EDERA
Early warning Demonstration of pan-European rainfall-induced impact forecasts

European Union
Civil Protection and Humanitarian Aid

Integration of EDERA Products & Training Materials into EFAS

Calum Baugh & Karen O'Regan (ECMWF)

Oisin Morrison, Dimitar Tasev, Juan Pereira Colonese (ECMWF); Seppo Pulkkinen (FMI); Marc Berenguer, Victor Gonzalez, Shinju Park, Sonsoles Queralt (UPC)

Centre de Recerca Aplicada en Hidrometeorologia
UNIVERSITAT POLITÈCNICA DE CATALUNYA

ECMWF

ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

Agencia de Medio Ambiente y Agua de Andalucía
Consejería de Agricultura, Pesca, Agua y Desarrollo Rural
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DIRECCIÓN GENERAL DE PROTECCIÓN CIVIL Y EMERGENCIAS

EMERGÊNCIA E PROTEÇÃO CIVIL
AUTORIDADE NACIONAL

Outline

1. Integration of new products into EFAS (WP6)
    a) Revised river flash flood products
    b) New pluvial hazard layer
    c) New precipitation hazard layer

    } To capture urban flash floods
2. New training materials
    a) Hosted within the CEMS-Floods wiki pages

Scheduled for release in EFAS v5.4 provisionally on 5th February

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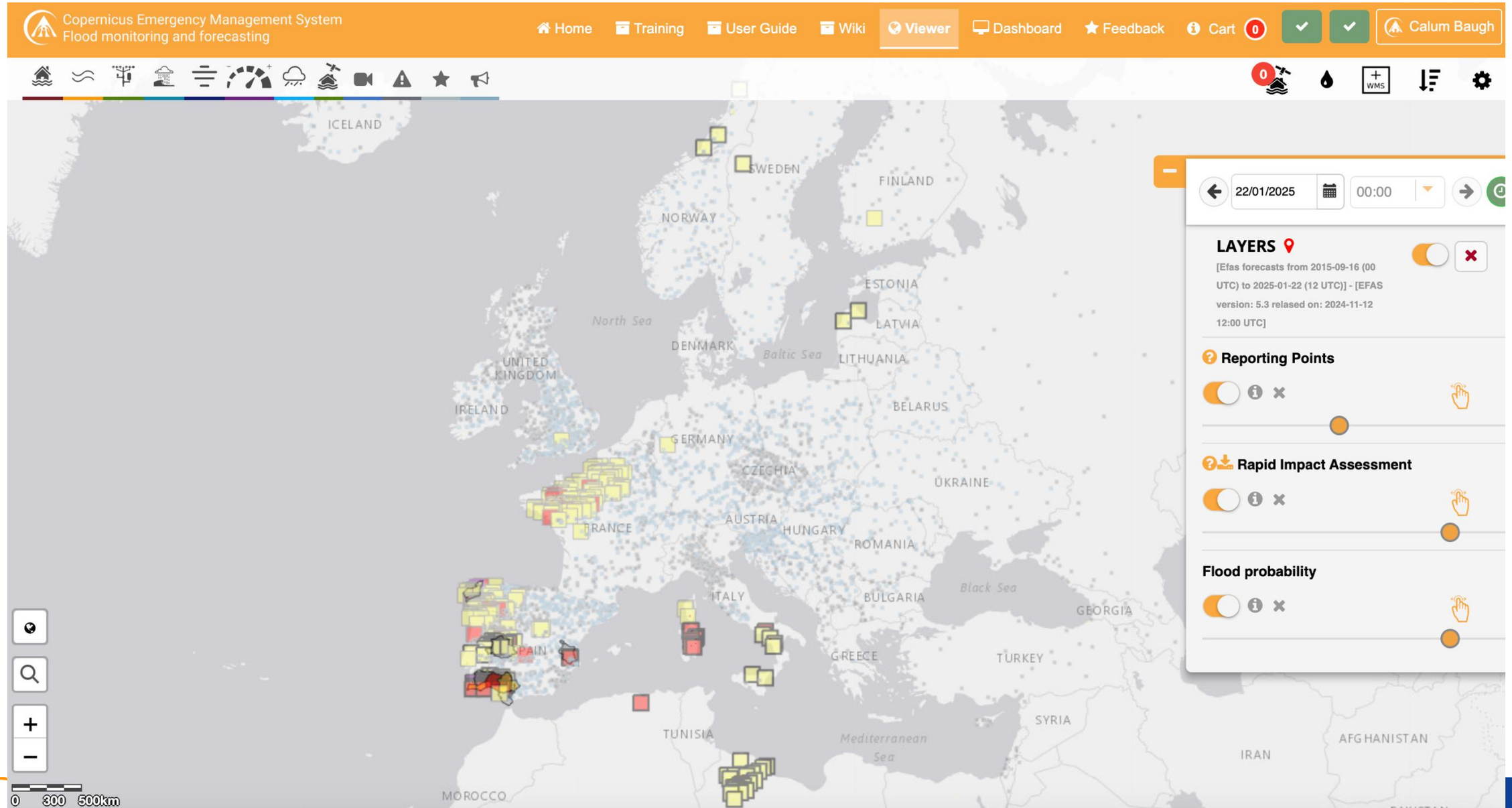
EFAS (https://www.efas.eu/en)

Forecasts not publicly available for first 30 days

Become a partner: https://european-flood.emergency.copernicus.eu/en/become-efas-partner



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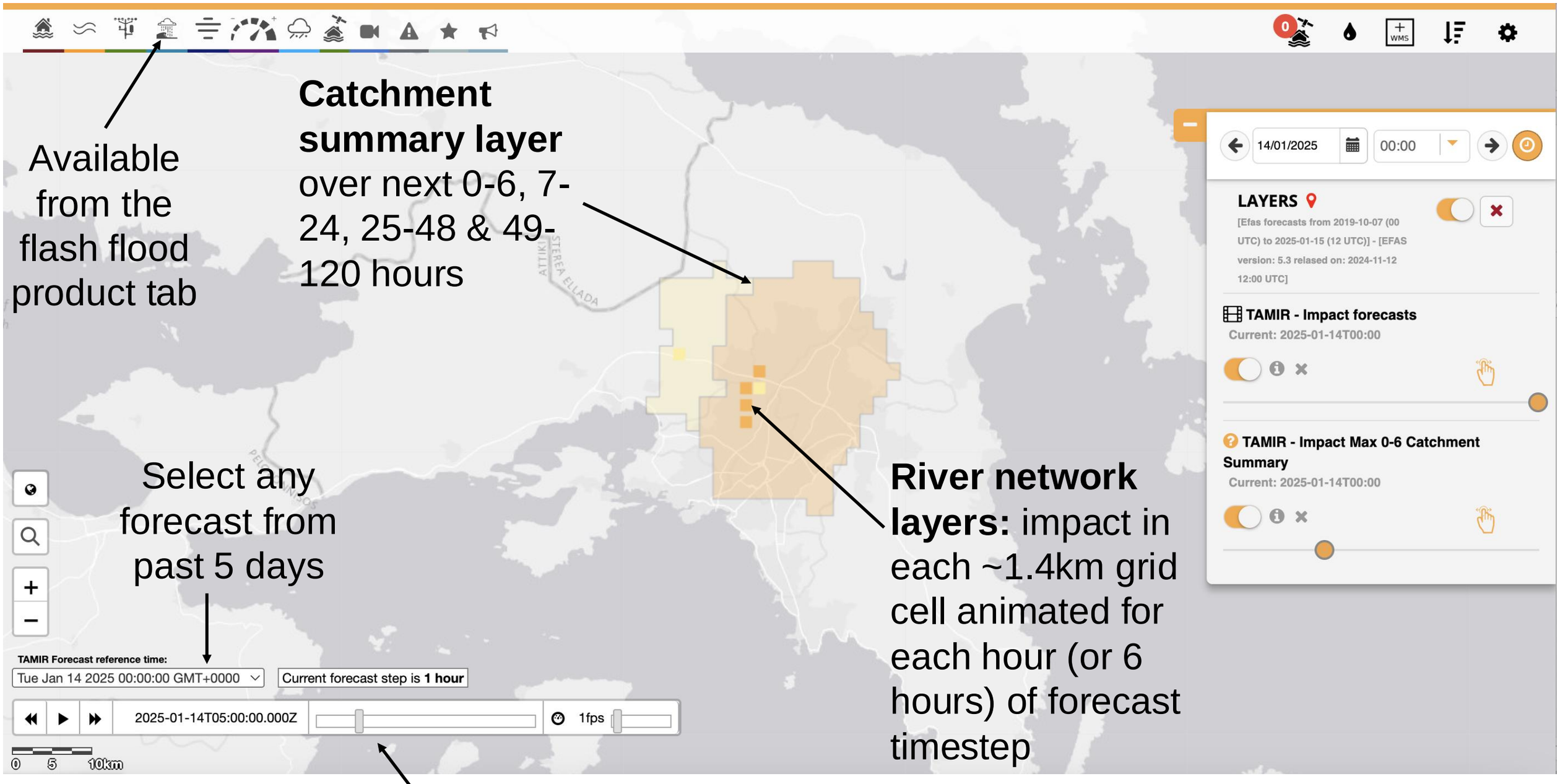
Integration of New Products into EFAS

Emergency Management

1. Revised river flash flood products



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Update of TAMIR Products in EFAS

1. River flash flood products

Updates during EDERA:

- Updated climatology file, applied to new 1 arcmin grid (~1.4 km)
- More contextual information in pop-out window

Lead time date	Admin ID	Upstream Area	River Name	Basin Name	Regions	Countries	Alert Level
2025-01-14T05:00:00	20684	405.886	Coastal	Coastal	Attiki (EL)	Coastal	2

Impact matrix

	Low Exposure	Medium Exposure	High Exposure
High Likelihood	✔		
Medium Likelihood			
Low Likelihood			

Exposed population and critical infrastructure

	#
Lead time date	**2025-01-14T05:00:00**
Total population affected	**102950**
Education facilities affected	**9**

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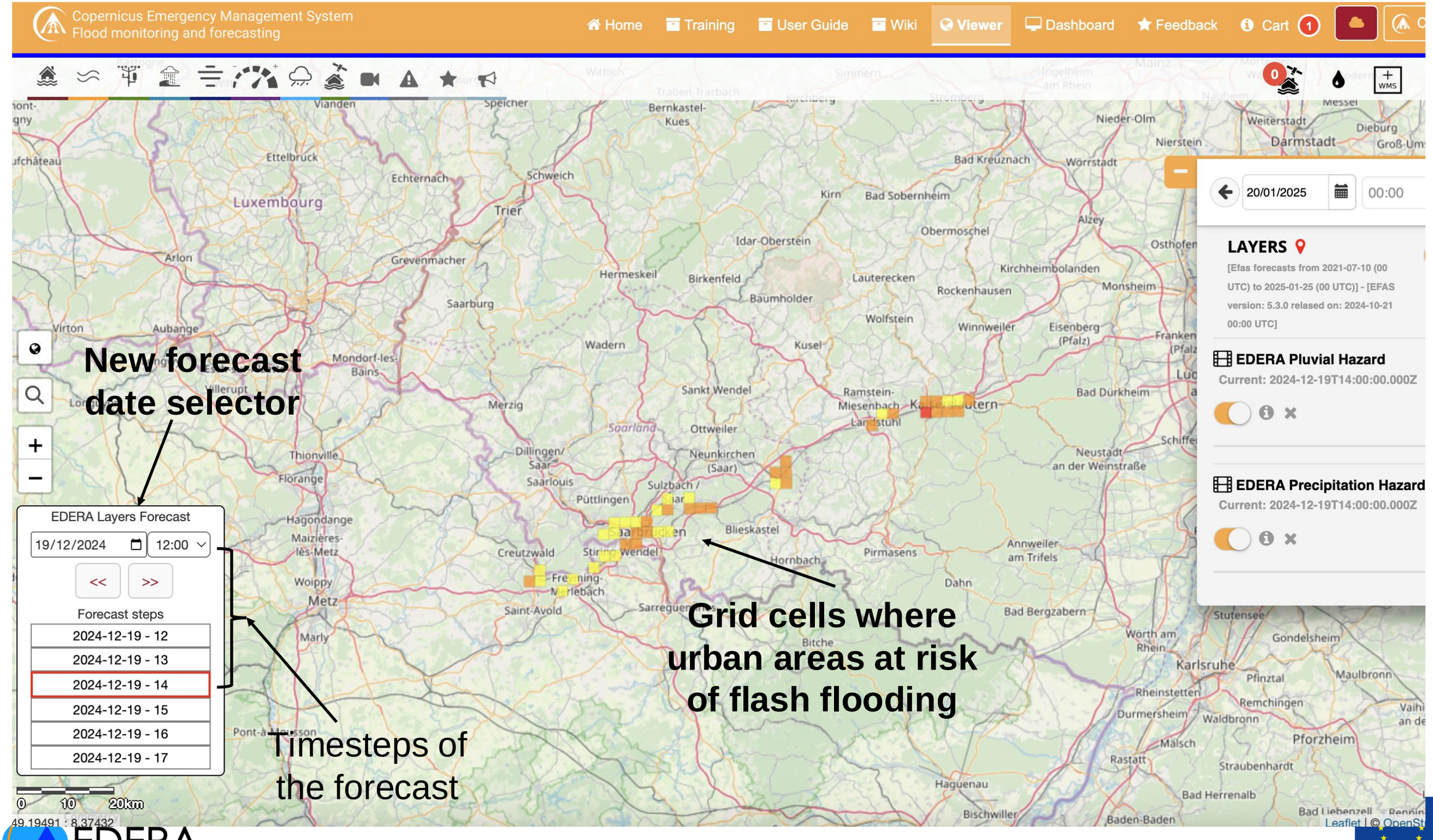
Integration of New Products into EFAS

2. Pluvial hazard product – updated every hour



Show 1-hour timesteps as 15-min not compatible with rest of EFAS web

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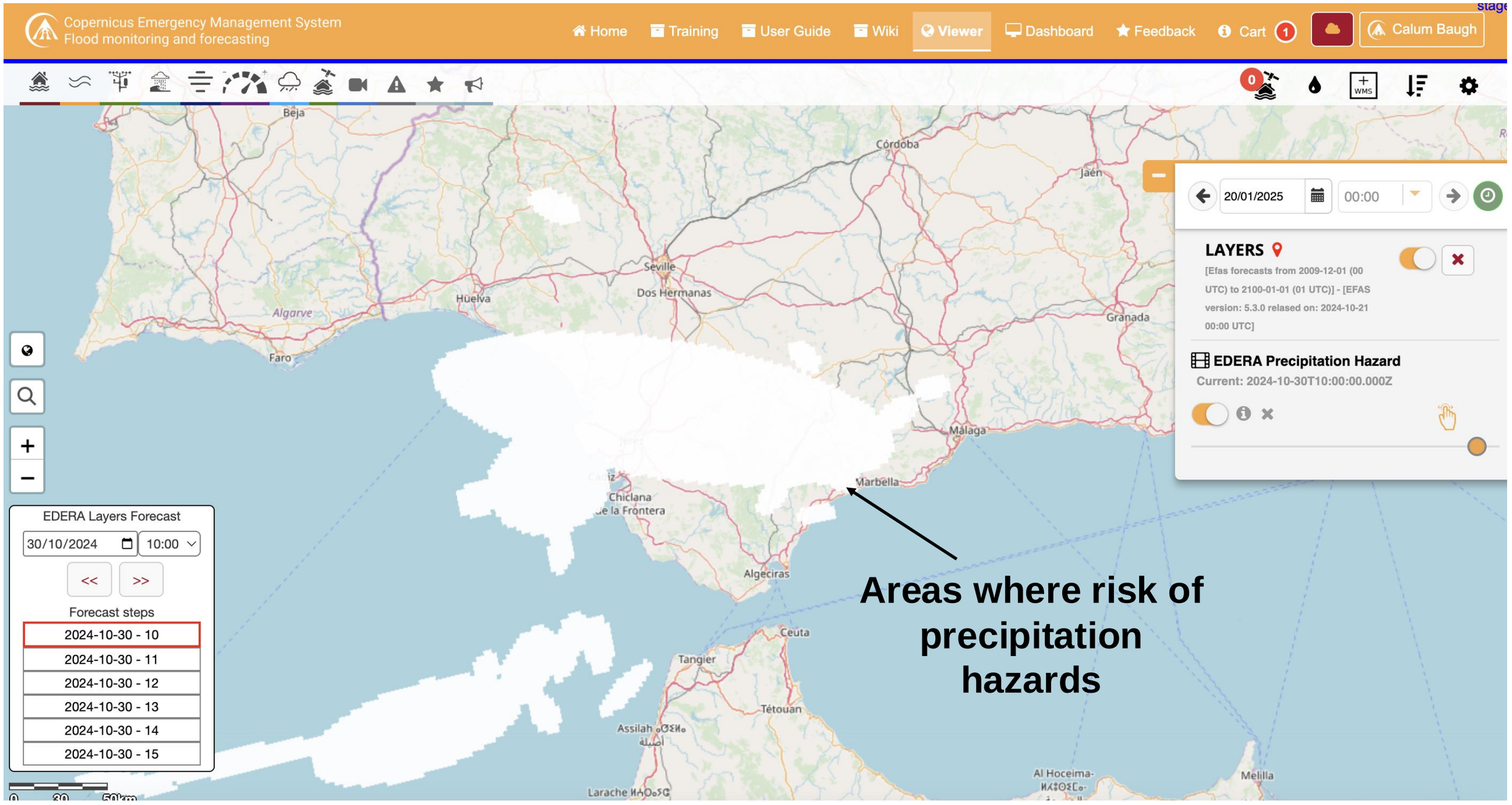
Emergency Management

3. Precipitation hazard product – updated every hour



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Future Work to Products in EFAS

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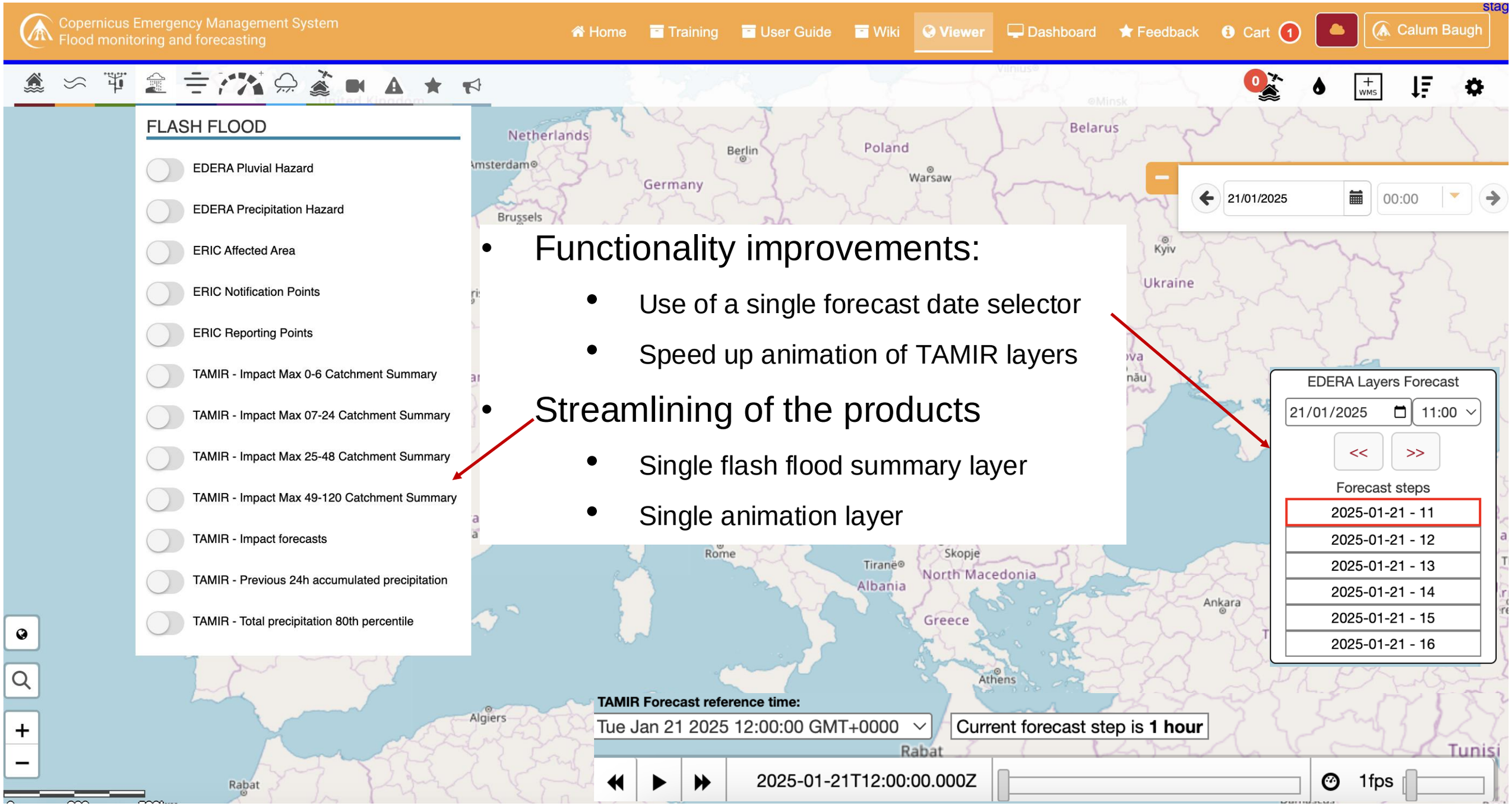

- Functionality improvements:
  - Use of a single forecast date selector
  - Speed up animation of TAMIR layers
- Streamlining of the products
  - Single flash flood summary layer
  - Single animation layer

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Other Work – Automated Notifications

- Developed system for issuing automated notifications within EFAS web services
- Could inform future developments for flash flood notifications
  - E.g. could test with ARISTOTLE project

Notifications from forecast 2024-11-09 11:00:00+00:00

E

edera-notifications@efas.eu <edera-notifications@efas.eu> Saturday 9 Nc

To: EDERA Notifications

EDERA AMAYA 0-6H Nowcast Notifications

Latest Forecast - 2024-11-09 11:00:00+00:00

Region			Affected Popluation	Rule
Granada			32540	AMAYA 0-6H Nowcast
Notifications				
River	**Level**	**Forecast**	**Peak**	**ID**
Genil	4	2024-11-09 11:00 UTC	2024-11-09 12:00 UTC	21215 [link]
Guadalfeo	3	2024-11-09 11:00 UTC	2024-11-09 12:00 UTC	21589 [link]

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Training Materials on EDERA Website

https://edera-project.eu/documentation/

Examples of how to use the EDERA platform & products

Documentation

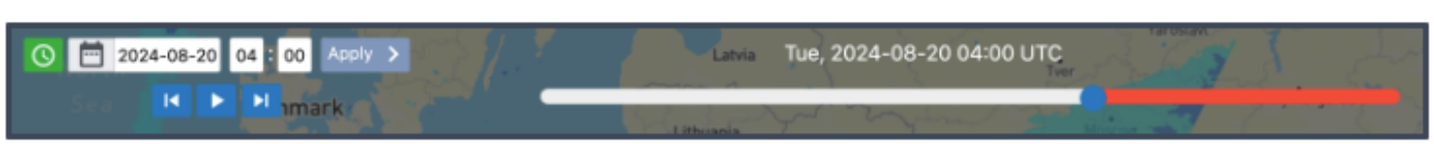
- Using the platform
- Training videos
- How to analyse an EDERA forecast
- Analysis of Case Studies using EDERA
- Products
- Additional list of events
- List of Layers
- References

Frame Selector

Once you have configured the desired layers, go to the frame selector at the bottom of the screen. The frame selector can be minimised using the 'down arrows' icon .

Frame selector of the EDERA platform with lead times.

- **Forecast Time Selector:** On the left-hand side, you can select a forecast date and time for your chosen event. Select the date/time of your event and click 'Apply'. Please note that times are in the UTC rather than local time zone.
- **Forecast Frame Selector:** For selected products, on the right-hand side, you can scan through the different time steps of your chosen forecast using the time slider. The left portion (in white) displays past time steps derived from observational data, while the right portion (in red) indicates forecasted data.



Time slider of the EDERA platform with observed data (white) and forecasted data (red).

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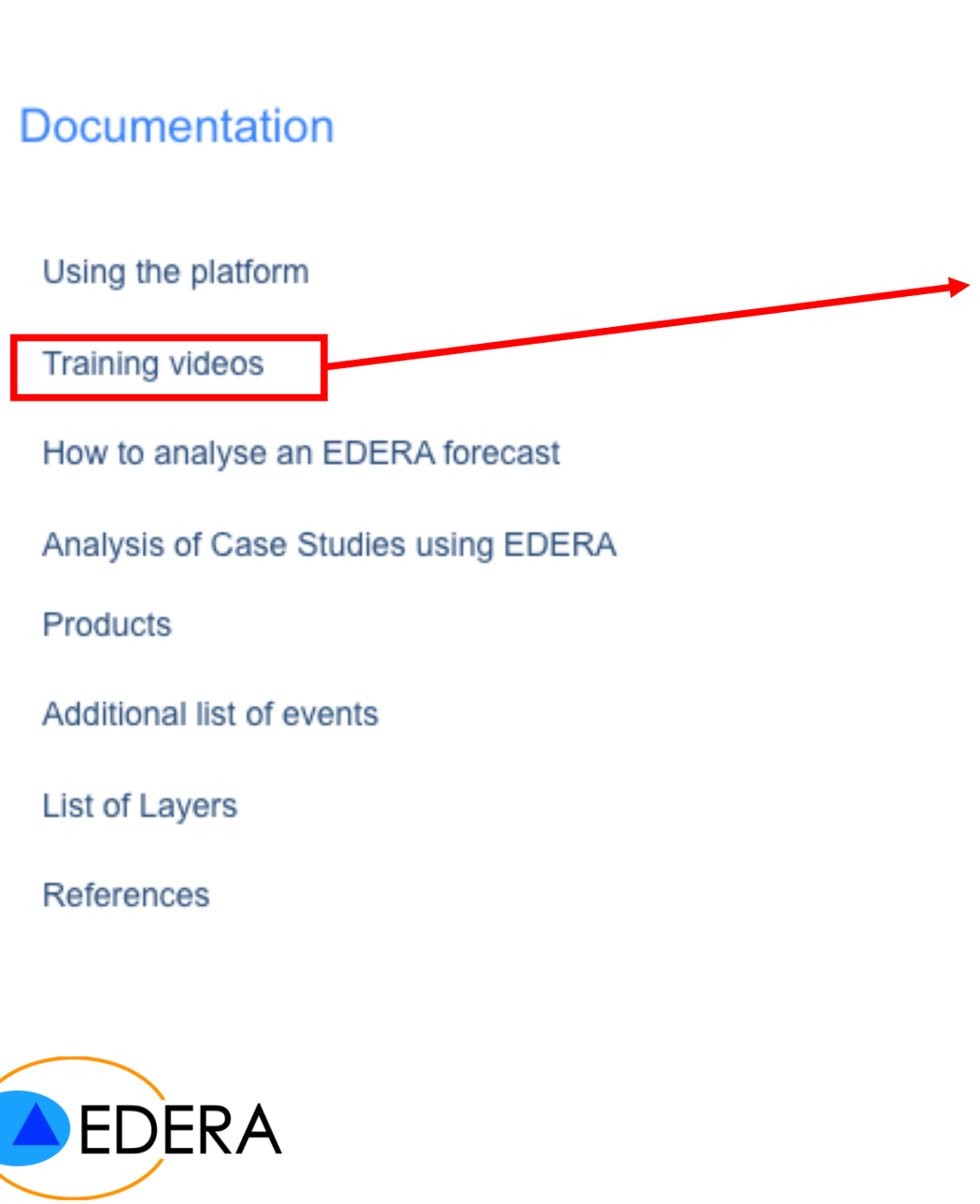
Training Videos

https://edera-project.eu/videos/

8 training videos produced, available in EN, ES, PT, and FI.



English version

Access to the platform

Components of the platform.

Organisation of layers in blocks.

Example of use of the platform in a river flash flood case (Part 1/2). Flash Flood Summary Layers.

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Training Materials on EDERA Website

https://edera-project.eu/documentation/

How to analyse an EDERA forecast with case studies

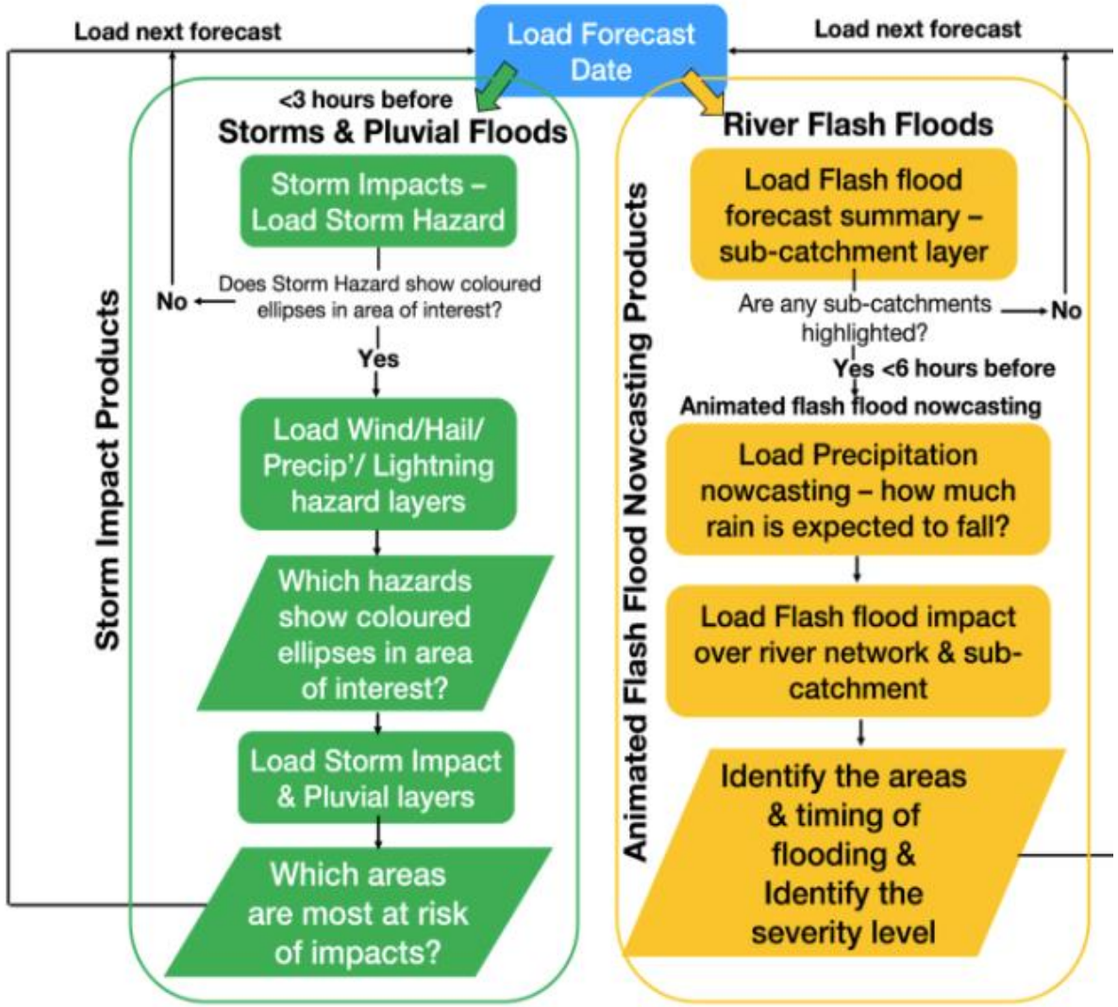
Documentation

Using the platform

Training videos

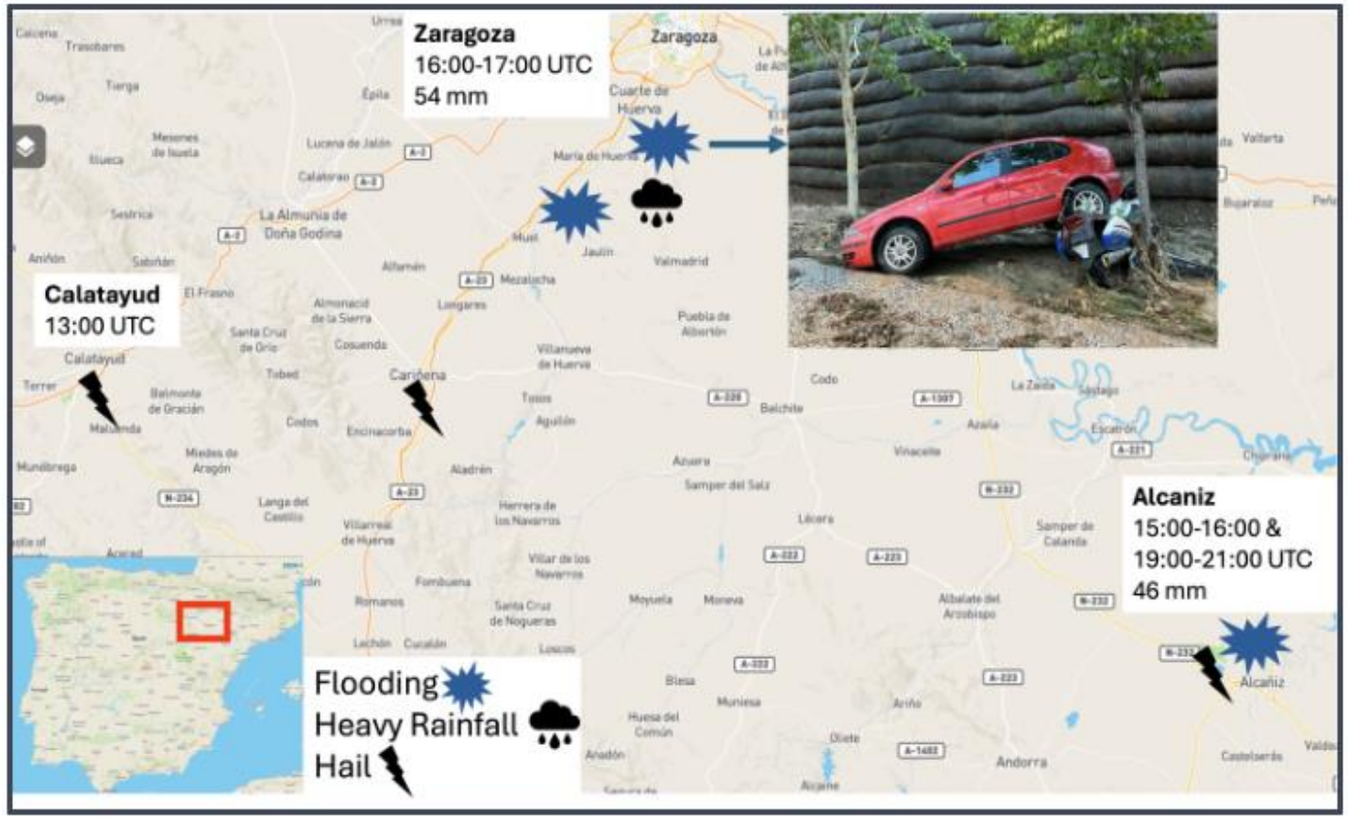
How to analyse an EDERA forecast

Analysis of Case Studies using EDERA Products



Case Study 2: Zaragoza, 6th July 2023 (Urban flash flooding)

Zoom in on the area of interest to begin analysing the EDERA forecast. In this case, the event occurred in Zaragoza, northeastern Spain, on 06th July 2023, where hail, heavy rainfall and flooding impacted localised areas from 13:00 UTC to 21:00 UTC.



Area of urban flooding, heavy rain, and hail event in Zaragoza, northeastern Spain on 06th July 2023.

At 06:00 UTC: Review the Official Warnings layer to check if the region has an active warning from the Local Meteorological & Hydrological Services.

Integration of Training Materials in EFAS

CEMS-Floods wiki page contains documentation about the forecast products available on EFAS:

https://confluence.ecmwf.int/display/CEMS/CEMS-Flood

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Creation of a new block of Radar-based flash flood documentation:

Analytics

SPACE SHORTCUTS

Here you can add shortcut links to the most important content for your team or project. Configure sidebar.

PAGE TREE

- Please read: CEMS Early Warning Data Store (EWDS) is now liv
- CEMS-Fire
- CEMS-Flood
  - European Flood Awareness System
    - EFAS models and procedures
    - EFAS operational system
    - EFAS products
    - Overall EFAS Products Summary
    - EFAS Evaluation Products
    - EFAS flash flood forecast products
      - EFAS Flash Flood Notifications
      - ERIC Affected Area
      - ERICHA 24-h accumulations
      - ERICHA FF Hazard Levels Forecast
      - ERICHA Hourly Accumulated Precipitation
      - ERIC Notification points
      - ERIC reporting points
      - TAMIR
      - **Radar-based Flash Flood Products**
        - Copy of TAMIR Project Background
        - EDERA Project Background
        - Rainfall Forecast Products
        - River Flash Flood Products
        - Urban Flash Flood Forecast Products
        - Case Studies of Radar-based Flash Flood Products

Pages / ... / EFAS flash flood forecast products Analytics Edit View inline comments

Radar-based Flash Flood Products

Created by Karen O'Regan, last modified about an hour ago

PROGRAMME OF THE EUROPEAN UNION · Copernicus · Emergency Management Service

European Flood Awareness System service providers

European Commission · ECMWF · GHENOVA DIGITAL · SMHI · SHMU · KISTERS · Deutscher Wetterdienst Wetter und Klima aus einer Hand · DWD

pages under construction ----------

The Radar-based Flash Flood Products available on EFAS-IS have been developed by the TAMIR and EDERA projects.

+ Expand all − Collapse all

- Copy of TAMIR Project Background
- EDERA Project Background
- Rainfall Forecast Products
- River Flash Flood Products
- Urban Flash Flood Forecast Products
- Case Studies of Radar-based Flash Flood Products

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Integration of Training Materials in EFAS

Documentation on each of the products

Analytics

EDERA Precipitation Hazard Forecasts

Created by Calum Baugh, last modified just a moment ago

European Flood Awareness System service providers

This layer shows a weather radar-based nowcasting product for multi-hazards and impacts caused by thunderstorms. The hazard types are heavy rainfall, wind gusts, hail, and lightning. In addition, a total hazard product is generated by taking the maximum hazard level from each of the above. Impact products are generated by combining the predicted hazard levels with an exposure layer.

These products combine cell-based storm nowcasts (Rossi et al. 2015) with a machine learning (ML) model to predict storm hazard levels. The hazard levels are storm-estimated based on historical meteorological observations and weather impact reports following the concepts described by *Rossi et al. (2013)* and *Tervo et al. (2019)*.

The storm impact layers combine meteorological data from various sources such as weather radar, Numerical Weather Prediction (NWP) models and ERA5 re-analyses. The weather impact reports are obtained from the European Severe Weather Database (ESWD). Probabilistic nowcasts for the future location of the classified thunderstorms for the coming 5-60 minutes are being produced by using a Kalman filter model (*Rossi et al. 2015*).

The product generation process is illustrated in Figure 1. Storm cells are identified and tracked from OPERA reflectivity composites (step 1). Hazard levels of the cells are then predicted with the ML model for the four different hazard types (heavy rainfall, wind gusts, hail and lightning). This is done by using meteorological information from additional data sources, such as ERA5 reanalyses (step 2). Ellipses are fitted to the storm cells, and probabilistic nowcasts of storm ellipse locations are produced by applying the Kalman filter-based model (step 2). The predicted hazard levels are combined with the storm locations, which gives the hazard nowcasts (step 3). Here we assume that the hazard levels remain constant during the forecast time range. The nowcast giving the total hazard level is generated by taking the maximum levels from each hazard type. Finally, the maximum hazard nowcast is combined with an exposure layer to produce an impact nowcast (step 4). This is done by using a single exposure data source combined with openly available datasets of population, transport and critical infrastructure (e.g. health, education and energy).

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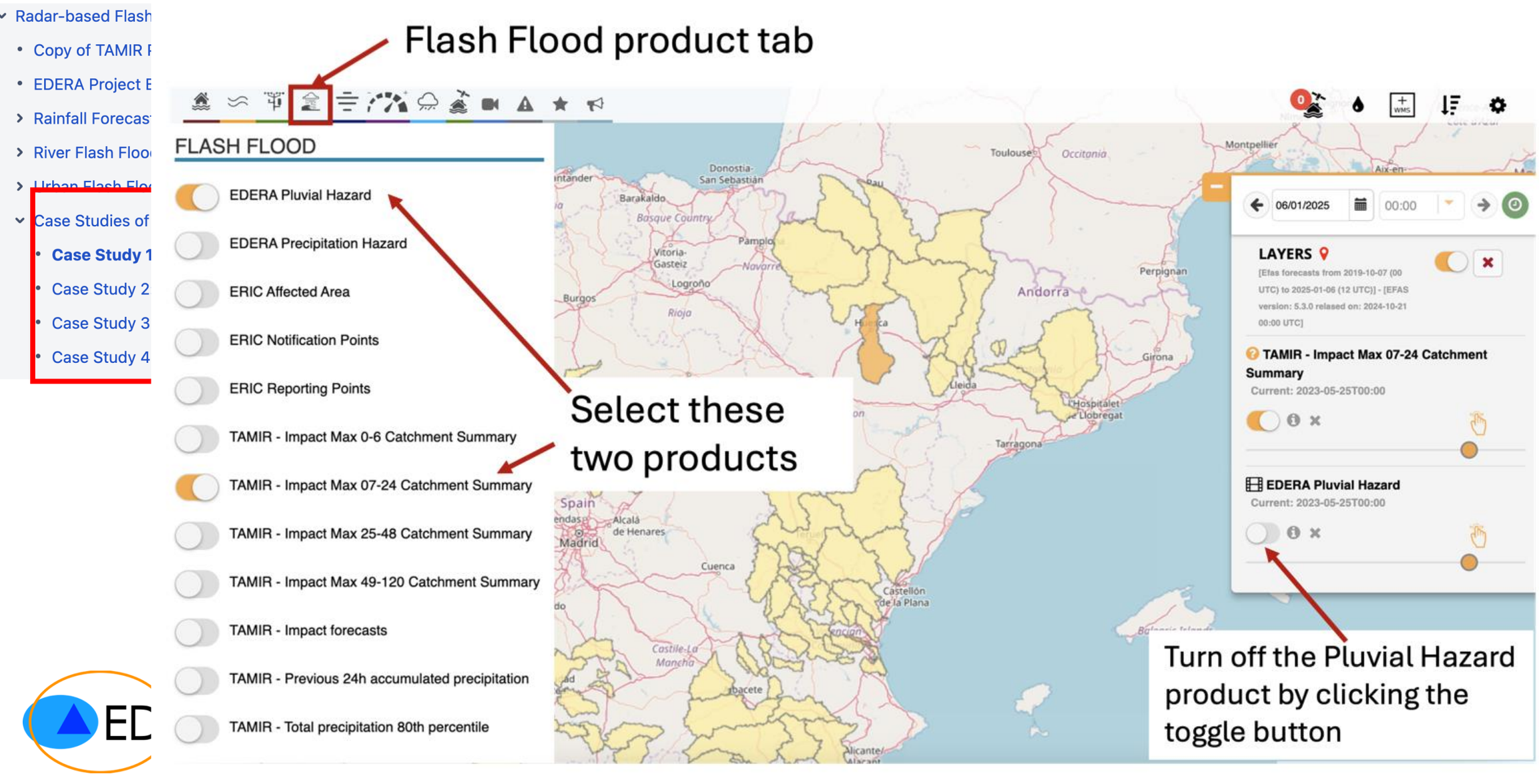
Case studies which give examples of how to use the products

Analysing the Event using the EFAS Radar flash flood Products

Step 1: 7-24 hours before the event

- From the 'Flash Flood' product tab select the following products (Fig. 2):
  - EDERA Pluvial Hazard
  - TAMIR - Impact Max 07-24 Catchment Summary
- Unselect the Pluvial hazard layer by clicking the toggle button



Radar-based Flash
- Copy of TAMIR F
- EDERA Project E
- Rainfall Forecas
- River Flash Floo
- Urban Flash Flo
- Case Studies of
  - **Case Study 1**
  - Case Study 2
  - Case Study 3
  - Case Study 4

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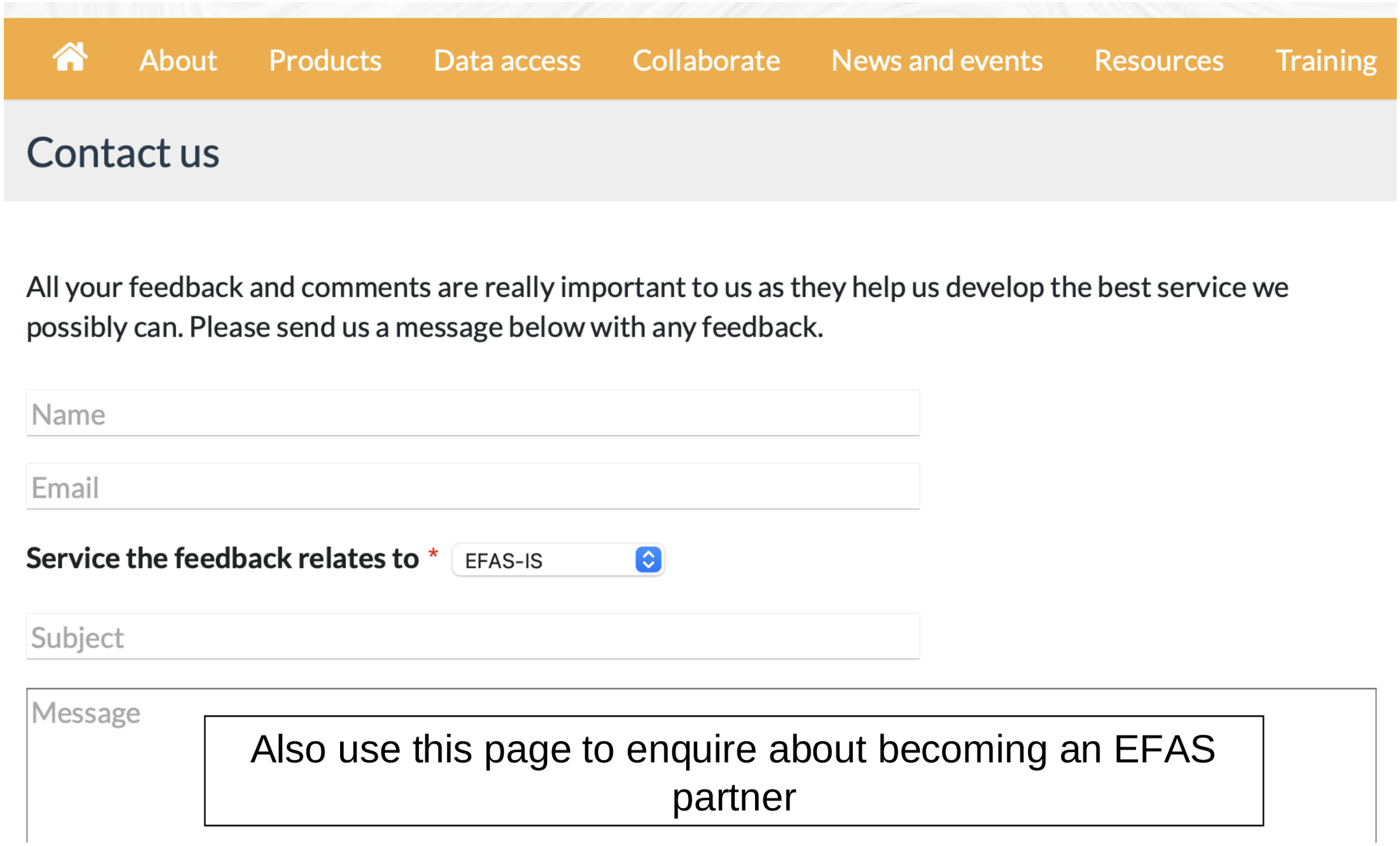
How to Provide Feedback

https://european-flood.emergency.copernicus.eu/en/form/feedback



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