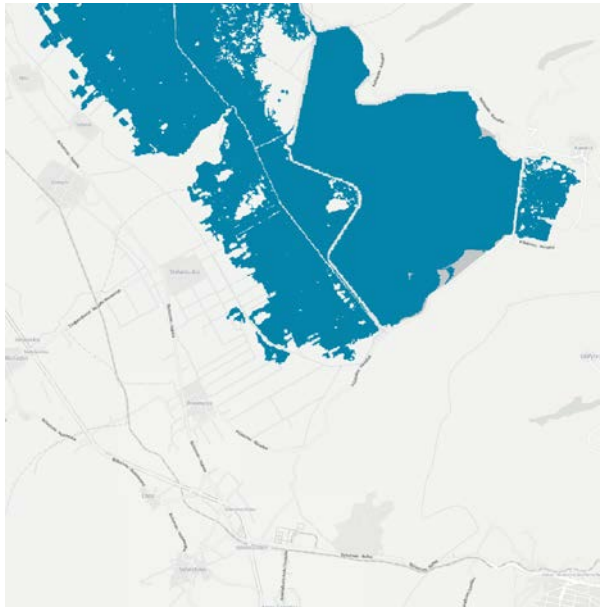


S-1 reference water mask

Permanent & seasonal water extent

S-1 observed water extent

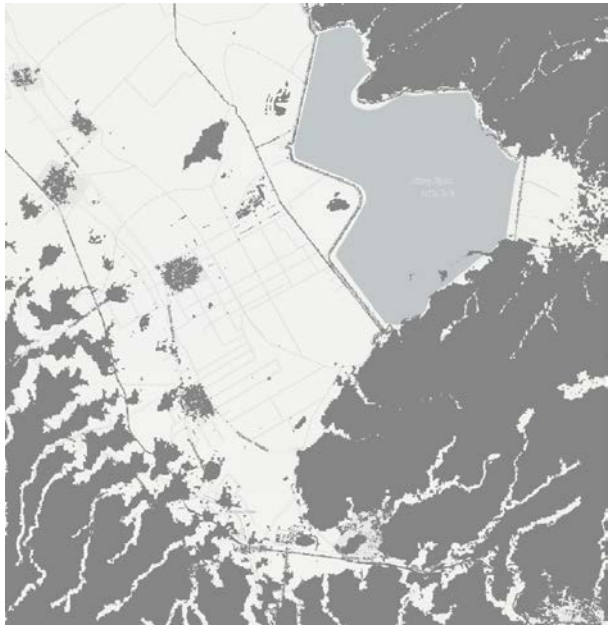
Open water extent, as combined from flood and reference waters



Product output layers – Contextual information

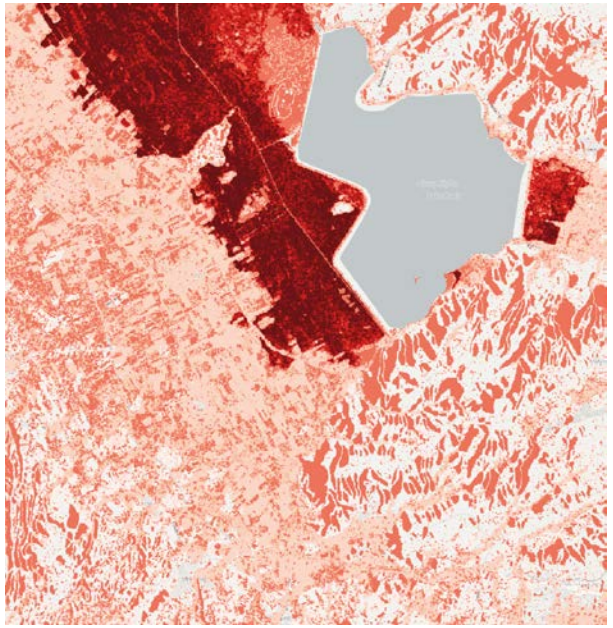
Exclusion mask

Exclusion mask where S1 flood delineation is hampered



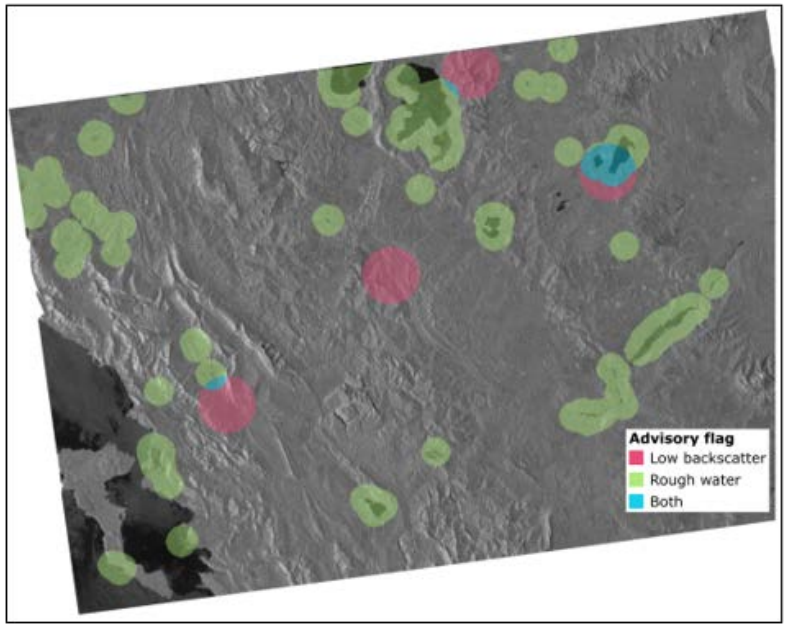
Likelihood values

Likelihood values accounting for classification confidence



Advisory flags

Advisory flags indicating challenging classification circumstances



Product output layers – Metadata & Context

Affected Landcover/Population

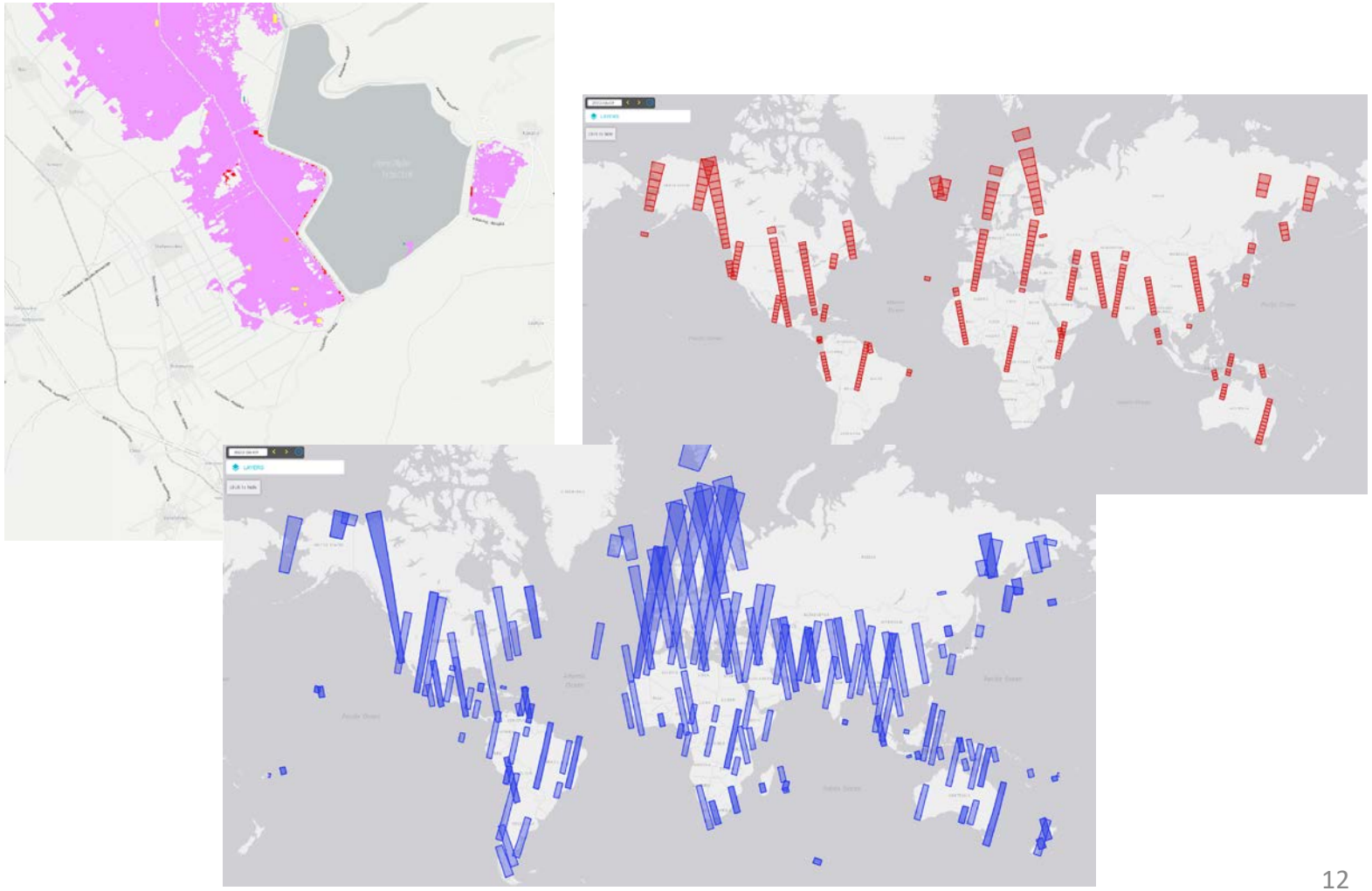
GlobCover/CORINE Land Cover
GHSL (Global Human Settlement Layer)

S-1 Footprint + Metadata

S-1 orbit footprint boundary for a specific day

S-1 Schedule

S-1 orbit overflight boundaries for the next 3 days



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Observe flooded areas

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Observe flooded areas

Observed Flood Extent

No Floodwater

Floodwater

Observed Flood Extent Footprint

Flooding detected — unusually high amount and flooded area >= 2 km²

Flooding detected — not unusually high amount, or flooded area < 2 km²

Flooding detected — unknown significance (incomplete SAR time-series)

1st February 2023

9th March 2023

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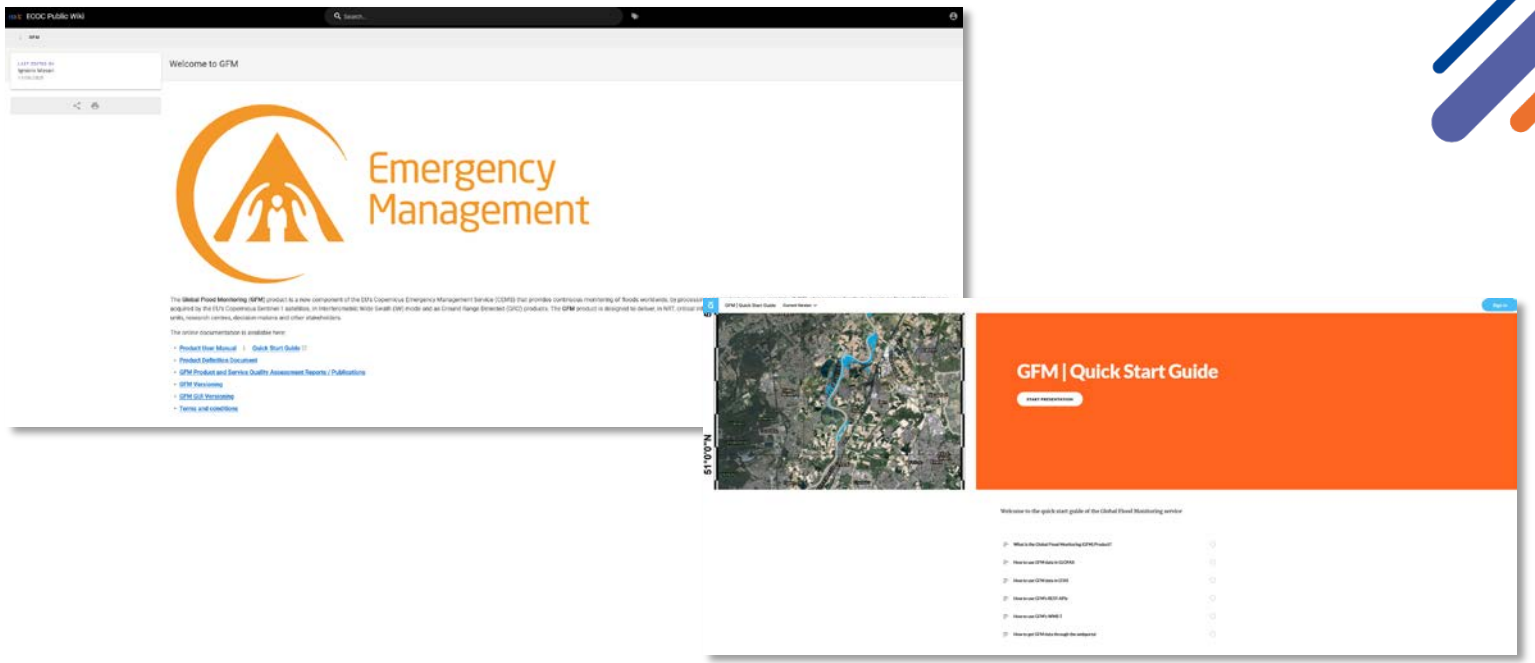
User Support



- GFM Wiki (extwiki.eodc.eu/GFM)
  - Product User Manual
  - Quick Start Guides
  - Annual Product Quality Review

- GloFAS Contact Form (https://global-flood.emergency.copernicus.eu/contact-us/)
  - Subject [Satellite-based Global Flood Monitoring]

- GFM Portal
  - portal.gfm.eodc.eu

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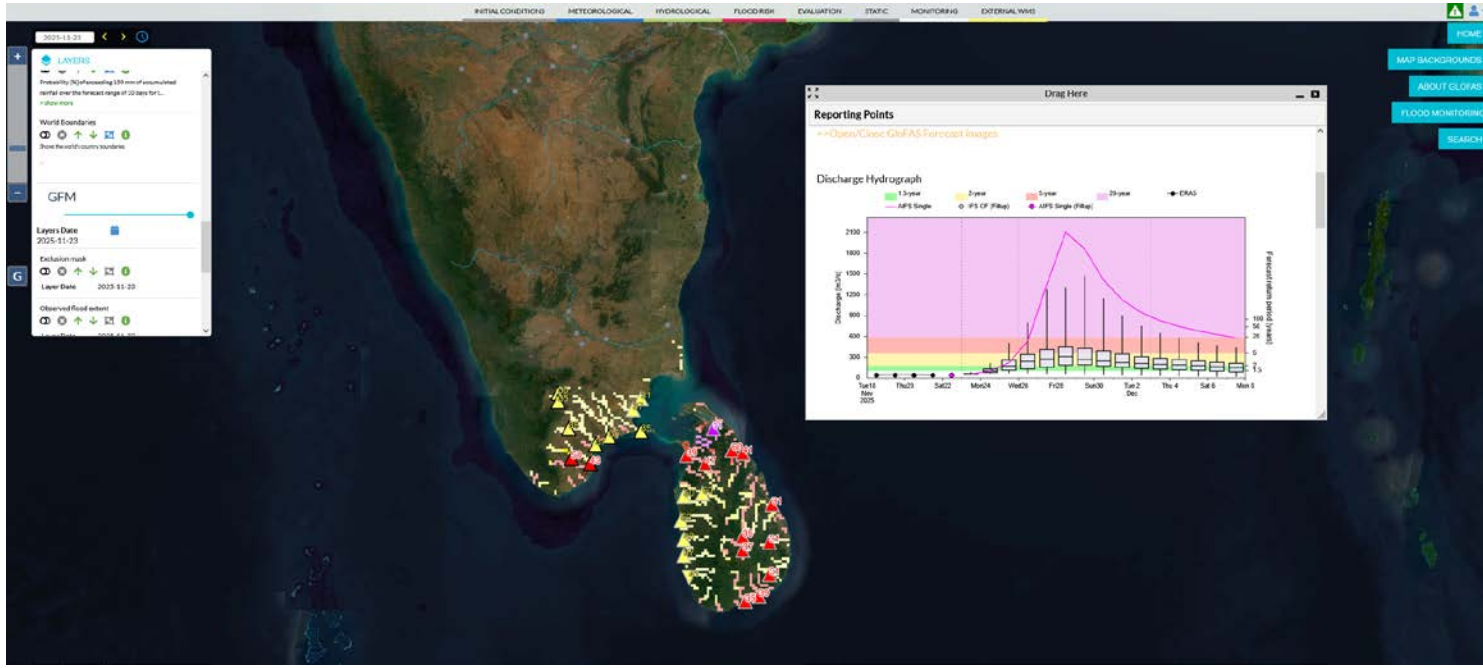
Monitoring the recent floods in Sri Lanka

- It is the **23 of November 2025**
- You have checked the **flood forecasting**
- You identified a potentially **severe** flood forecasts



Is there already some flooding ongoing?

When will be the next satellite image available?

Did **GFM** observe flooded areas throughout the event?

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Thank you

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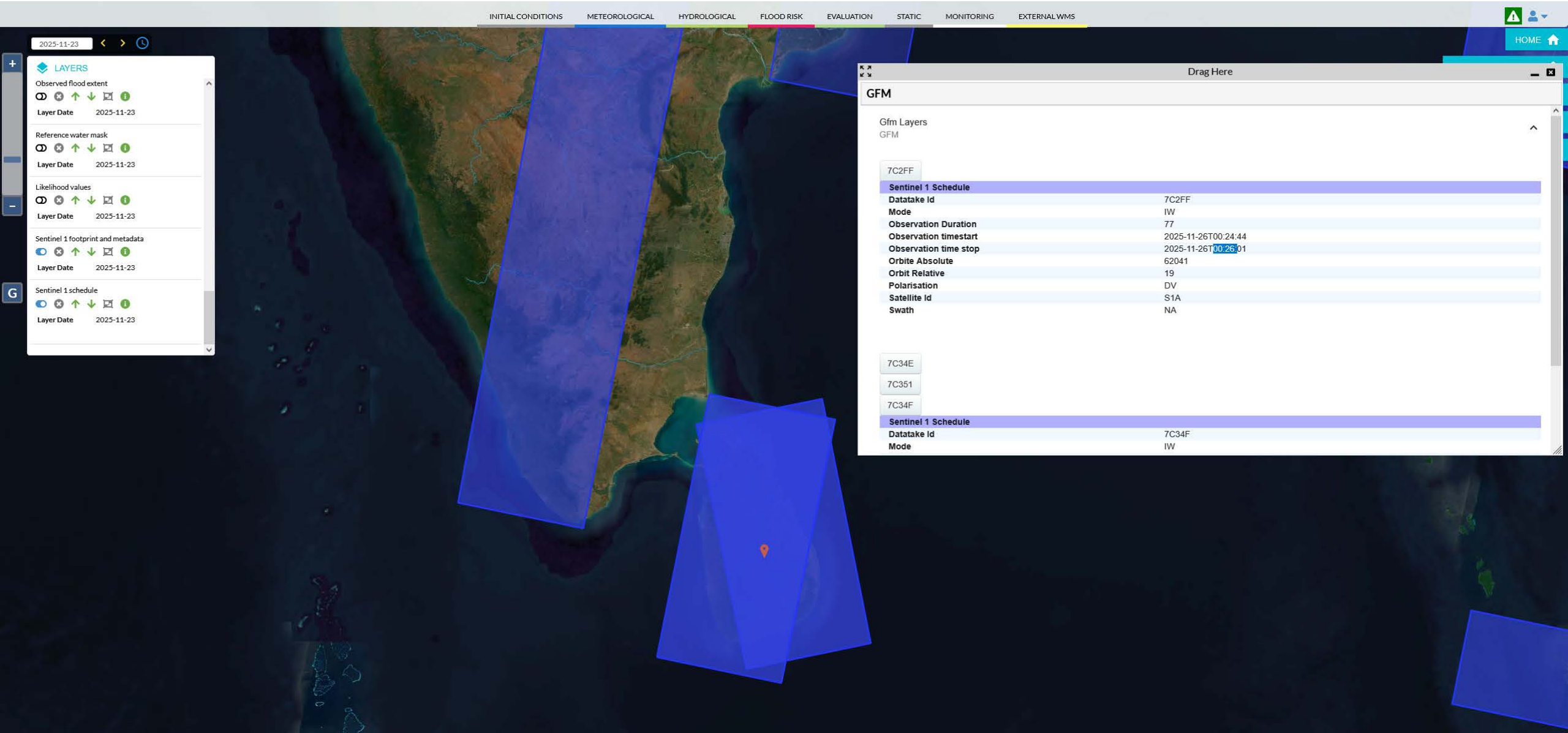
23 November



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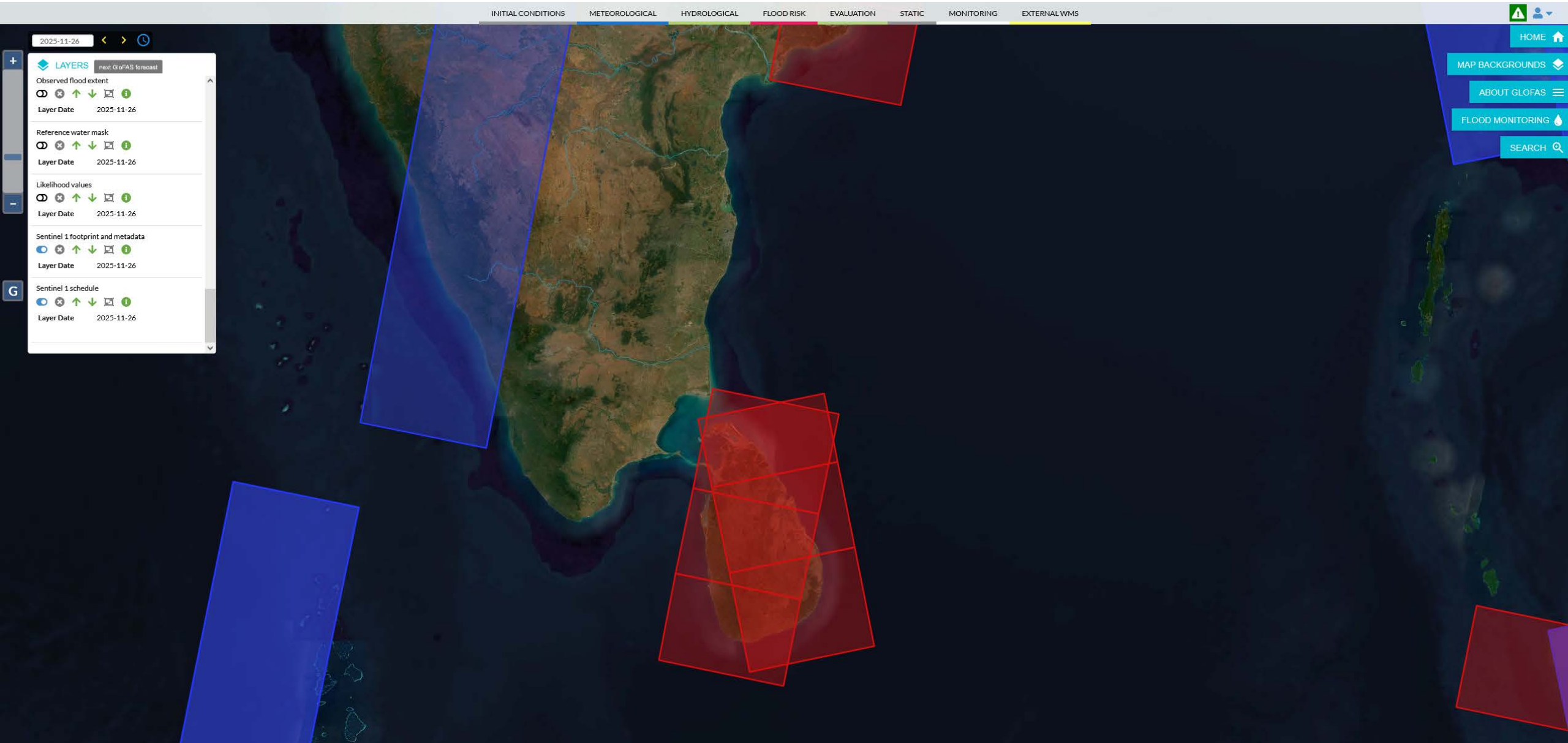
26 November



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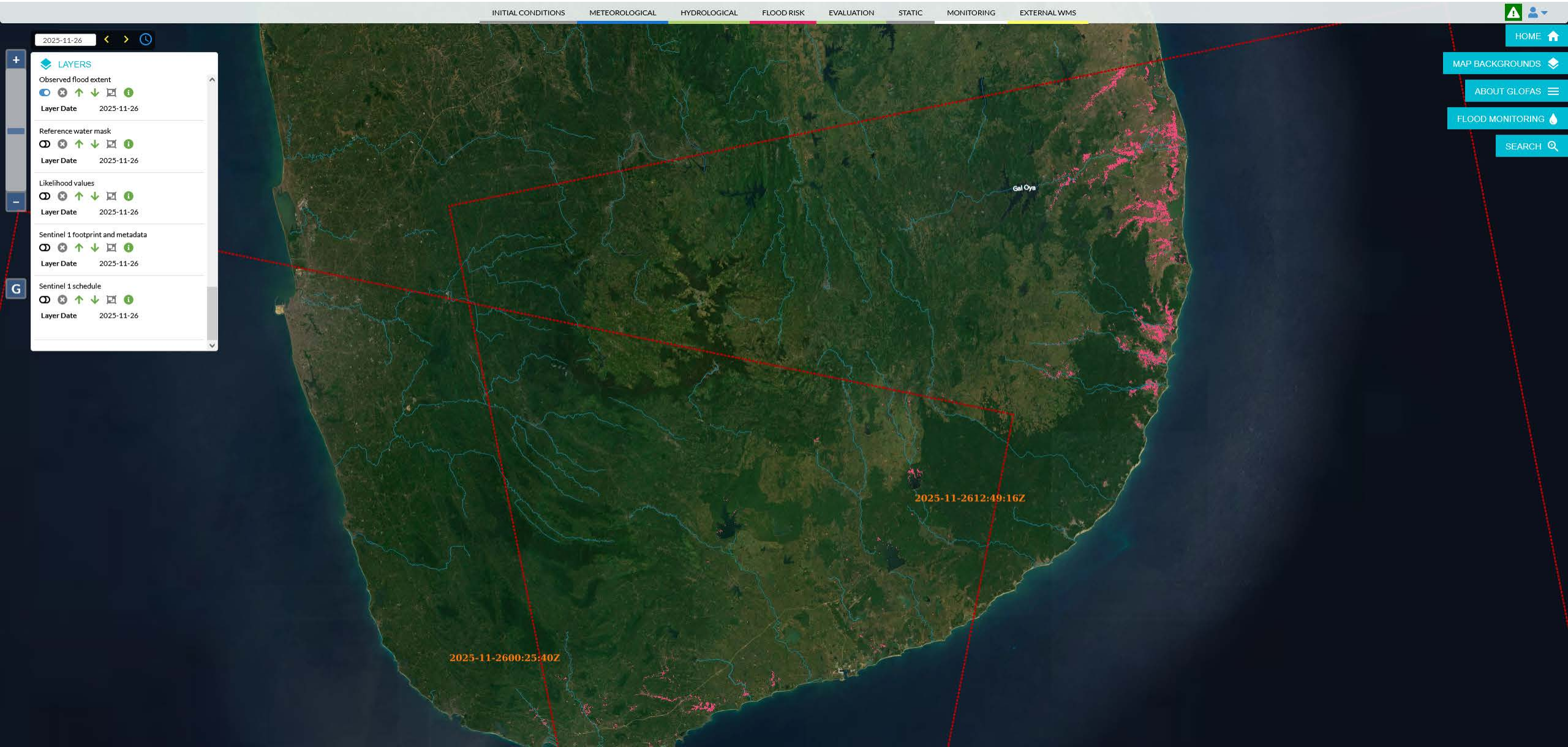
26 November



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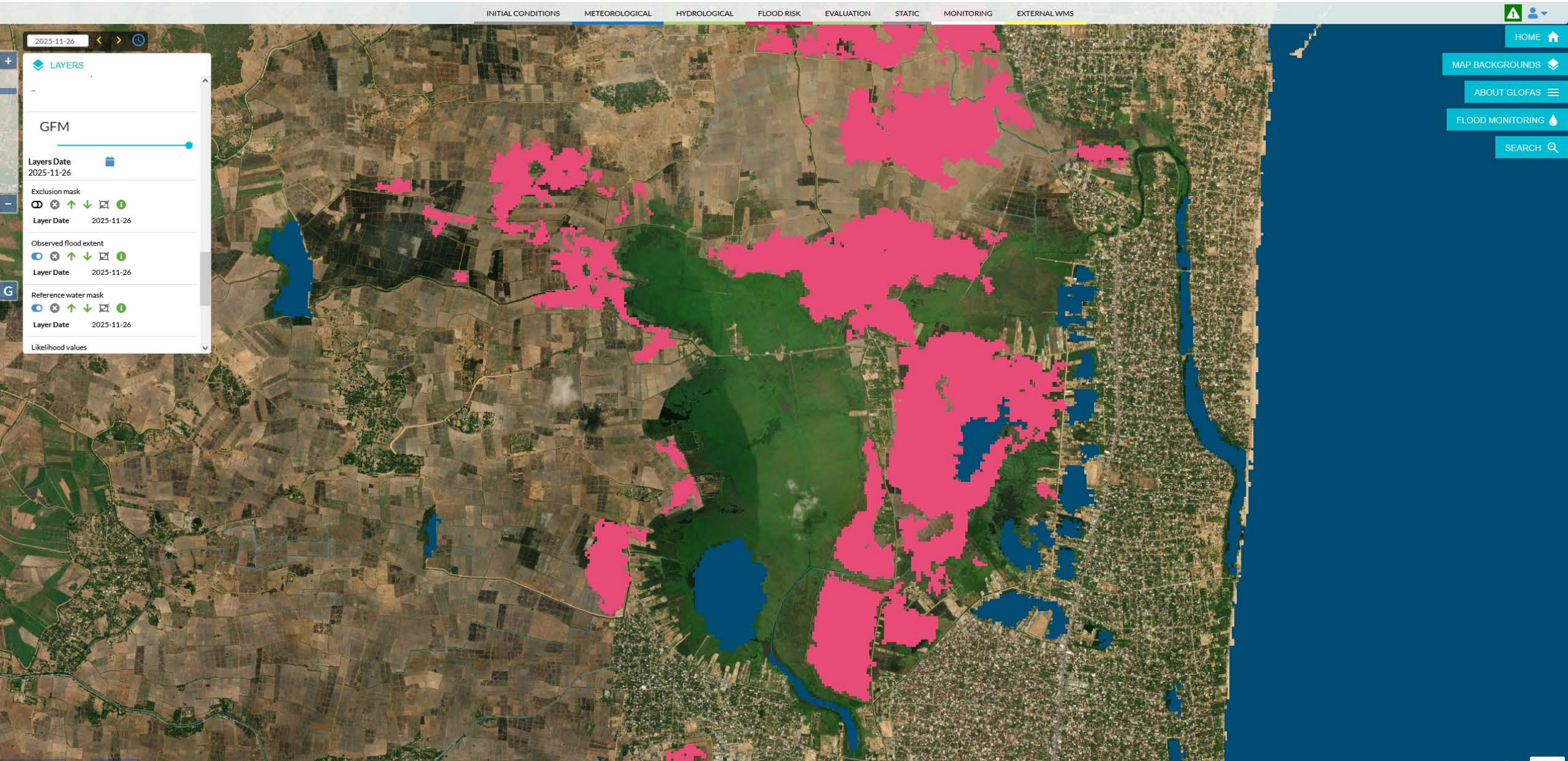
26 November



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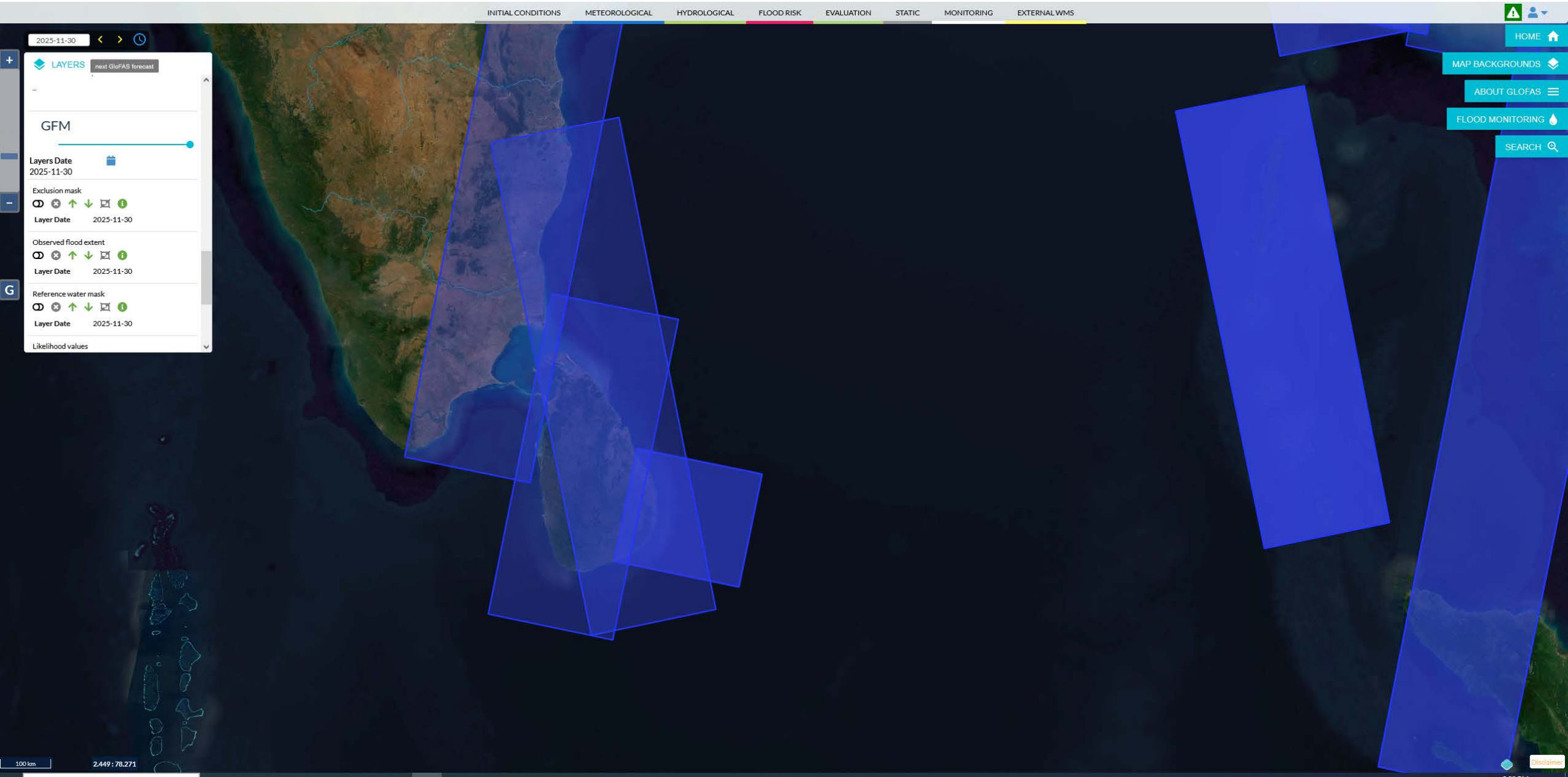
30 November



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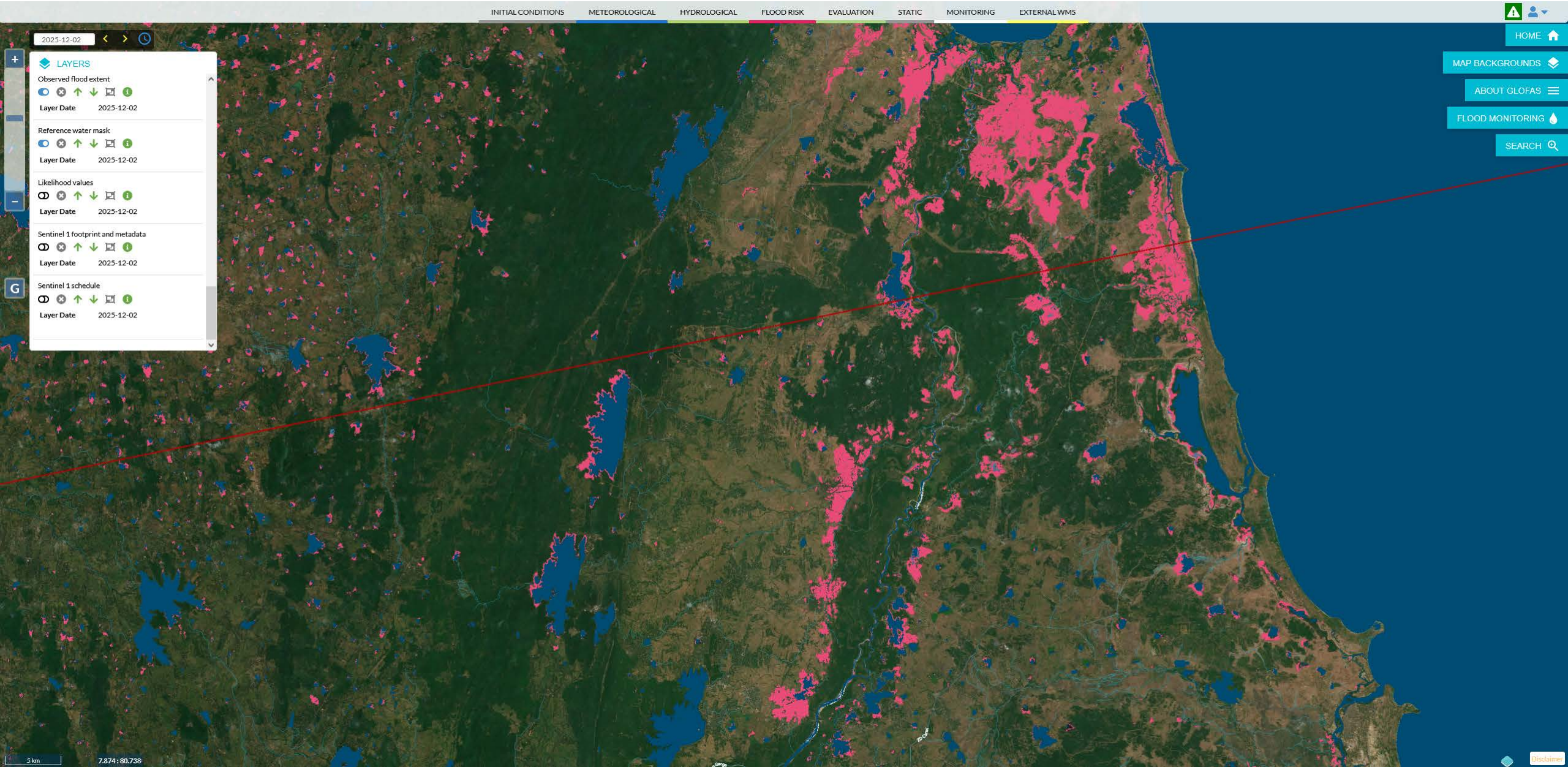
2 December



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GFM download