

PROGRAMME OF THE EUROPEAN UNION



European Commissi

Everything you need to know about EFAS version 5.0

18th EFAS Annual Meeting Cinzia Mazzetti and the EFAS COMP Team



EFAS v5.0 DOMAIN

- A <u>higher spatial resolution</u>. EFAS v5.0 has a 1 arcmin / 0.0167 degrees resolution (<u>~1.4km</u>), as opposed to the 5-km resolution of all the previous EFAS versions.
- A different projection system, now based on WGS84 Coordinate Systems (EPSG:4326) instead of ETRS89 Lambert Azimuthal Equal Area Coordinate Reference System (ETRS-LAEA) for previous versions.
- A larger modelling domain whose extension has been enlarged to match the river catchments.



STATIC MAPS

"Static" maps describe the geo-physical properties of the catchments and define LISFLOOD parameters. An entirely new set of <u>1 arcmin / 0.0167 degrees resolution (~1.4km) static maps</u> produced using the most recent research findings, remote sensing, and in-situ datasets.

Documentation is available on LISFLOOD Users Guide.





https://egusphere.copernicus.org/preprints/2023/egusphere-2023-1306/

LISFLOOD OS

Major improvements to the open-source hydrological model LISFLOOD OS (v 4.1.3).

LISFLOOD CALIBRATION

A <u>new calibration at 1903 in-situ gauging stations</u>. Furthermore, a parameter <u>regionalisation</u> was performed to estimate the parameters of catchments for which in situ discharge observations were not available.

HYDROLOGICAL MODEL PERFORMANCE

The model performance layer on EFAS-IS shows **LISFLOOD performance (KGE')** at the calibration stations during the calibration period.

MEDIUM RANGE FORECAST SKILL

New reforecast configuration (medium-range), with the hydrological reforecast being generated during the operational processing chain, **ensemble headline forecast skill scores updated each quarter**.

EFAS v5.0 DATA ON THE COPERNICUS CLIMATE DATA STORE (CDS)

New <u>km-scale 6-hourly pan-European reanalysis</u> for <u>1992 - NRT</u> available for <u>download</u> (interactive form + API) on the <u>Copernicus Climate Data Store (CDS</u>).

EFAS v5.0 DATA ON THE COPERNICUS CLIMATE DATA STORE (CDS)

- Medium-range forecasts once 30-day embargo is up! (~20th Oct)
- Seasonal forecasts at next seasonal run (usually available ~12th each month)
- <u>Reforecasts</u> (medium-range + seasonal) made available <u>soon</u>!

Please note that accessing this dataset via CDS for time-critical operation is not advised or supported. We suggest checking the list of known issues on the EFAS wiki here σ before downloading the dataset.

WARNING: Due to a lack of observational data from Ukraine, river discharge quality in this area could be degraded. WARNING: Sub-region extraction has been disabled for EFAS datasets after the identification of an error (more information α)

Accessing EFAS data (CDS, ftp, WMS) Dimitar Tasev and Eleanor Hansford (EFAS COMP)

ANOMALIES AND RETURN PERIOD THRESHOLDS

New <u>return period thresholds</u> and <u>snow water equivalent/soil moisture anomaly</u> maps based on the new km-scale 6-hourly pan-European reanalysis from 1992-2022. Discharge Hydrograph (ECMWF-ENS)

REPORTING POINTS GENERATION

Flood probability is only computed on every grid cell with a river <u>upstream area > 50 km2</u>. <u>Very dry areas are excluded</u> by filtering the rivers with a 1.5-year return period < 1 m3/s.

Minimum upstream area to be a reporting point, fixed or dynamic, decreased to <u>150 km2</u> (before 500km2)

3070 fixed RP (stations) drainage area >=150km2

Exception: <u>269 'tiny' fixed RP (stations)</u> 50 <= drainage area <150km2

> MORE REPORTING POINTS

(Test)

POST-PROCESSING

Station ID

Name

Gornja Radgona

Post-processed Hydrograph ^

Provider Drainage Area

10197.2

Updated hydrological post-processing models, recalibrated for EFAS v5.0.

- □ <u>1580 reporting points</u> with post-processing
- Refactored code
- New calibration (improved to deal with missing observations)
- Revamped pop-up window showing providers' thresholds (discharge only)
- Better information: calib. period, min and max obs, why the forecast isn't there

EFAS FLASH FLOODS – ERIC LAYERS

Compute ERIC from simulated LISFLOOD surface runoff

output (previously computed using a regression to translate precipitation and soil moisture into surface runoff)

ERIC notification points and reporting points shown only for catchments **below 1000km2**

ERIC Affected Area Legend Flash Flood Severity Moderate (>2 year Return Period) High (>5 year Return Period) Extreme (>20 year Return Period) Description Drainage area affected by the forecasted

Drainage area affected by the forecasted heavy precipitation and potential flash floods. Yellow/Red/Purple = drainage area affected with a high probability to exceed a 2/5/20 year return period magnitude.

There is also more information on the wiki page for ERIC Affected Area

RAPID FLOOD MAPPING LAYER

New <u>flood hazard maps</u> generated using *LISFLOOD-FP* at 90 m resolution (previously 100m)
MERIT-Hydro DEM (hydrologically conditioned)
Flow forcings from EFAS 5 reanalysis

Workshop A:

Flood Hazard Maps Calum Baugh (EFAS COMP)

RAPID IMPACT ASSESSMENT

<u>Updated exposure information</u> used in Rapid Impact Assessment with <u>more</u> <u>information</u> included in pop-out tables.

Exposure Information

Flood Event Information

Updated exposure information sources:

□ Population: GHSL v2023 for the year 2020

Dams: GeoDAR v1.1

Deverplants: Global Powerplant Database

Schools, hospitals, airports, refugee camps: OpenStreetMap

		PROTECTED	UNPROTECTED	
Population affected [No. of people]	Estimated peak return period [yr]	52	13 Rapid Flood Mapping	0
Artificial surfaces [ha]	Estimated protection level [yr]	45	Rapid Flood Mapping	at 100m
Agricultural surfaces [ha]	Estimated flooding start date	ongoing	ongo Rapid Impact Assessment	evels n are
Forest and Seminatural [ha]	Estimated flooding end date	2023-09-21 12 hours	2023- hours	the layer will ded grey are od return
Settlements affected [No of Settlements]	Estimated flooding duration [days]	2 days 06 hours	2 day Feature Info + ©	stimated flood
Airports affected [No of facilities]	Estimated peak date	2023-09-19 12 hours	2023- hours	rmation on the od Mapping
Education facilities affected [No of facilities]	Estimated flooded area [km ^ 2]	962	1667	
Powerplant facilities affected [No of facilities]	Mean probability exceeding 2-years	81	88	
Health facilities affected [No of facilities]	threshold [%]		Thessalla	13
Refugees sites affected [No of sites]	Mean probability exceeding 5-years threshold [%]	73	42 Impact Risk Matrix A	
Dams affected [No of dams]	Mean probability exceeding 20-years threshold [%]	67	20 High likelihood Medium likelihood	man
EUROPEAN UNION			Low likelihood	~

SEASONAL AND SUB-SEASONAL OUTLOOK LAYERS

Updated EFAS seasonal and sub-seasonal forecasts using the newly calibrated, higher resolution hydrological model.

DID I MISS YOUR FAVORITE LAYER?

Marketplace:

EFAS products help-desk, including EFAS-IS functionalities Calum Baugh and Cinzia Mazzetti (EFAS COMP)

Thanks for your attention!

... and a big thank you to all EFAS Centres and JRC colleagues!

STAY CONNECTED

EVENTS, ONLINE, and MAP VIEWERS

@CopernicusEMS

emergency.copernicus.eu

activations.emergency.copernicus.eu

REPORTING POINTS GENERATION

Flood probability is only computed on the rivers with an <u>upstream area > 50 km2</u>. **ANY NICE PLOT?** <u>Very dry areas are also excluded</u> by filtering the rivers with a 1.5-year return period < 1 m3/s.

For each NWP-driven forecast, a <u>flood</u> <u>probability</u> is computed <u>for each</u> <u>return period flood threshold</u> (2-year, 5-year and 20-year) using the maximum forecast discharge value over the 10-day forecast horizon. A **total probability of exceedance** is computed from the maximum forecast probabilities of DWD-HRES, ECMWF-HRES, ECMWF-ENS, COSMO-LEPS using a weighted average:

- Inside COSMO-LEPS domain: (25%, 25%, 25%, 25%)
- Outside COSMO-LEPS domain: (25%, 25%, 50%, 0%)

The **persistence probability** is then calculated by averaging the total probabilities from the current and the previous forecast.

20-year return period: persistence probability > 30% and upstream area > 150 km2.
 5-year return period: persistence probability > 30% and upstream area > 150 km2.
 2-year return period: persistence probability > 50% and upstream area > 150 km2.
 Dynamic Points too close to each other are removed, unless they are on different rivers (based on the upstream area > 150 km2 network)

MORE REPORTING POINTS

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ANYTHING TO A

RAPID FLOOD MAPPING LAYER

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