INLINE
Integrated pan-European rainfall and floods impact forecasts for cooperation in emergency management

Co-funded by the European Union

INLINE follow-up meeting

16 June 2025

Centre de Recerca Aplicada en Hidrometeorologia
UNIVERSITAT POLITÈCNICA DE CATALUNYA

ECMWF

ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

AEMet
Agencia Estatal de Meteorología

IPMA Instituto Português do Mar e da Atmosfera

EMA

GOBIERNO DE ESPAÑA
MINISTERIO DEL INTERIOR
DIRECCIÓN GENERAL DE PROTECCIÓN CIVIL Y EMERGENCIAS

EMERGÊNCIA E PROTEÇÃO CIVIL
AUTORIDADE NACIONAL

Project summary

Integrated pan-European rainfall and floods impact forecasts for cooperation in emergency management

- **Duration:** 01 Mar 2025 - 28 Feb 2027 (24 months)
- **Budget:** 1,173,954.78€ (grant: 997,861.55€)
- **Program:** KAPP-2024-UCPM
- **Partners:**

  Universitat Politècnica de Catalunya (ES)

  European Centre for Medium-range Weather Forecasts (INT)

  Finnish Meteorological Institute (FI)

  State Agency of Meteorology (ES)

  Institute for Sea and Atmosphere (PT)

  Environment and Water Agency of Andalusia (ES)

  Directorate-General for Civil Protection and Emergencies (ES)

  National Authority of Emergency and Civil Protection (PT).

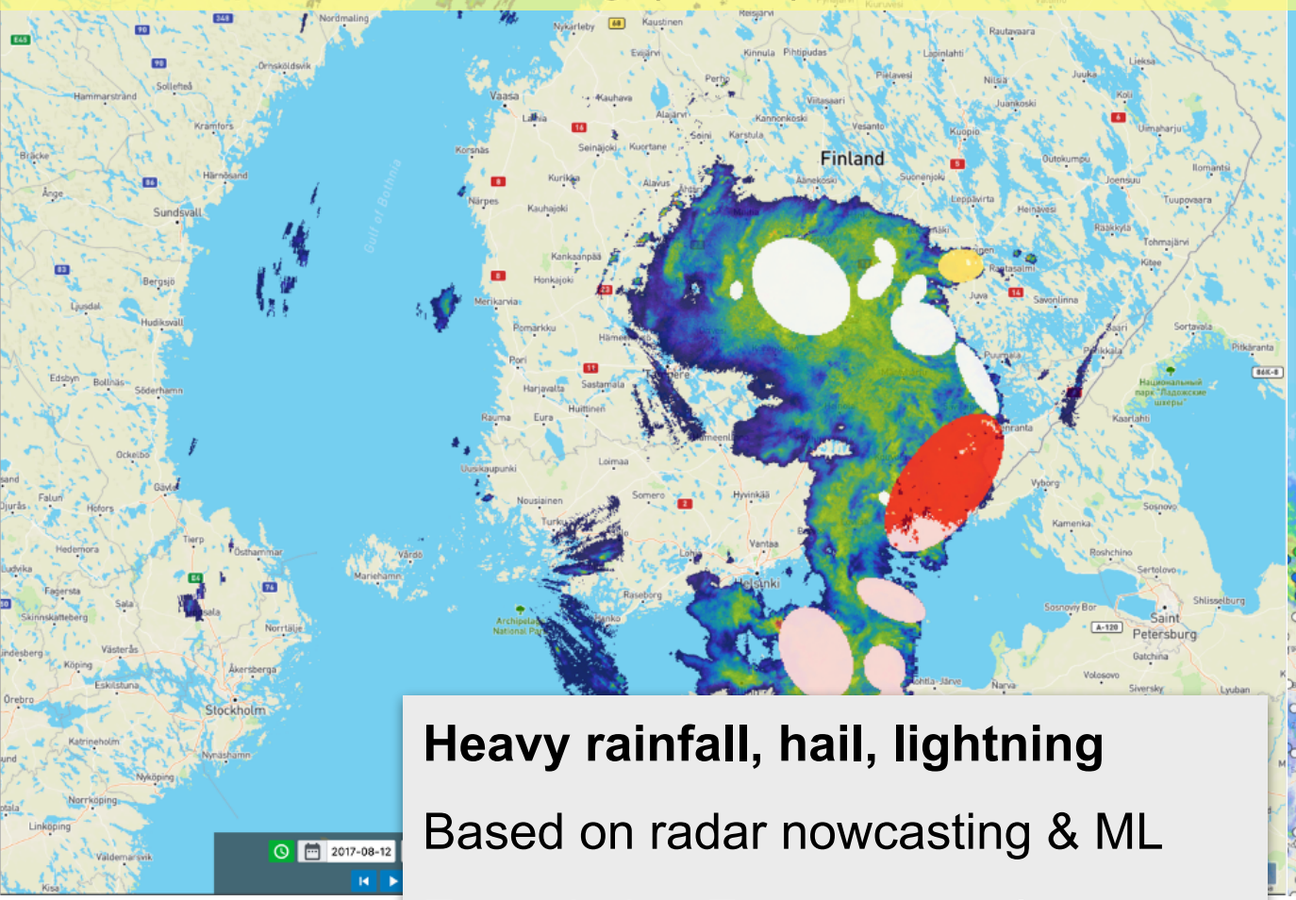
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Main objective

Advance on the capabilities of EWS with tools to anticipate the **impacts caused by storms, heavy rain and floods to support the decision-making workflows** of various levels of Civil Protection Agencies (CPAs), including their coordination and cooperation.

Impact forecasts for storms and heavy rainfall

Storm impact nowcasting (0-3 h).



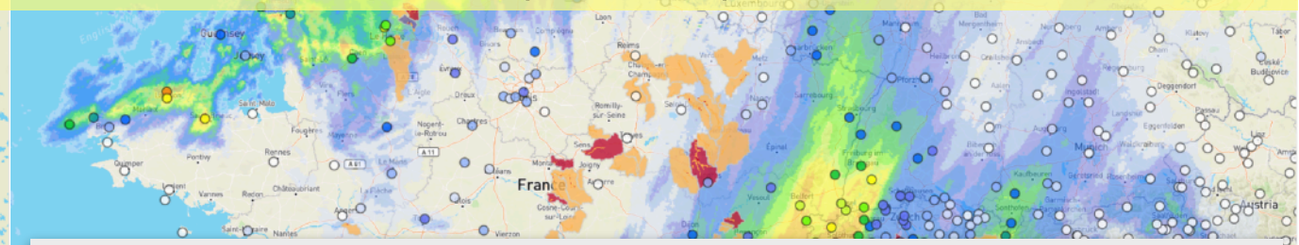
Heavy rainfall, hail, lightning

Based on radar nowcasting & ML

Extended to European scale

European-wide exposure.

Flash flood impacts (0-120 h).



Flash floods (basins 10 - 2000 km²)

Resolution: 1 h, 1 km - Update: 1 h

Blended precipitation forecasts → Flash flood hazard → Flash flood impacts

- Using probabilistic nowcasting & NWP.
- Seamless blending in the first 6 hours

- Basin-aggregated precipitation on the drainage network (1 km).
- Hazard assessment by comparison with climatological thresholds.

- By combining hazard with exposure.

Specific objectives and expected outputs

- **Improved precipitation estimation for hydrological forecasting.**
- **Enhanced pan-European impact forecasting products with the use of AI**, applying a strategy to provide compound impact forecasts, and implement configurable user-defined notifications.

→ *more reliable and longer storm probabilistic hazard nowcasts*

→ *improved impact forecasts by combining the hazard with multiple exposure datasets*

- **Local adaptability of multi-hazard storms and compound floods forecasting** for improved preparedness and response management during flood events.

→ *New/more flexible notification functionalities*

- **Demonstration of the impact forecasts with end users** at European scale and in the pilot site.

→ *Assessment of the added value of the integration for CPAs*

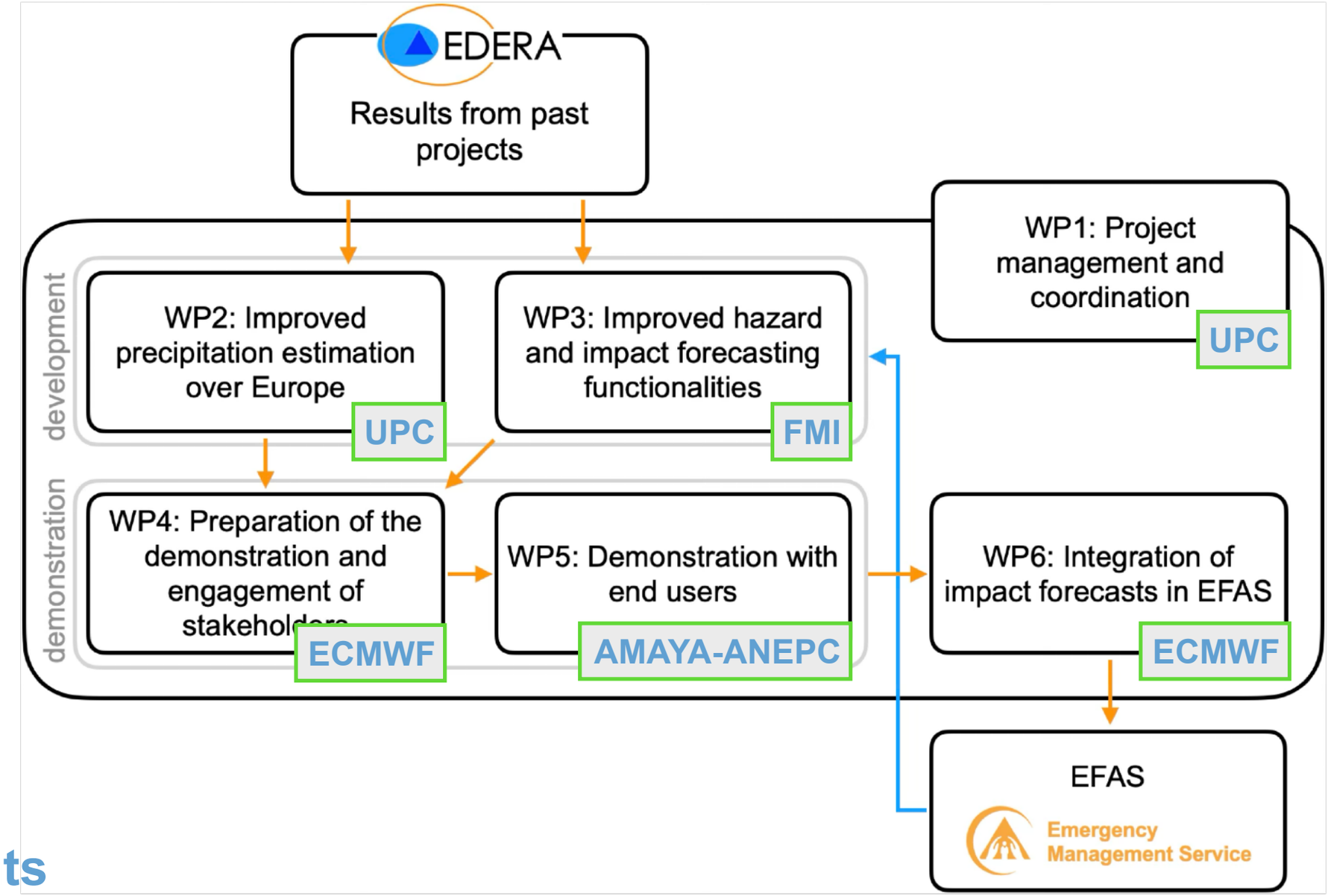
- **Creation of an INLINE Community of Interest** to promote the adoption of the developed impact forecasting products and functionalities.

→ *Uptake of developed functionalities for storms and floods forecasting*

→ *Sustainability of the products*

INLINE

Project organisation



Main events

Mar 2025: 1st project meeting (Brussels, BE)

Feb 2026: 2nd project meeting (Reading, UK) → **24-25 February (Ispra, IT)**

May 2026: International demonstration Workshop (Lisbon, PT)

Feb 2027: Final workshop (Brussels, BE)

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INLINE timetable

	Mar 25 M1	Apr 25 M2	May 25 M3	Jun 25 M4	Jul 25 M5	Aug 25 M6	Sep 25 M7	Oct 25 M8	Nov 25 M9	Dec 25 M10	Jan 26 M11	Feb 26 M12	Mar 26 M13	Apr 26 M14	May 26 M15	Jun 26 M16	Jul 26 M17	Aug 26 M18	Sep 26 M19	Oct 26 M20	Nov 26 M21	Dec 26 M22	Jan 27 M23	Feb 27 M24
WP 1: Project management and coordination																								
T1.1: Technical and financial management		MS1				MS2						MS3										MS4		
T1.2: Coordination with the EC										D1.2								D1.3						
T1.3: Communication and dissemination						D1.1																		
WP 2: Improved precipitation estimation over Europe																								
T2.1: Continuous evaluation of OPERA...				MS5					MS6															D2.1
T2.2: Improved precipitation estimation...																								
T2.3: Hydrological assessment of improved...																								D2.2
WP 3: Development of improved hazard and impact forecasting functionalities																								
T3.1: Machine learning models for storm hazard...						MS7																		
T3.2: Improved storms and flash floods impact forecasting						MS8																		
T3.3: Improved notification functionalities									D3.1															
WP 4: Preparation of the demonstration and engagement of stakeholders																								
T4.1: Integration of the developments of WP3 and...						MS9																		
T4.2: Configuration of the tools for storms & floods...						D4.1																		
T4.3: Organisation of an INLINE Com. of Interest																								
T4.4: Training and Int. Demonstration Workshop						D4.2												MS10						
WP 5: Demonstration with end users																								
T5.1: Demonstration of the developments for hazard...																								
T5.2: Demonstration of the developments for hazard...																								
T5.3: Evaluation of the demonstration results												MS11												D5.1
WP 6: Integration of INLINE Developments in EFAS																								
T6.1: Integration of the improved precipitation...												MS12												
T6.2: Integration of the improved products for...																								D6.1

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WP 1

PROJECT MANAGEMENT AND COORDINATION (M01-M24)	UPC
T1.1: Technical and financial management	**UPC**, ECMWF, FMI, AEMET, IPMA, AMAYA, DGPCE, ANEPC
T1.2: Coordination with the EC	**UPC**, ECMWF, FMI, AEMET, IPMA, AMAYA, DGPCE, ANEPC
T1.3: Communication and dissemination	**UPC**, ECMWF, FMI, AEMET, IPMA, AMAYA, DGPCE, ANEPC

DELIVERABLES		
Communication and dissemination plan	6	UPC
First progress report	10	UPC
Second progress report	18	UPC

MILESTONES		
First INLINE Meeting	2	UPC
Data license agreements	6	UPC
Second INLINE Meeting	12	UPC
Final Workshop	22	UPC

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WP 2

IMPROVED PRECIPITATION ESTIMATION OVER EUROPE	UPC
T2.1: Continuous evaluation of OPERA precipitation estimates	**UPC**, FMI, AEMET, IPMA
T2.2: Improved precipitation estimation for EFAS initial conditions	**UPC**, ECMWF
T2.3: Hydrological assessment of improved precipitation estimates for EFAS initial conditions	**ECMWF**, UPC

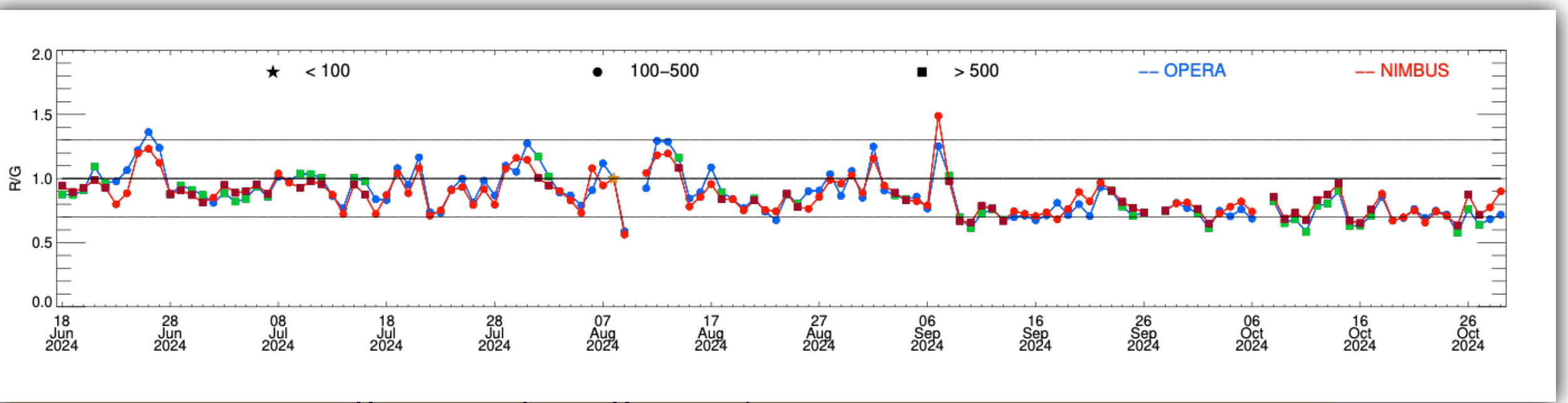
DELIVERABLES		
Results of the systematic monitoring of OPERA NIMBUS precipitation composites	24	UPC
Evaluation of radar-based precipitation estimates for improved EFAS initialization	15	ECMWF

MILESTONES		
Design of the QPE evaluation scheme for the new OPERA NIMBUS composites	4	UPC
QPE climatology from OPERA composites for EFAS initial conditions	9	UPC

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Continuous evaluation of OPERA precipitation estimates

NIMBUS products operational since Nov 2024



Rainfall intensity

+ Over some local areas, it may be higher than the one from ODYSSEY

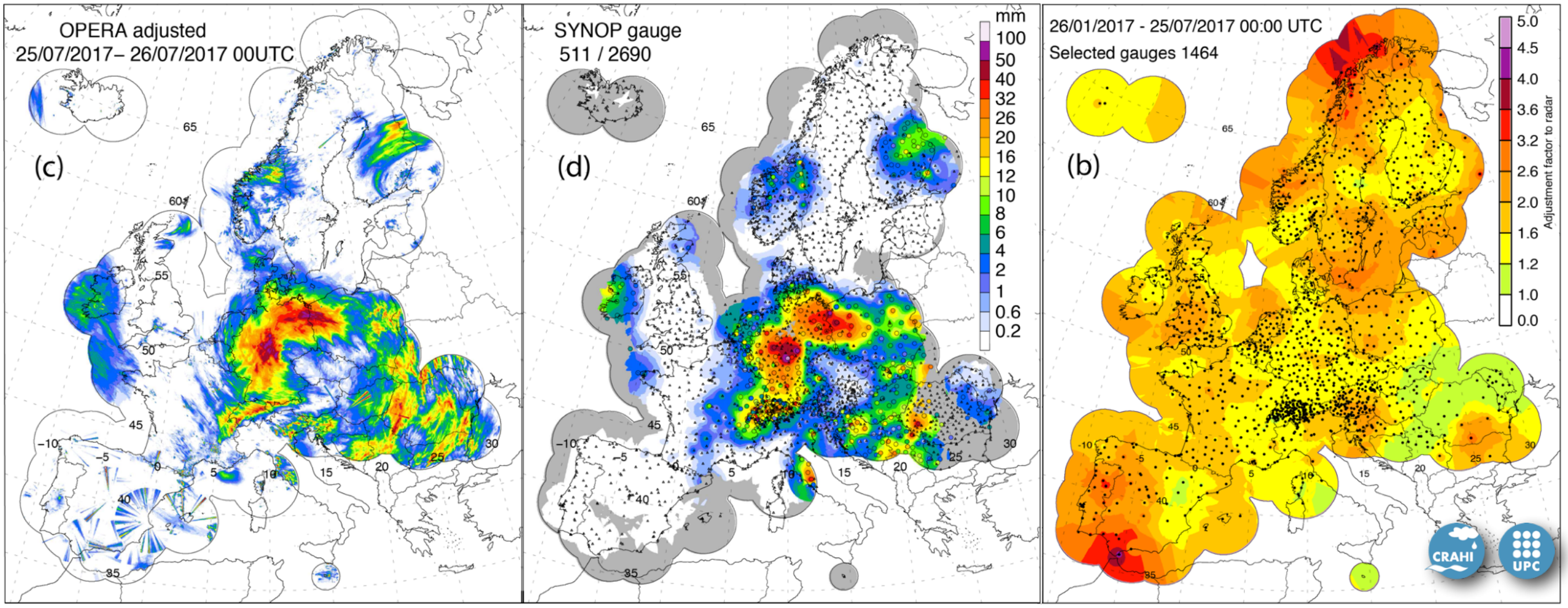
- Still underestimated compared with Gauges. Note that a systematic underestimation is also shown from mid-August to October compared with previous months (R/G factor less than 1).

Correction factor still needed!

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Continuous evaluation of OPERA precipitation estimates

Correction Factor updated daily

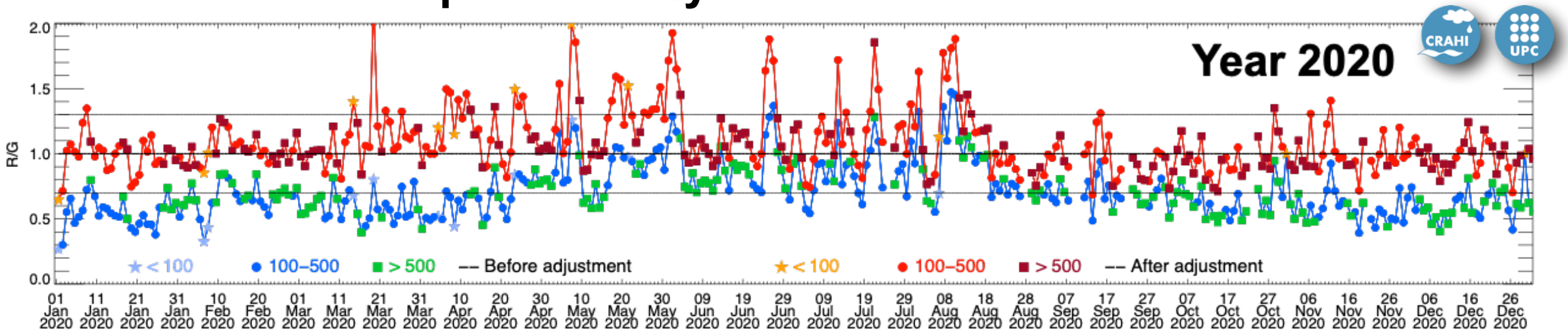


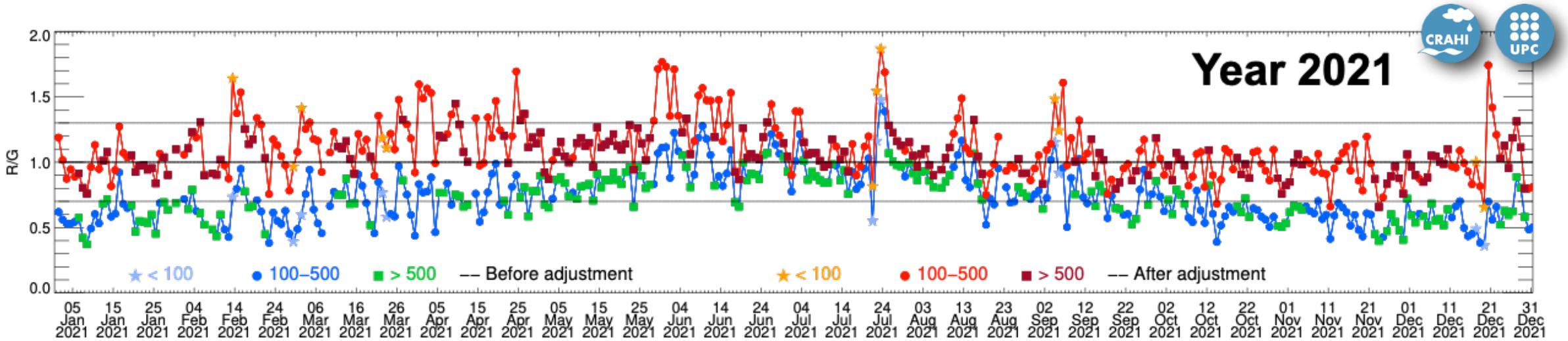
Park, S., M. Berenguer, and D. Sempere-Torres. 2019. Long-term analysis of gauge-adjusted radar rainfall accumulations at European scale, **J. of Hydrology**, 573, 768-777. 10.1016/j.jhydrol.2019.03.093

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Continuous evaluation of OPERA precipitation estimates

Correction Factor updated daily





M5. Design of the QPE evaluation scheme for the new OPERA NIMBUS composites, UPC, Internal Short Report, **Month 04 (Jun 2025)**

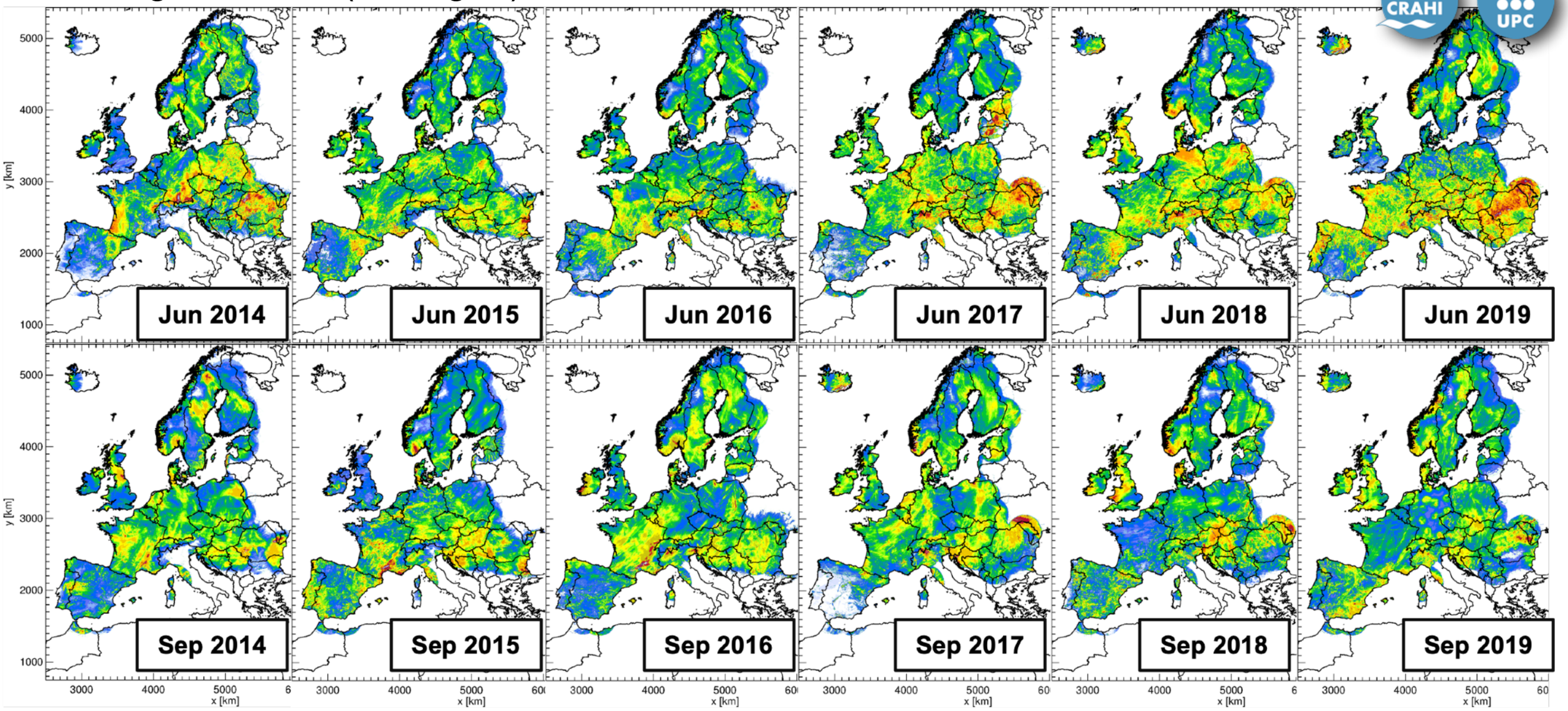
D2.1 Results of the systematic monitoring of OPERA NIMBUS precipitation composites, UPC, Public Report, **Month 24 (Feb 2027)**

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Continuous evaluation of OPERA precipitation estimates

Climatology update (2013-2025 replacing of 2013-2020 done in TAMIR)

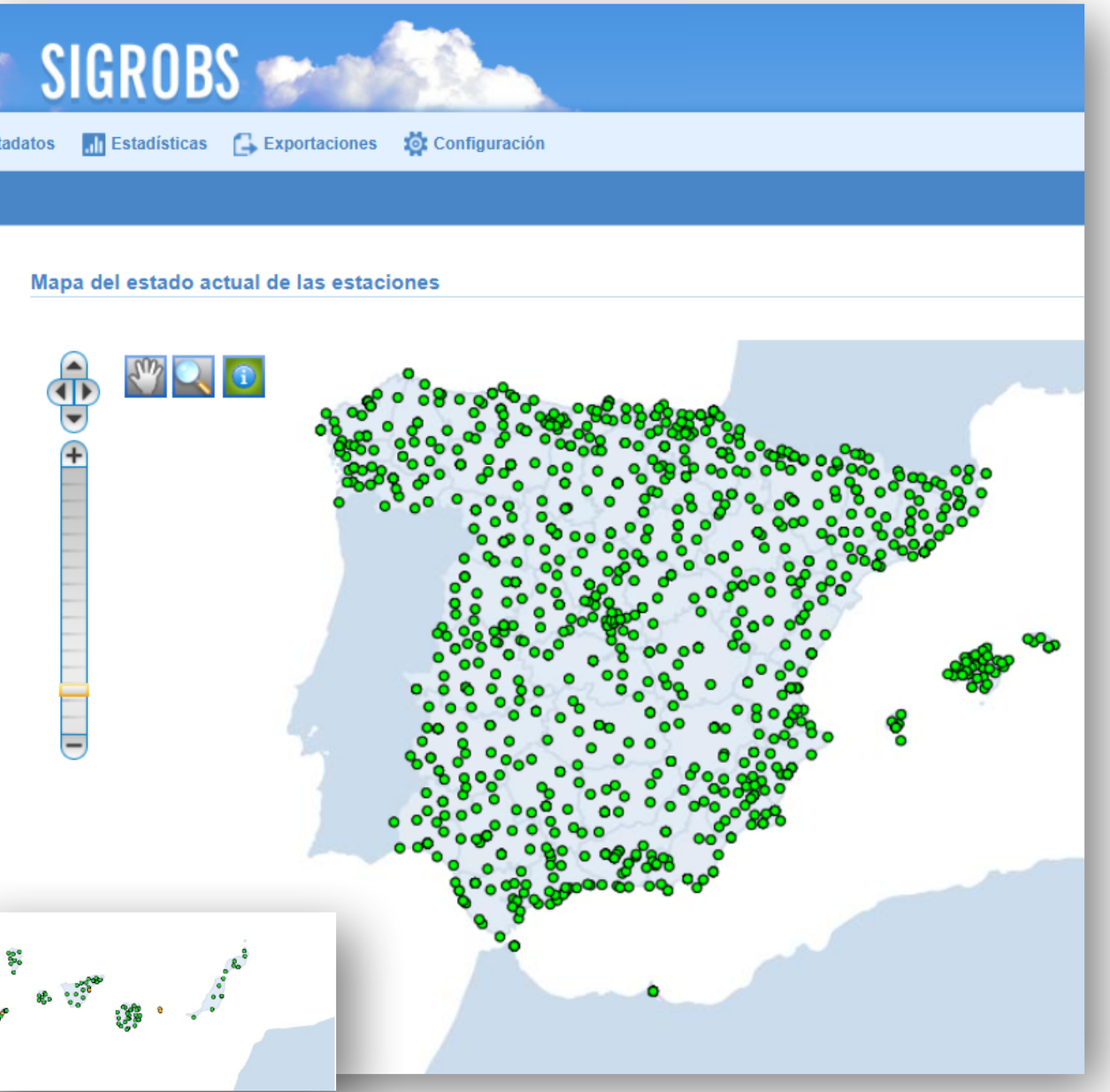
Fitting of Gumbel distributions with the method of Menabde et al. (1999) to the monthly maximum values of the basin-aggregated rainfall accumulations at each point of the drainage network (1 km grid). **d=24h**



Park, S., M. Berenguer, and D. Sempere-Torres, and A. von Lerber, 2024. The EUMETNET OPERA Radar Network – European-Wide Precipitation Composites Supporting Rainfall- Induced Flash Flood Emergency Management. Chapter 5 in D. Sempere-Torres, A. Karakostas, C. Rossi, & P. Quevauviller (Eds.), **Responding to Extreme Weather Events. John Wiley & Sons Ltd**. 105-118. ISBN:9781119741589

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AEMET rain gauges



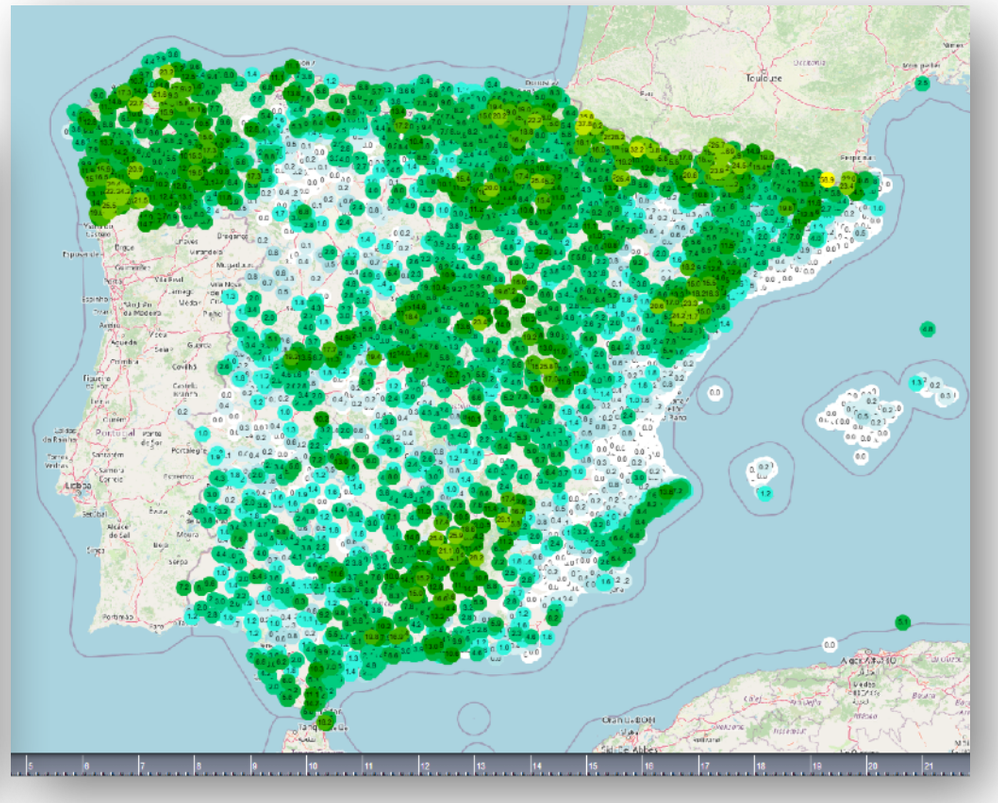
873.Automatic Weather Stations

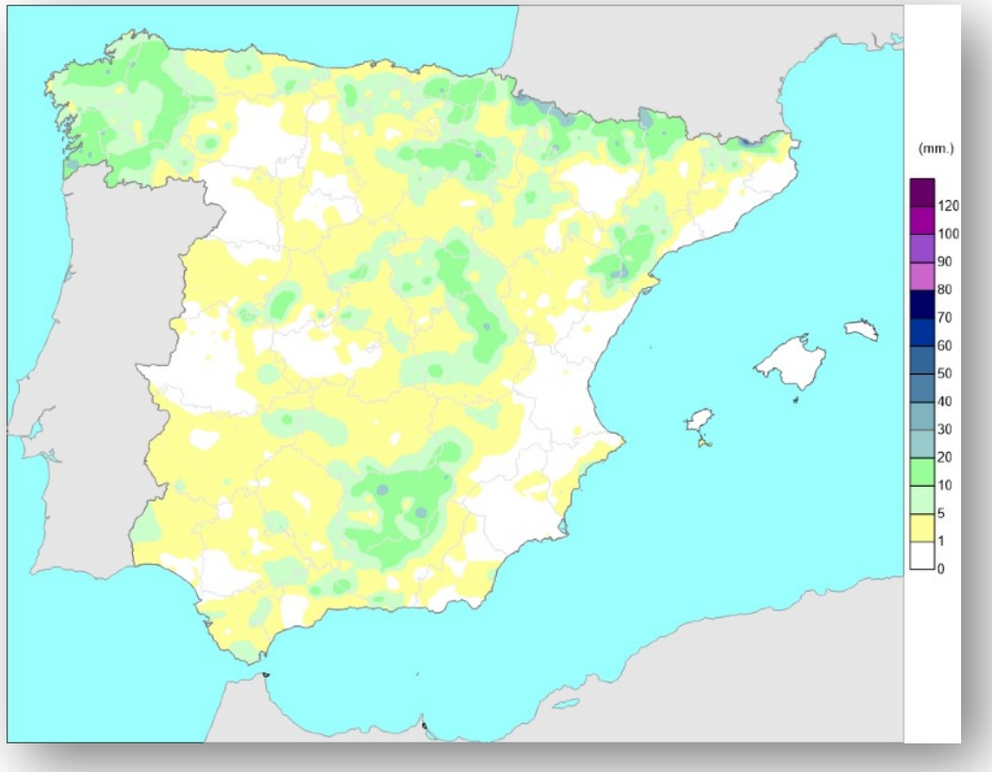
Weather Station Network	Number of Stations	Data Transmission Frequency
Automatic Weather Stations	323	10 minutes
	550	1 or 4 hours
Secondary Climatic Network	2000	7-7 UTC (2-3 months delay)

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AEMET rain gauges + basins+ autonomic

Red	Freq. datos (min)
Aemet	10
DGT	2/4
SiAR	30
Netatmo	Variable
Avamet	5
Meteoclimatic	15
Meteogalicia	10
SAIH	1 hora
SAIH-Guadiana	10
La Rioja	15
Euskalmet	10
Navarra	10
SMC	30





~20000 rain-gauges →

- Ordinary kriging
- grid: 1 km x 1 km

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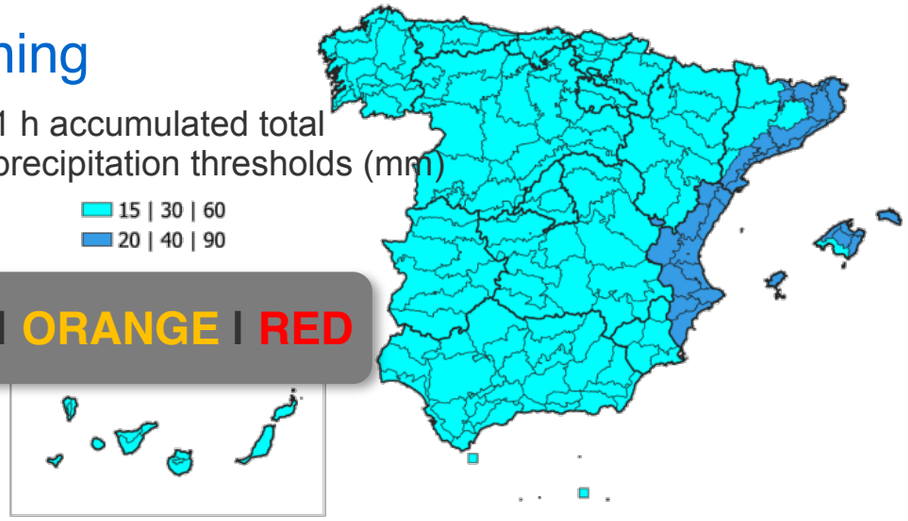
Events

P1 warning

1 h accumulated total precipitation thresholds (mm)

15 | 30 | 60
20 | 40 | 90

YELLOW | ORANGE | RED

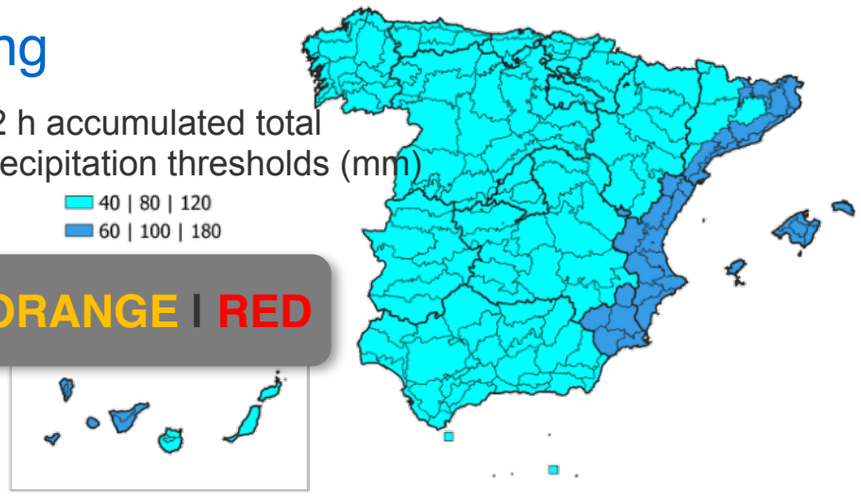


P2 warning

12 h accumulated total precipitation thresholds (mm)

40 | 80 | 120
60 | 100 | 180

YELLOW | ORANGE | RED

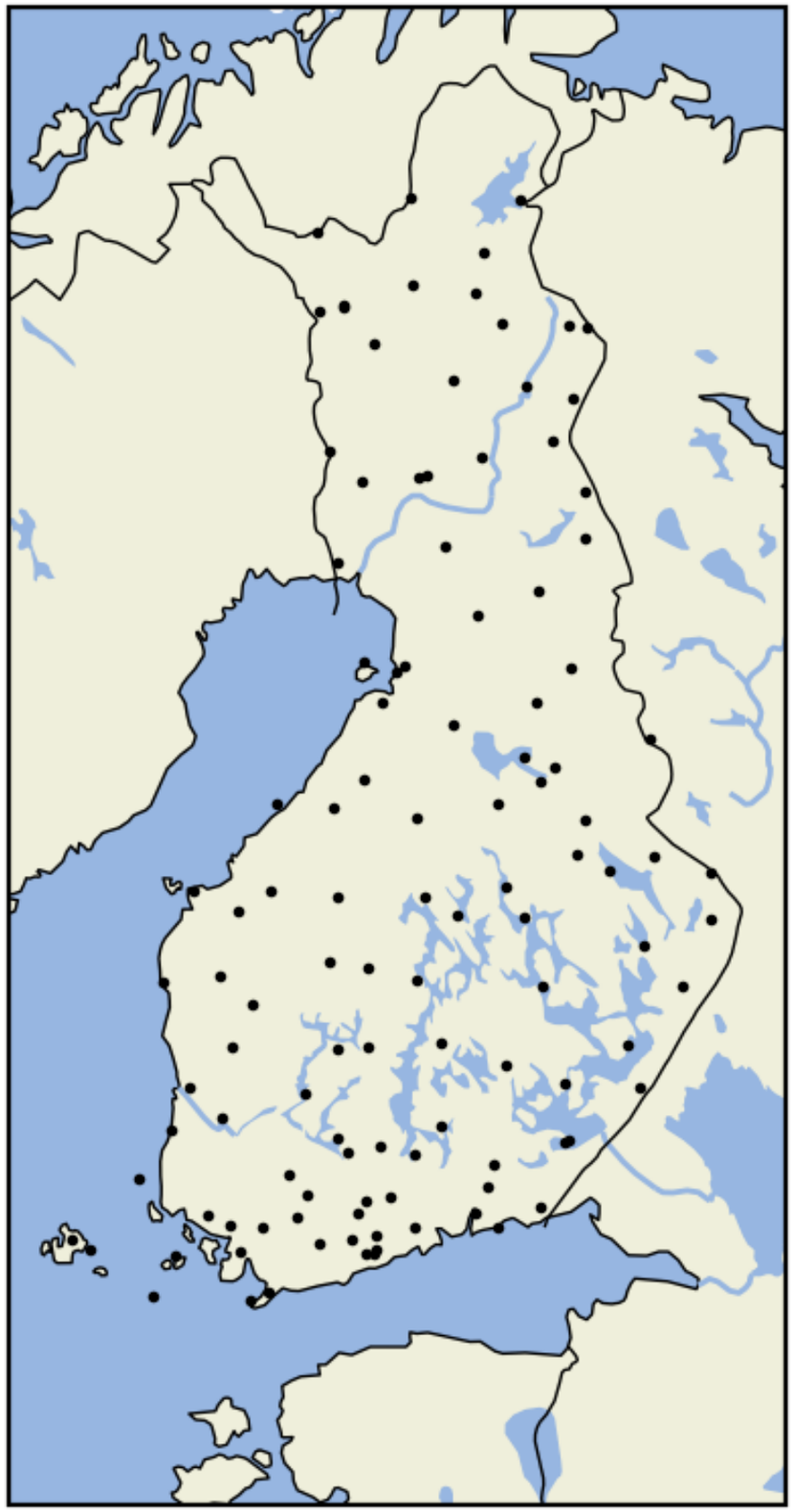


PAR	NOMBRE ZONA	Número de horas (UTC) Nivel Roj	DIA	MES	AÑO
02P2	Sierra y Pedroches	2	11	octubre	2024
02P2	Sierra norte de Sevilla	2	11	octubre	2024
02P2	Sierra y Pedroches	13	12	octubre	2024
02P2	Sierra norte de Sevilla	13	12	octubre	2024
02P2	Sol y Guadalhorce	3	29	octubre	2024
01P1	Interior norte de Valencia	9	29	octubre	2024
02P2	Interior norte de Valencia	9	29	octubre	2024
01P1	Litoral norte de Valencia	11	29	octubre	2024
02P2	Litoral norte de Valencia	13	29	octubre	2024
01P1	Litoral sur de Valencia	7	29	octubre	2024
02P2	Litoral sur de Valencia	5	29	octubre	2024
02P2	Campiña gaditana	5	30	octubre	2024
02P2	Interior norte de Castellón	5	31	octubre	2024
02P2	Litoral norte de Castellón	5	31	octubre	2024
02P2	Litoral sur de Castellón	5	31	octubre	2024
01P1	Andévalo y Condado	3	1	noviembre	2024
02P2	Andévalo y Condado	3	1	noviembre	2024
01P1	Litoral de Huelva	3	1	noviembre	2024
02P2	Litoral de Huelva	11	1	noviembre	2024
01P1	Valle del Almanzora y Los Vélez	5	3	noviembre	2024
02P2	Valle del Almanzora y Los Vélez	5	3	noviembre	2024
01P1	Nacimiento y Campo de Tabernas	5	3	noviembre	2024
02P2	Nacimiento y Campo de Tabernas	5	3	noviembre	2024
01P1	Levante almeriense	5	3	noviembre	2024
01P1	Litoral sur de Valencia	2	3	noviembre	2024
02P2	Litoral de Barcelona	4	4	noviembre	2024
01P1	Sol y Guadalhorce	11	13	noviembre	2024
02P2	Sol y Guadalhorce	15	13	noviembre	2024
01P1	Axarquía	11	13	noviembre	2024
02P2	Axarquía	15	13	noviembre	2024
02P2	Litoral sur de Tarragona	8	13	noviembre	2024
02P2	Litoral norte de Valencia	4	13	noviembre	2024
02P2	Litoral sur de Valencia	4	13	noviembre	2024
02P2	Sol y Guadalhorce	5	14	noviembre	2024
02P2	Axarquía	5	14	noviembre	2024
02P2	Litoral norte de Valencia	6	14	noviembre	2024
02P2	Litoral sur de Valencia	6	14	noviembre	2024
02P2	Andévalo y Condado	2	20	enero	2025
02P2	Ronda	3	3	marzo	2025
02P2	Interior sur de Castellón	5	3	marzo	2025

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FMI Rain Gauge Network

- Automatically weighting gauges
- Network density is relatively low
- Instruments:
    - OTT Pluvio 2 (weighing): useful for quantitative precipitation estimation
    - FD12P (optical): use only for qualitative estimation of rain conditions
- Available measurements:
    - 1 h and 12 h accumulated rainfall
    - 10 min average and maximum rain rate
    - Maximum rain rate from previous hour

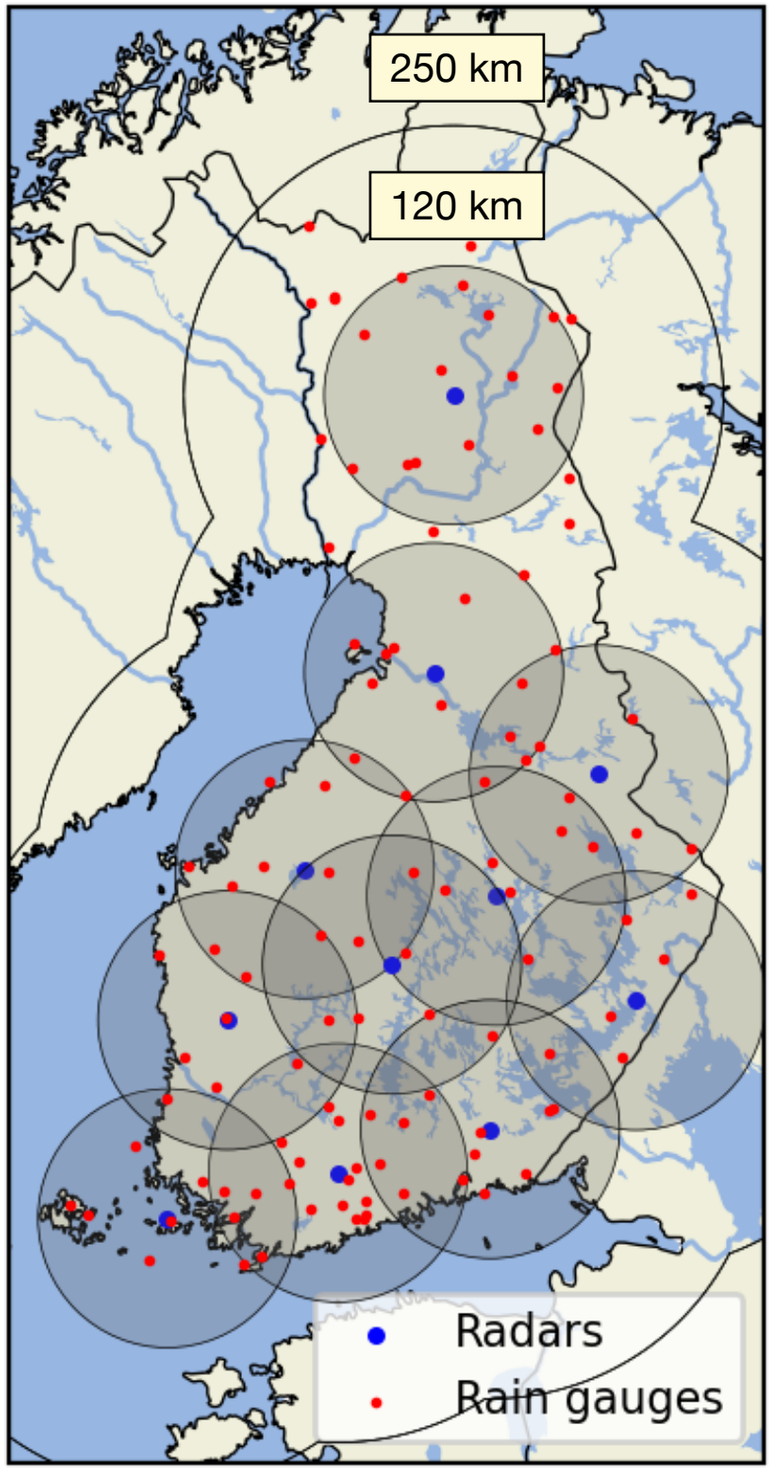


FMI weighing rain gauge network

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FMI Weather Radars: Overview

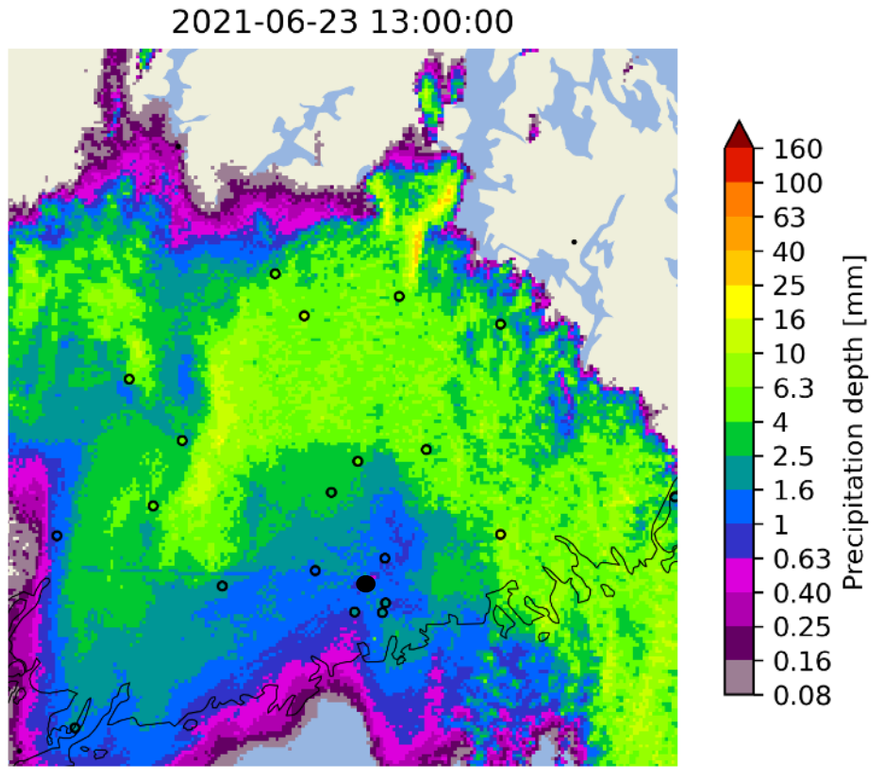
- 11 radars
- Reflectivity → rain rate conversion optimized to the local climatology
- Higher spatial and temporal resolutions than OPERA NIMBUS:
    - 1 km vs. 2 km
    - 5 min vs. 15 min
- Polarimetric QPE techniques not available in OPERA
- **Question:** use FMI radars for verifying the OPERA composites or the products using them?



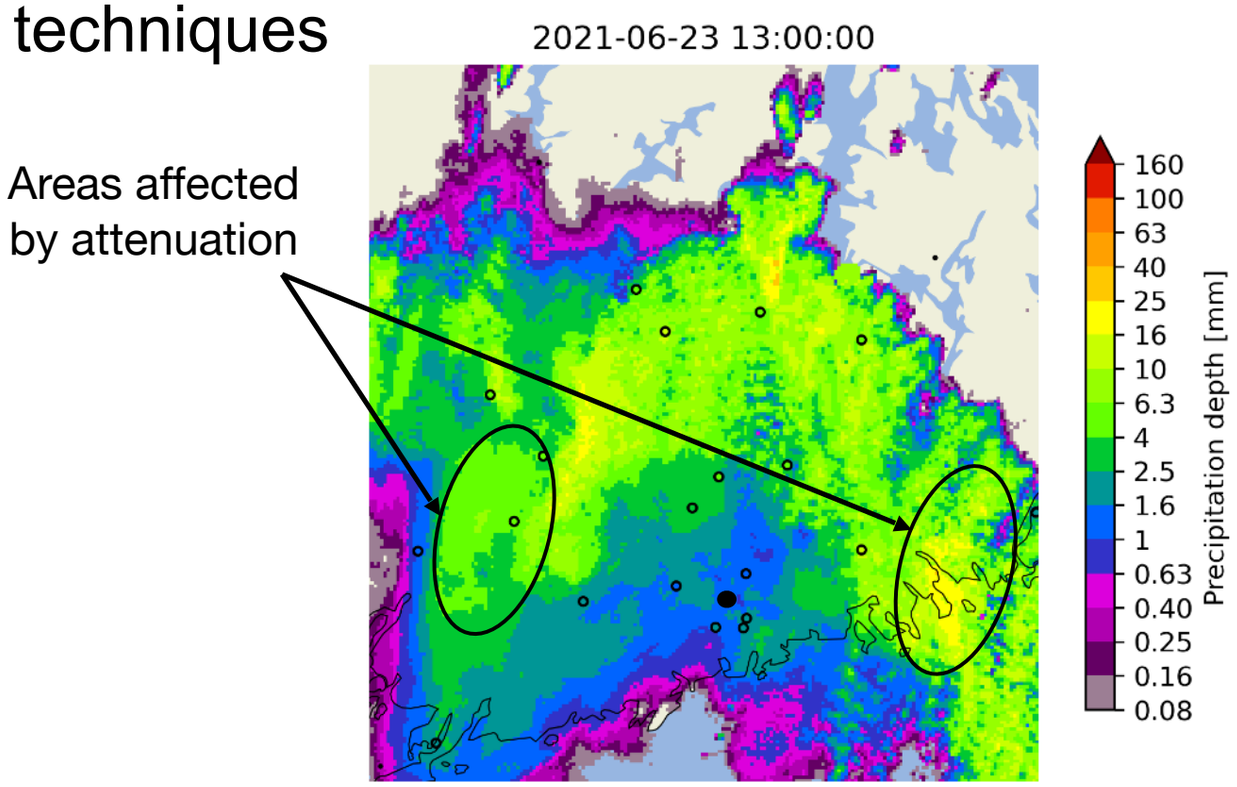
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FMI Weather Radars: Advanced Features

- Polarimetric parameters: K_{dp}, Z_{dr} and ρ_{hv}
- Applications
  - Filtering of non-meteorological echoes
  - Hydrometeor classification (rain, snow, graupel, hail)
  - Identification of precipitation type (convective or stratiform)
  - More accurate rain rate estimation than using non-polarimetric techniques (only reflectivity)



Non-polarimetric



Dual polarization

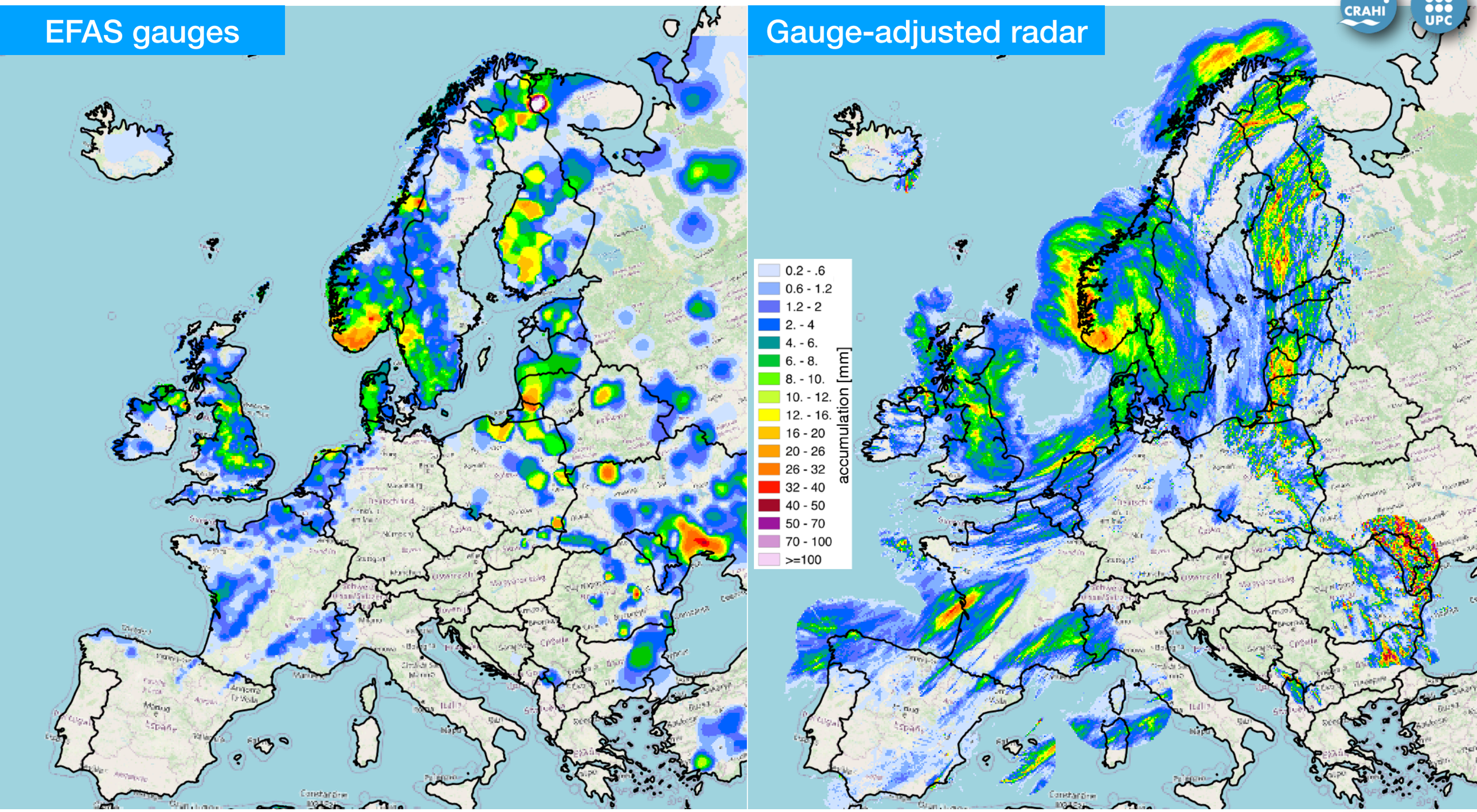
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Improved precipitation estimation for EFAS

24h rainfall accumulaion 09 June 2019 0600UTC

EFAS gauges

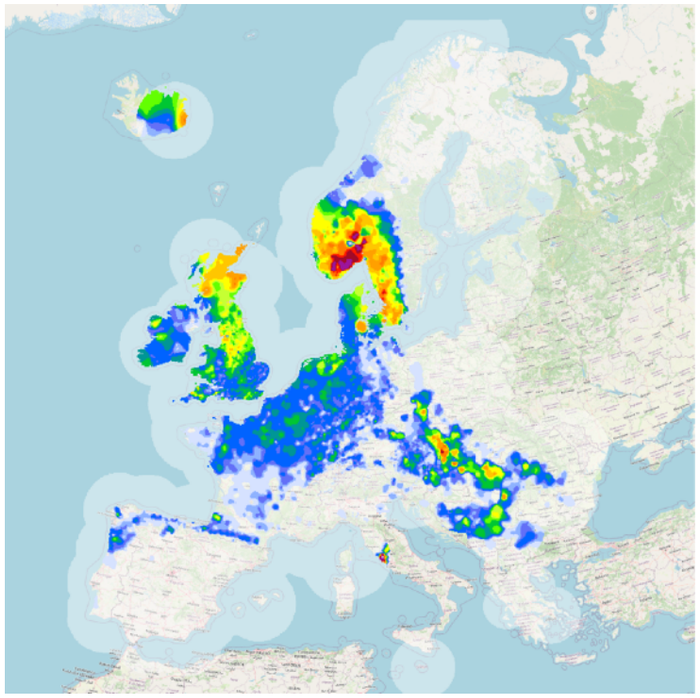
Gauge-adjusted radar



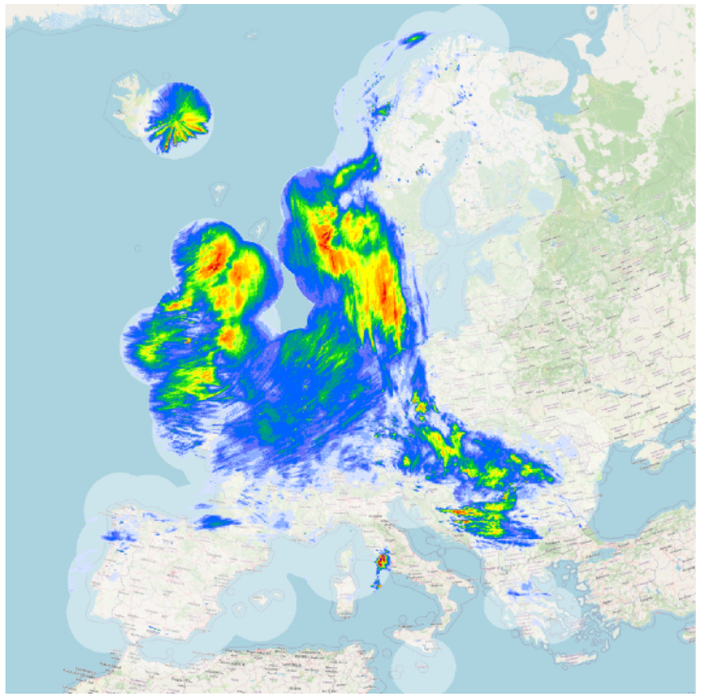
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Improved precipitation estimation over OPERA domain

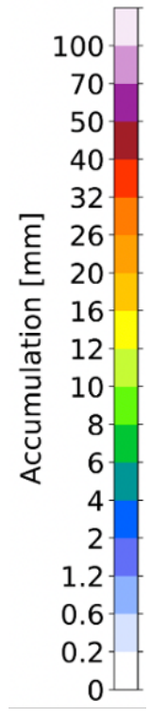
2021/09/28

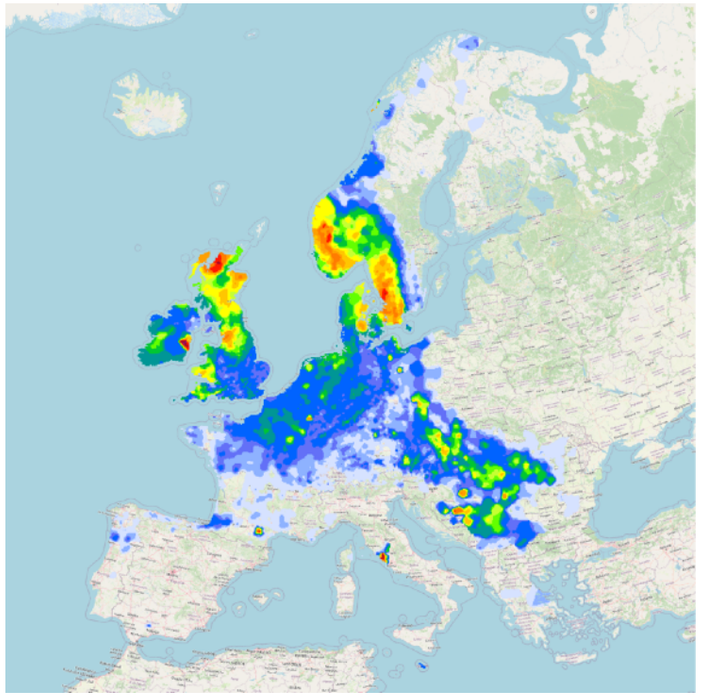


Rain gauge interpolation



OPERA rain accumulation

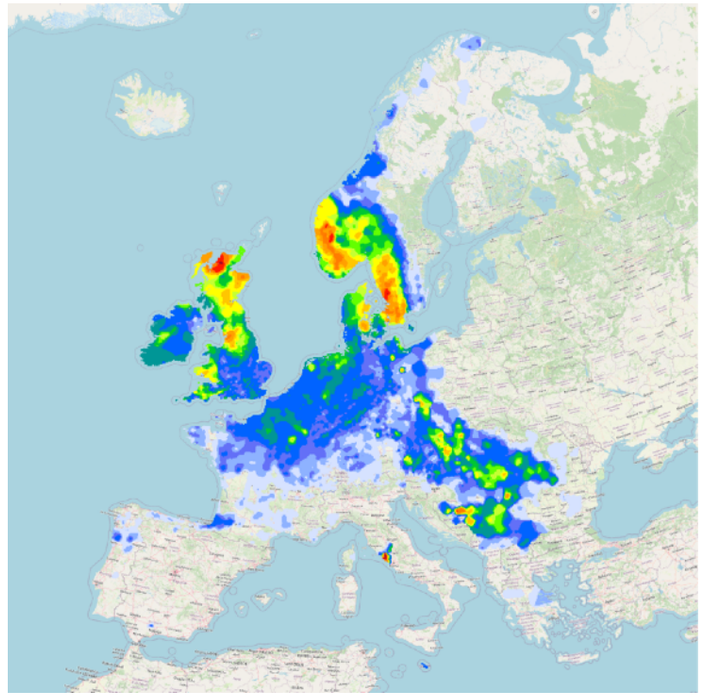




Radar interpolation
at gauge locations



Low-quality areas filter



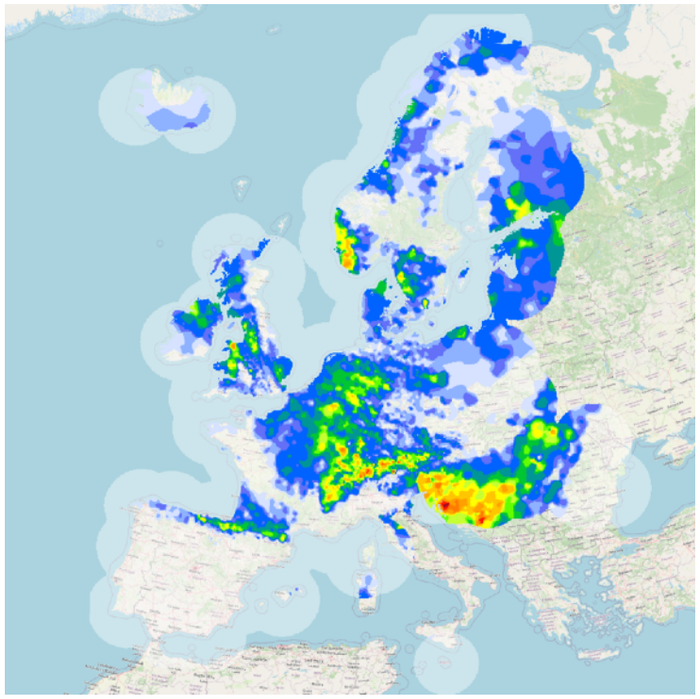
Filtered radar interpolation

INLINE

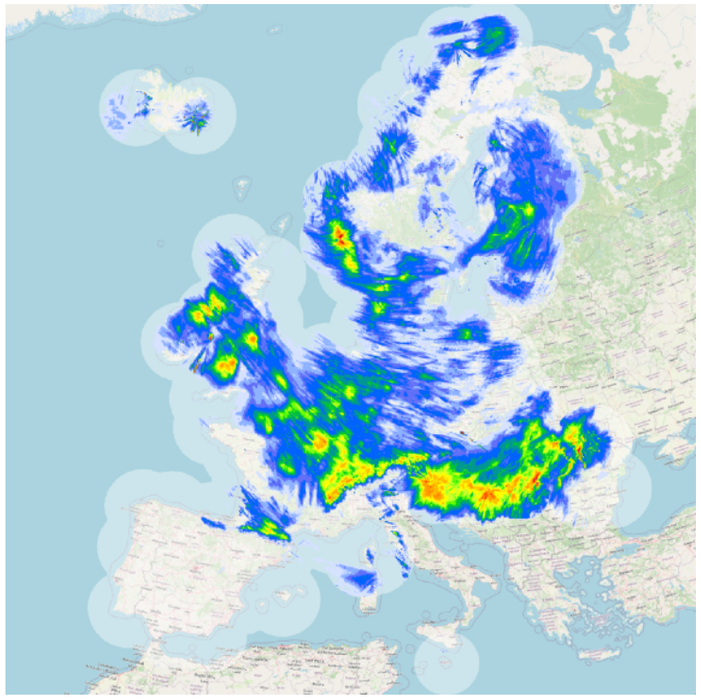
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Improved precipitation estimation over OPERA domain

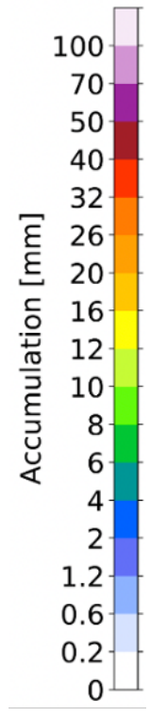
2021/03/15

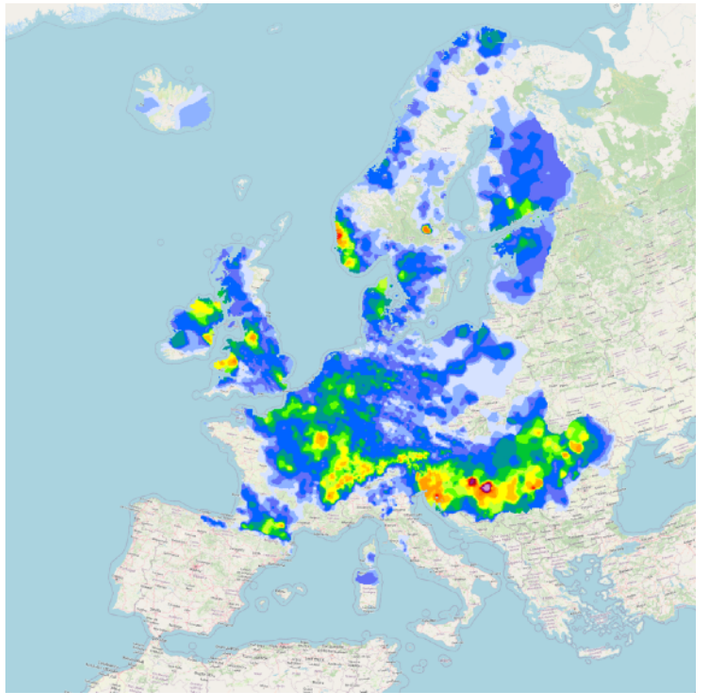


Rain gauge interpolation

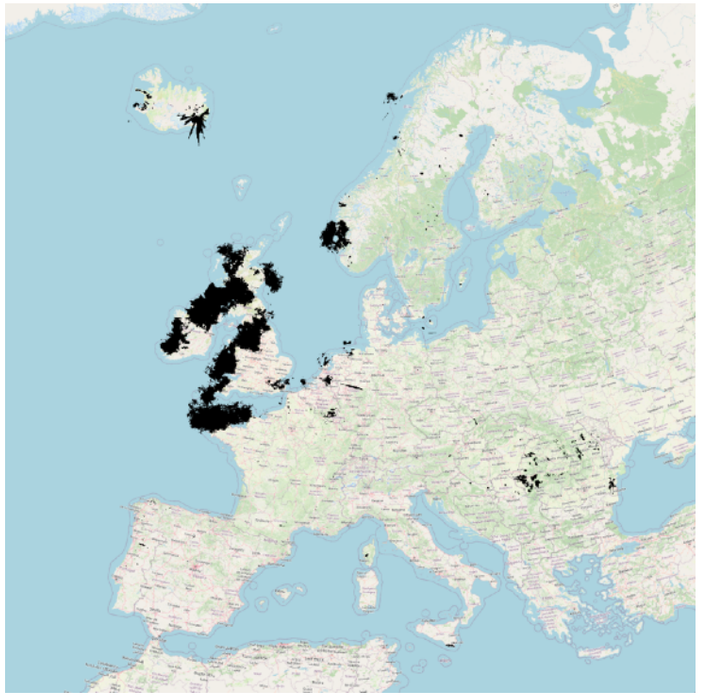


OPERA rain accumulation

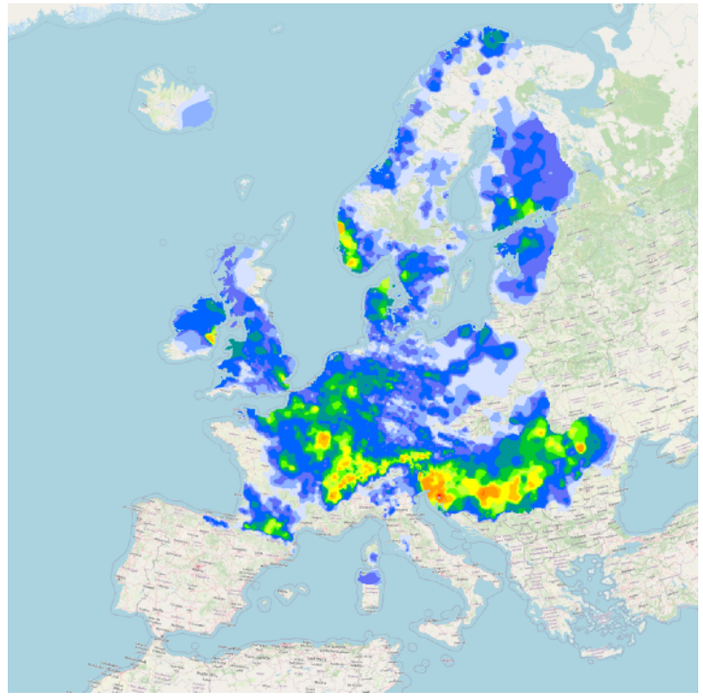




Radar interpolation
at gauge locations



Low-quality areas filter



Filtered radar interpolation

INLINE

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WP 3

IMPROVED HAZARD AND IMPACT FORECASTING CAPABILITIES	FMI
T3.1: Machine learning models for storm hazard nowcasting	**FMI**
T3.2: Improved storms and flash floods impact forecasting module	**FMI**, ECMWF, UPC
T3.3: Improved notification functionalities for multi-hazard impact forecasting	**ECMWF**, UPC, FMI

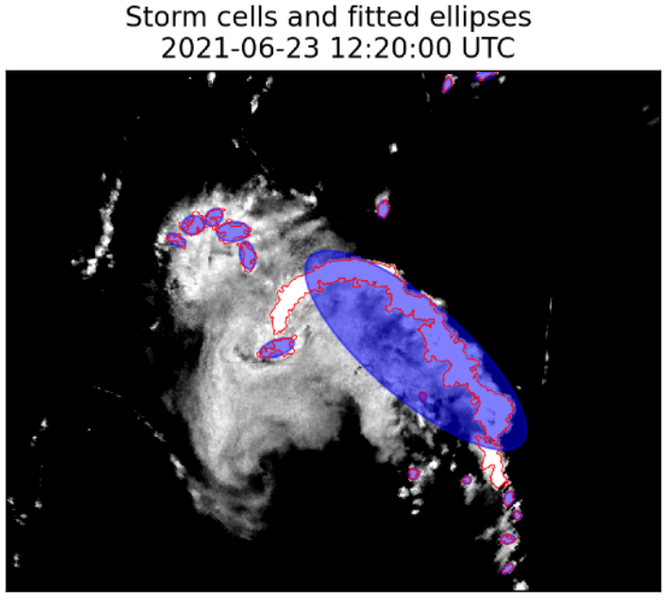
DELIVERABLES		
Convective hazard nowcasting and improved impact forecasting functionalities: description and evaluation	9	UPC

MILESTONES		
Machine learning storm hazard nowcasting ready for demonstration	6	UPC
Impact forecasts and notifications ready for demonstration	6	UPC

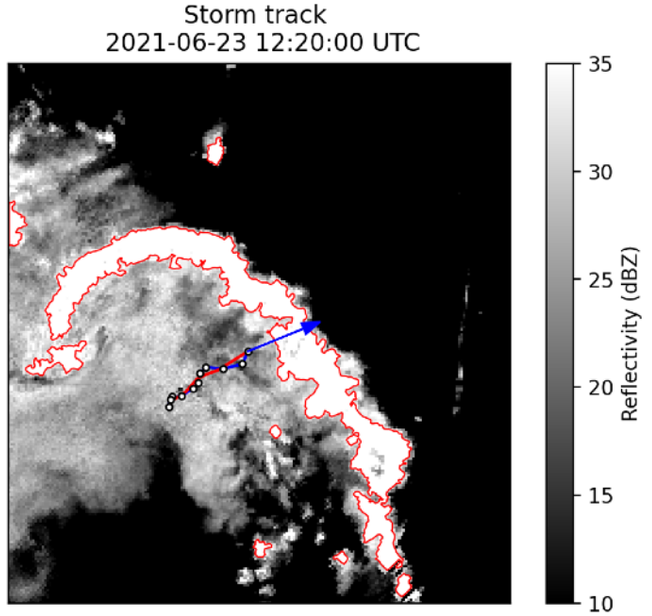
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EDERA Storm Impact Products: Cell Tracking

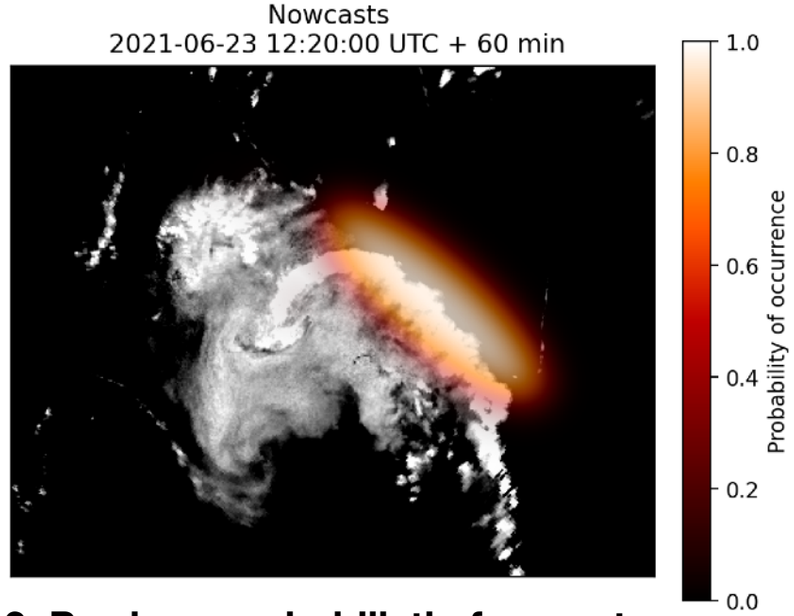
- Warnings based on convective cells tracked from OPERA composites
- Issues with the cell-based approach:
    - Cell identification based on radar-measured reflectivity: not necessarily representative of convective activity
    - Large number of misses: for instance, severe wind can occur outside the detected cells
    - Cell tracking is not reliable



1. Identify storm cells from radar reflectivity and fit ellipses



2. Track cells and estimate motion + uncertainty



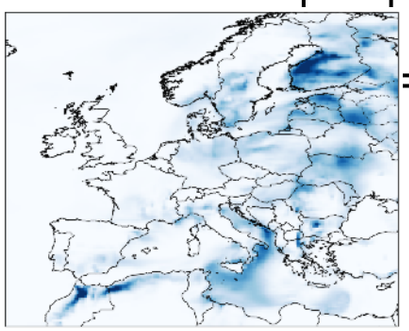
3. Produce probabilistic forecasts of future cell locations

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INLINE: Proposed Workflow

- All meteorological variables are forecast before identifying potentially hazardous storms
- Ensemble predictions by using a neural network
- Threshold-based classification of hazardous storms
- Short-term forecasts for the next 6 hours





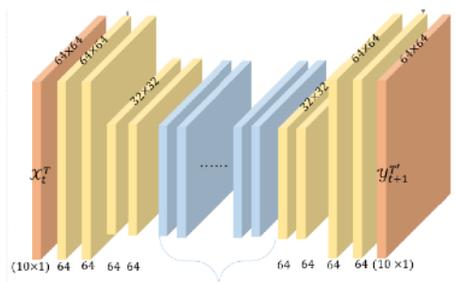
Inputs

Radar composites

Meteorological fields from reanalyses / NWP model forecasts

Simultaneous prediction of all weather parameters

Convolutional neural network

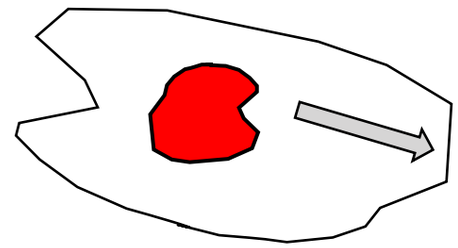


Ensemble forecasts of input fields

- Combinations of thresholds for different hazard types
- Multiple intervals for different hazard levels

Wind speed > x m/s
Rain rate > y mm / h

Identify potentially hazardous storm areas



Estimate storm hazard probabilities from ensembles

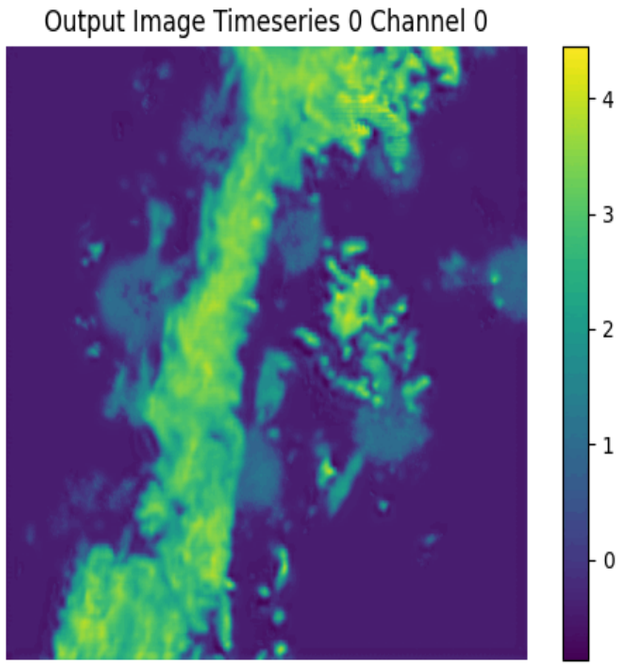
INLINE

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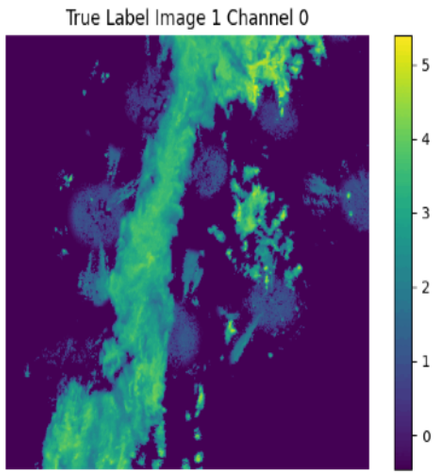
SimVP Nowcasts

- Experiments with Finnish data
- SimVP can predict
  - growth and decay patterns
  - cross-correlations between different variables
- Loss of detail with increasing forecast length: tuning of loss function?

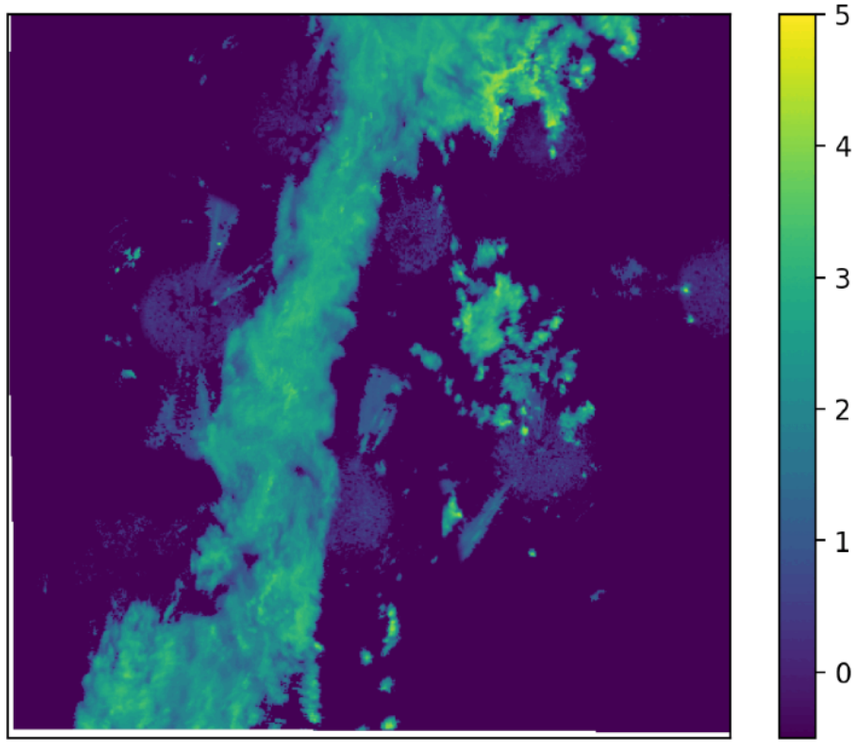
Dual-channel SimVP nowcast



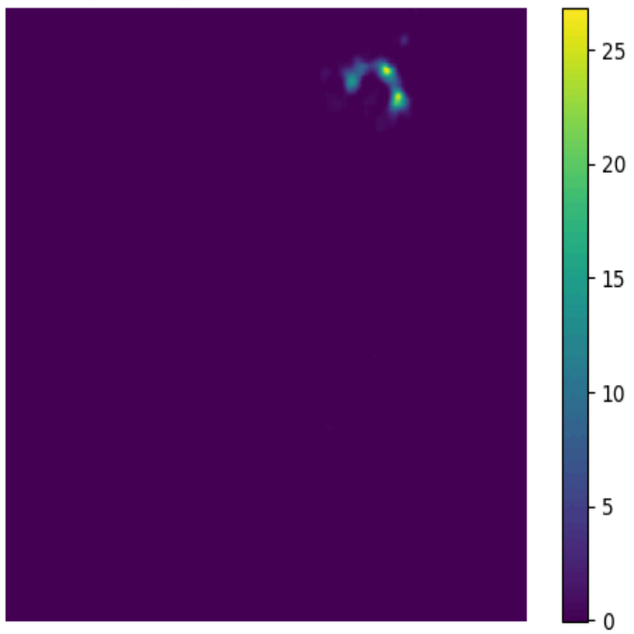
Ground truth

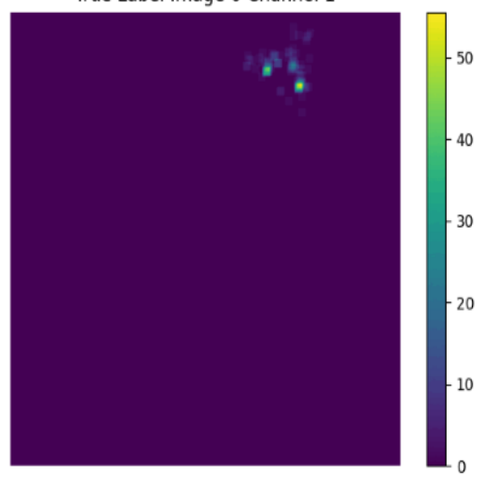


Extrapolation nowcast



Reflectivity





Lightning flash density

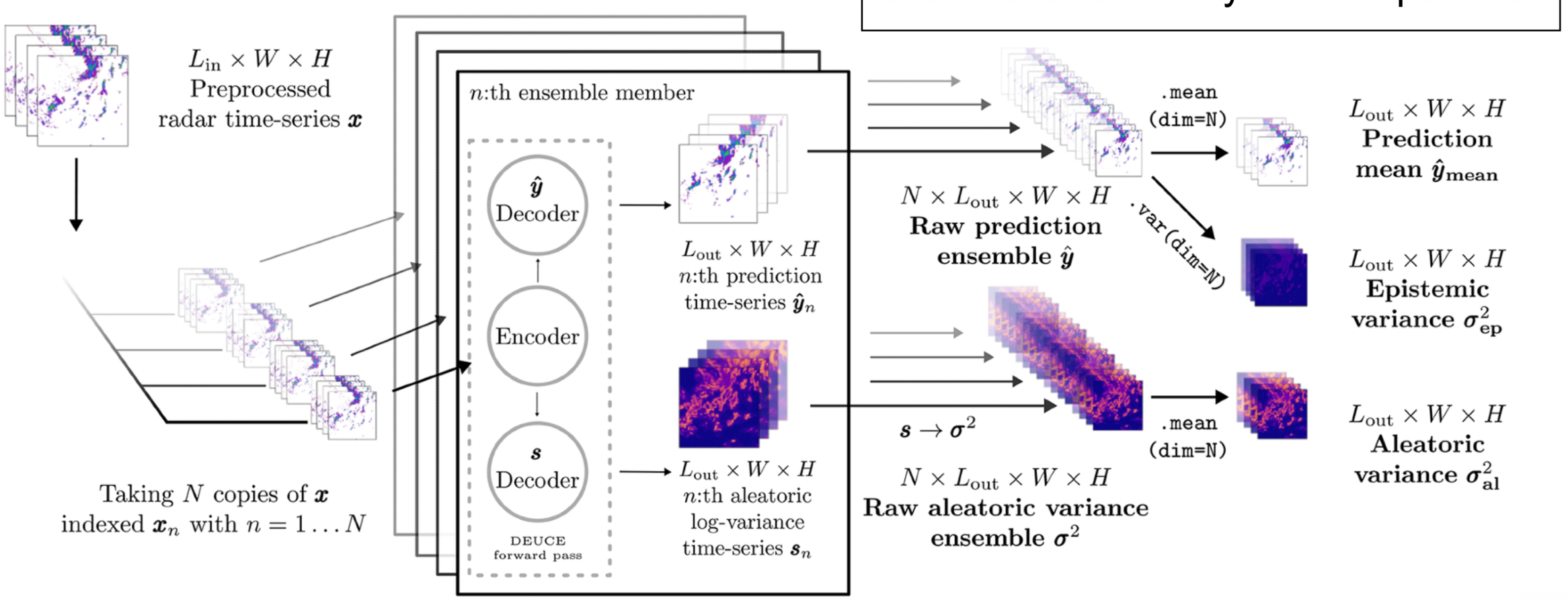
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Probabilistic Extensions: the DEUCE Model

- Encoder-decoder architecture with convolutional layers
- Perturbation of model parameters to produce ensembles
- Decoder with a separate branch for aleatoric uncertainty
- Model training by using variational inference

Epistemic: uncertainty in the model

Aleatoric: uncertainty in the input data

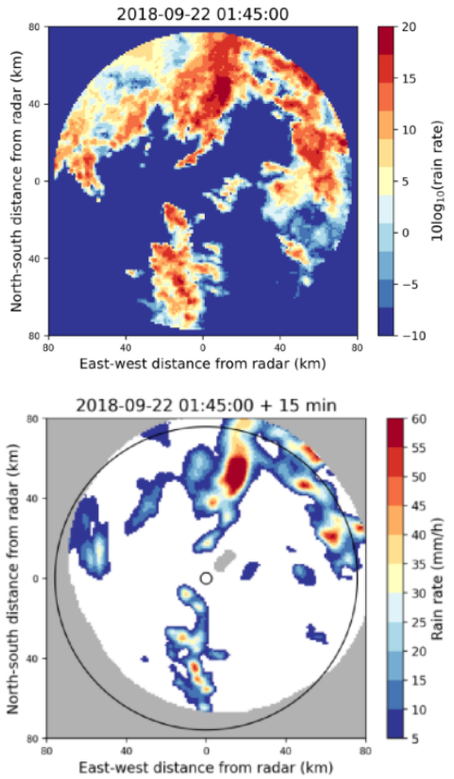


Harnist et al., DEUCE v1.0: a neural network for probabilistic precipitation nowcasting with aleatoric and epistemic uncertainties, Geosci. Model Dev., 17, 3839-3866, https://doi.org/10.5194/gmd-17-3839-2024, 2024

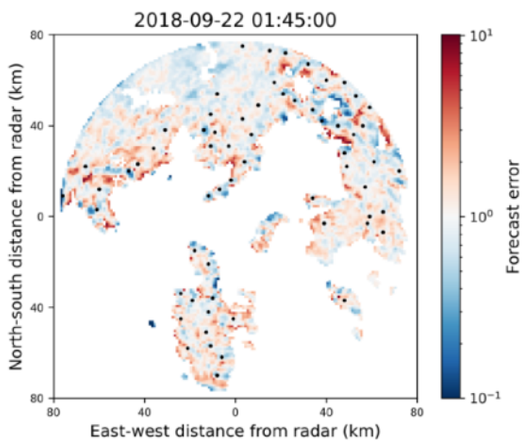
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Computational Issues

- CNN-based nowcasts are computationally intensive
- Deterministic nowcasts
    - GPU needed for training
    - Prediction possible without GPU (one nowcast in ~5 minutes)
- Probabilistic nowcasts
    - GPUs needed for both training and prediction
- Possible workaround
    - Generate ensembles by post-processing instead of using a CNN

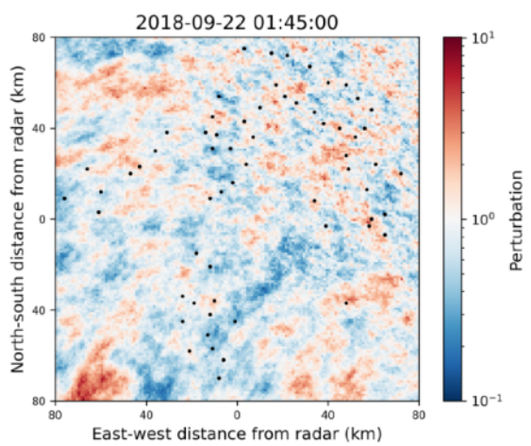


Forecast errors



- anchor points

Stochastically generated perturbation field that mimics the local error structure

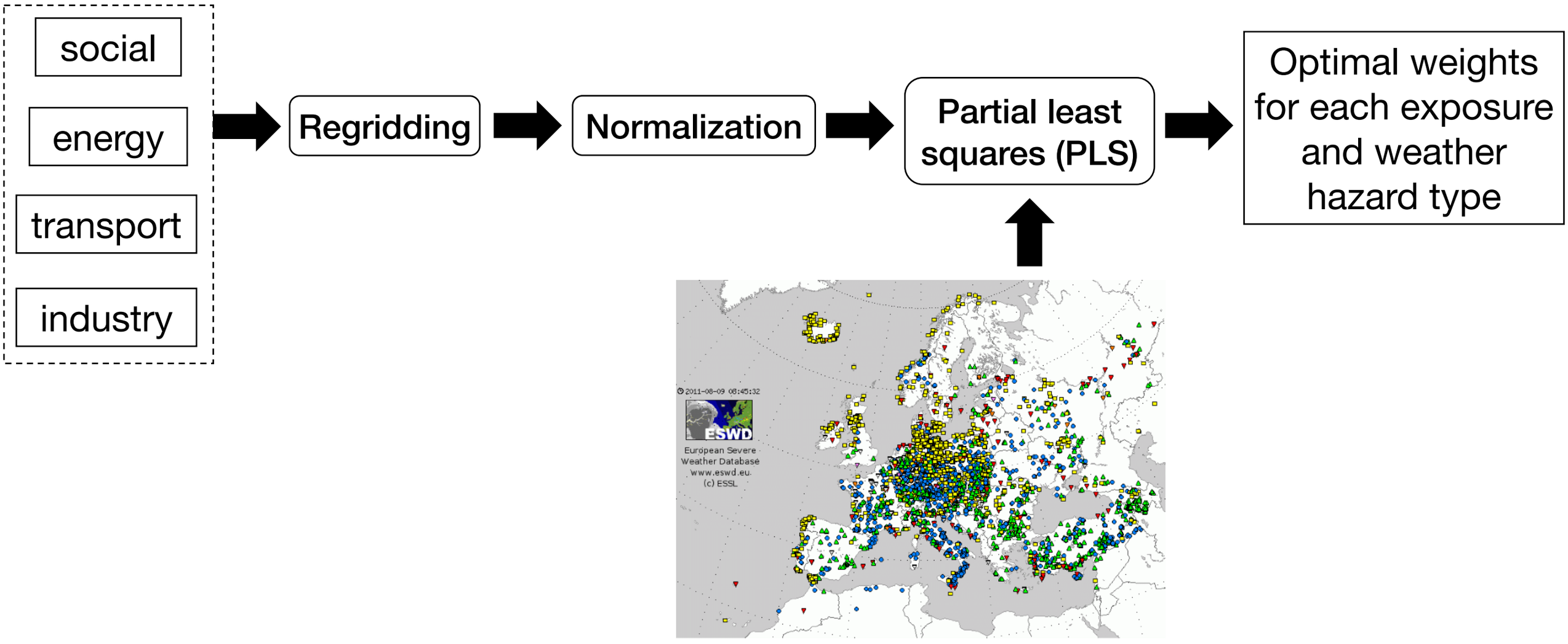


Pulkkinen et al., Lagrangian Integro-Difference Equation Model for Precipitation Nowcasting, J. Atmos. Ocean. Technol., 2125-2145, 38(12), https://doi.org/10.1175/JTECH-D-21-0013.1, 2021

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Optimal Combination of Exposure Information

- **Objective:** find linear combination of exposure indicators that maximize covariance with the target variable
- **Target variable:** total number of ESWD reports in a grid cell
- Can be locally adapted to each region



ESWD reports for different hazard types

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WP 4

PREPARATION OF THE DEMONSTRATION AND ENGAGEMENT OF STAKEHOLDERS	ECMWF
Integration of the developments of WP3 and set up of the system for real-time storms and floods impact forecasting	**ECMWF**, FMI, UPC
Configuration of the tools for storms and floods impact forecasting with end users	**UPC**, ECMWF, FMI, AEMET, IPMA, AMAYA, DGPCE, ANEPC
Organisation of an INLINE Community of Interest	**ECMWF**, UPC, FMI, AEMET, IPMA, AMAYA, DGPCE, ANEPC
Training and International Demonstration Workshop	**ECMWF, ANEPC**, UPC, FMI, AEMET, IPMA, AMAYA, DGPCE

DELIVERABLES		
Design of the integration of the INLINE products in the end-users systems	8	UPC
Training materials	16	ECMWF

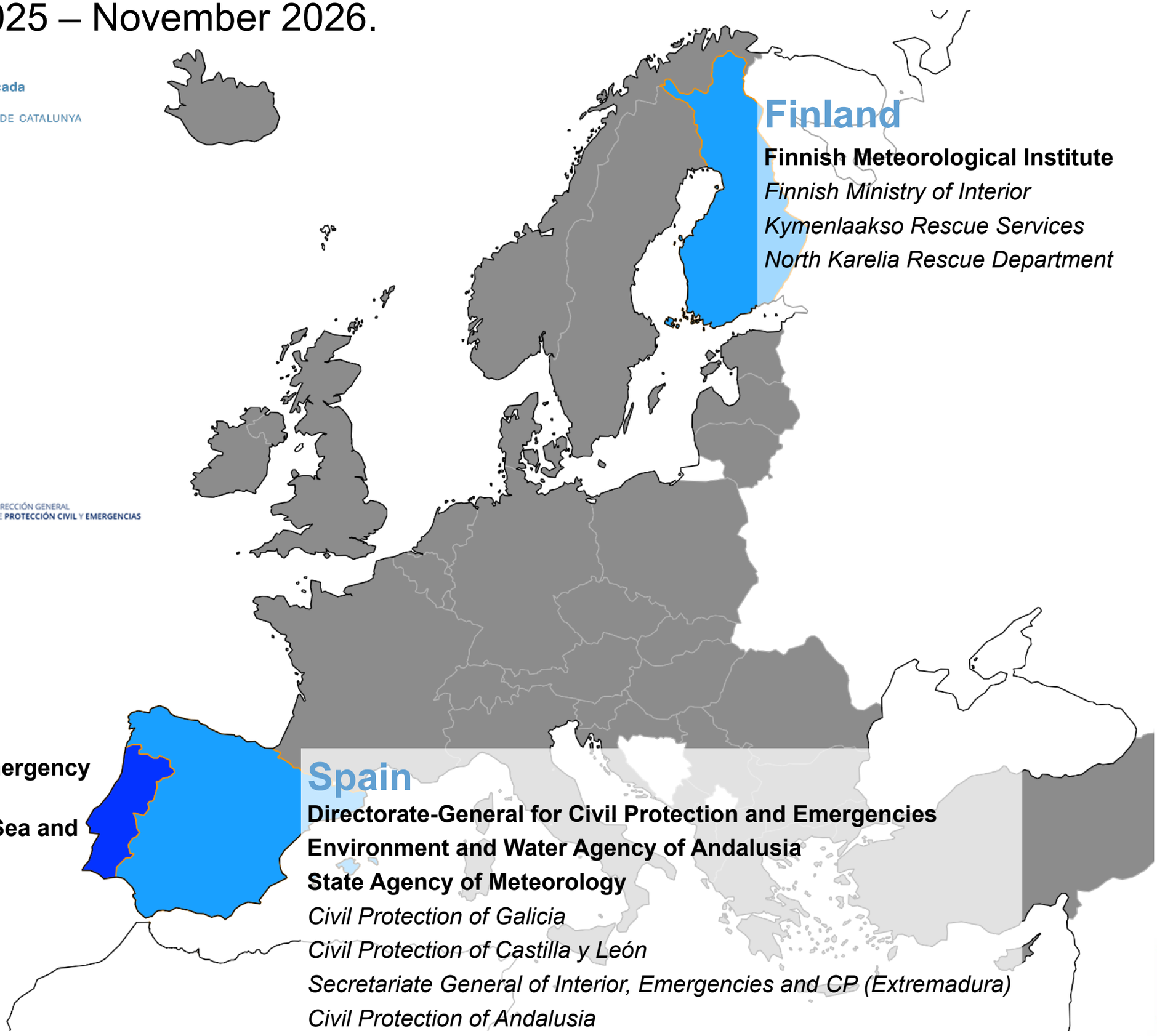
MILESTONES		
Real-time production of improved storms and floods impact forecasts	7	ECMWF
International Demonstration Workshop	15	ANEPC + UPC

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INLINE demonstration

- September 2025 – November 2026.



Finland

Finnish Meteorological Institute

Finnish Ministry of Interior

Kymenlaakso Rescue Services

North Karelia Rescue Department

Portugal

National Authority of Emergency and Civil Protection

Portuguese Institute of Sea and Atmosphere

Spain

Directorate-General for Civil Protection and Emergencies

Environment and Water Agency of Andalusia

State Agency of Meteorology

Civil Protection of Galicia

Civil Protection of Castilla y León

Secretariate General of Interior, Emergencies and CP (Extremadura)

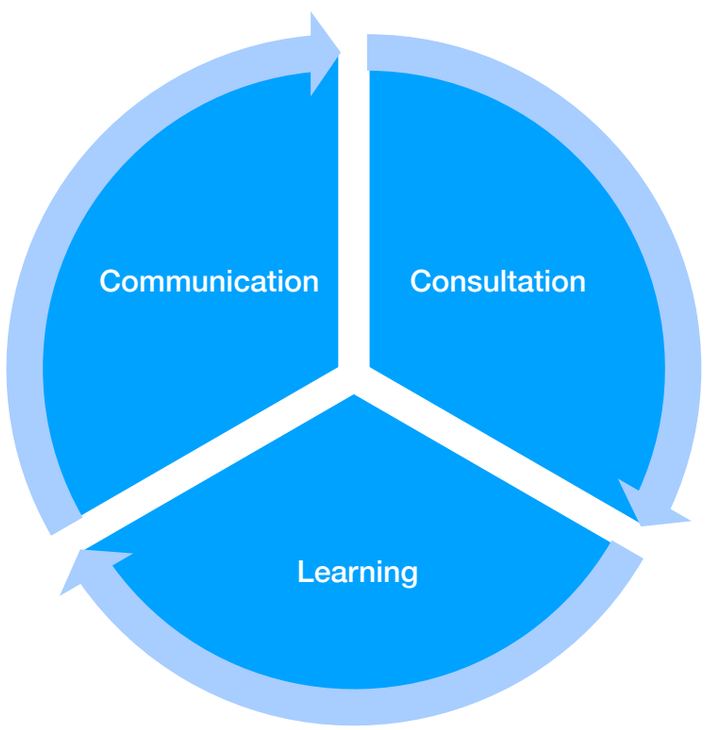
Civil Protection of Andalusia

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Community of Interest

Purpose of the INLINE Community of Interest:

- Regular engagement with stakeholders about the INLINE developments
- Promote INLINE products to different user groups and institutions outside the stakeholders of the project
- Used to train stakeholders on INLINE products
- Collect feedback on INLINE products from wider audience



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Community of Interest

Who would be the members?

How do we contact them / get them interested in participating?

We need to have a Point of Contact (PoCs) for each member…

Suggestions

- INLINE stakeholders: Spain, Portugal and Finland (Marc)
- MeteoAlarm: Germany, Switzerland, Austria (Nuno)
- UCPM member states (Rosa/Project Officer)
- EFAS Partners: open invite to EFAS partners during DISS webinar on 04 June 2025 (Karen)
- Others?

Contact email for COI: inline-coi@crahi.upc.edu

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Community of Interest – Meetings

Regular online meetings with members of the COI every ~ 6/8 weeks.

First meeting could include:

- Quick overview of the INLINE project and the products
- Interview with EDERA stakeholder (Rosa?) to explain how they found the products useful during EDERA
- Explain what is expected from members during the demonstration phase: 1) Attendance to regular meetings, 2) Provide feedback about products

Follow up meetings…

- Explanation of how to use the INLINE platform and how to set up notifications
- 5 mins for each COI member to introduce themselves, present how they currently forecast flash flood events, and provide a case study in their region we can use for the INLINE training materials.
- FMI introduce their new neural network product with a short presentation of the science, then the product is demonstrated for one case study, then the COI members analyse a second case study and answer questions to test their knowledge, finally the COI members give feedback about the product.
- Drop-in sessions, content led by COI members?
- etc…

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DRAFT - COI Meeting Plan

Duration: 1to 1.5 hours, **Day:** Thursday, **Start Time:** 2:00 PM (UK) / 3:00PM (CET)
Frequency: Every 6 weeks. Dates adjusted to avoid public holidays in UK,ES, PT, FI
Avoids Christmas 2025, Easter 2026

#	Content	Date	Time (UK)
0	Call for participants – EFAS webinar on radar-based FF	**04 June 2025**	13:00-14:00
1	**Introduction to the COI** – overview of INLINE & products, interview with stakeholders, explain purpose and expectations of COI	**18 September 2025**	14:00-15:30
2	**Session 2** – COI member presentations, explain how to use INLINE & set up notifications	**30 October 2025**	14:00-15:30
3	**Session 3** – Present FMI neural network science, guidance with case study, hands on case study analysis	**11 December 2025**	14:00-15:30
4	**Feedback session 1** – feedback from COI members on INLINE products and neural network session	**22 January 2026**	14:00-15:30
5	…	**05 March 2026**	14:00-15:30
6	…	**16 April 2026**	14:00-15:30
7	…	**28 May 2026 (International Workshop)**	14:00-15:30
8	…	**09 July 2026**	14:00-15:30
9	…	**03 September 2026**	14:00-15:30
10	**Final feedback session and wrap up of COI** – survey, presentation of Training materials, etc…	**08 October 2026**	14:00-15:30

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INLINE International Demonstration Workshop

- 3 days workshop in May 2026
- Hosted by ANEPC in Lisbon (PT)
- Aim: present the developments of the project and provide a hands-on experience
- Participants: INLINE Community of Interest.

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WP 5

DEMONSTRATION WITH END USERS	AMAYA - ANEPC
T5.1: Demonstration of the developments for hazard and impact forecasting over Europe with stakeholders.	**ECMWF**, FMI, UPC
T5.2: Demonstration of the developments for hazard and impact forecasting to support emergency management in the INLINE cross-	**ANEPC**, DGPCE, AMAYA, AEMET, IPMA
T5.3: Evaluation of the demonstration results	**AMAYA**, UPC, ECMWF, FMI, AEMET, IPMA, AMAYA, DGPCE, ANEPC

DELIVERABLES		
Evaluation of the results of the INLINE demonstration	24	UPC

MILESTONES		
Design of the methodology to evaluate the results of the INLINE demonstration	12	UPC

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WP5: Evaluation of the results of the demonstration

- **Hydrometeorological forecasts**

  Evaluate the accuracy, reliability, and timeliness of the precipitation, flood hazard, and flood impact forecasts.

- **Operational Value from the User Perspective**

  Assesses the practical usability, timeliness, relevance, anticipation, and decision-support capabilities of INLINE's outputs for stakeholders and end-users. Compared the forecast results with the current system used.

- **Added Value and Collaboration Efficiency**

  Compared the forecast results with the current system used. Specifically, evaluated INLINE's added value in improving information sharing, coordinated decision-making, and Joint response capabilities through different stations.

- **Stakeholder Engagement and Impact**

  Measure the effectiveness of INLINE's established Community of Interest, the adoption level of project outputs, and potential broader socio benefits.

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WP5: Evaluation of the results of the demonstration

EVALUATION WITH QUESTIONNAIRES:

- **Event performance:**

  Event questionnaire sent every time a notification has been issued (reduce number of notifications).

  Commented during CoI meetings.

- **Added value:**

  Initial questionnaire at the beginning of the demonstration period or when stakeholders engage.

  Final questionnaire at the end of the demonstration.

- **Stakeholder engagement & impact**

  During project events (questionnaires & interviews)

WP5: Evaluation of the results of the demonstration

EVENT PERFORMANCE

INLINE Notification Performance Feedback

Dear Participant, Thank you for participating in our INLINE notification performance feedback survey. Your feedback helps us enhance notification accuracy, clarity, and usefulness. This questionnaire aims to gather your opinion about the notification generated through the INLINE platform. All collected data will remain anonymous and be kept strictly confidential. Estimated time: 5–10 minutes.

Section 1: Event Information

1. What is the Code of the Notification you want to provide feedback on? *

2.Did the forecasted event actually occur in the notified area? *

- ◯ Yes
- ◯ No

Section 3: Comparison between INLINE and Current Products Used

1.Did you access other forecasts during the event or after you received the notification? *

- ◯ Yes
- ◯ no

Section 4: Overall Feedback

1.How helpful was this Notification in guiding your decisions?	1 - Very low	2	3	4	5 - Very high
-	◯	◯	◯	◯	◯

2.Any other comments or ideas?

3. If you take this notification as a True Positive (correct flood notification), would you be willing to complete a more detailed follow-up survey now (approximately 10 more minutes)? *

- ◯ Yes
- ◯ Yes, but provide me with a link later.
- ◯ No

Thank you for your time!

Your input is invaluable in helping us deliver more timely, accurate, and actionable flood notifications. If you have further feedback, please get in touch with us at inline-feedback@crahi.upc.edu.

Save Draft ✔ Submit

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WP 6

INTEGRATION OF INLINE DEVELOPMENTS IN EFAS	ECMWF
T6.1: Integration of the improved precipitation estimation approach in EFAS	**UPC**, ECMWF
T6.2: Integration of the improved products for storms and floods hazard and impact forecasting in EFAS	**ECMWF**, FMI, UPC

DELIVERABLES		
INLINE developments integrated into a quasi-operational environment of EFAS	21	ECMWF

MILESTONES		
Roadmap for the integration of the INLINE developments in EFAS	12	ECMWF

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Amendment

1) Termination of AMAYA's participation as beneficiary of the project and engagement of EMA (PIC: 873408953) as new beneficiary assuming AMAYA's responsibilities and efforts

2) Transfer of 16 k€ from the category "Personnel" to the category "Subcontracting" to guarantee the full integration of the developments of the project in EMA's operational system

3) Change of Task 6.1 description to adapt it to the constraints of ECMWF's High Performance Computing Facility (HPCF)

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INLINE
Integrated pan-European rainfall and floods impact forecasts for cooperation in emergency management

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INLINE follow-up meeting

16 June 2025

Centre de Recerca Aplicada en Hidrometeorologia
UNIVERSITAT POLITÈCNICA DE CATALUNYA

ECMWF

ILMATIETEEN LAITOS
METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

AEMet
Agencia Estatal de Meteorología

IPMA Instituto Português do Mar e da Atmosfera

EMA

GOBIERNO DE ESPAÑA
MINISTERIO DEL INTERIOR
DIRECCIÓN GENERAL DE PROTECCIÓN CIVIL Y EMERGENCIAS

EMERGÊNCIA E PROTEÇÃO CIVIL
AUTORIDADE NACIONAL