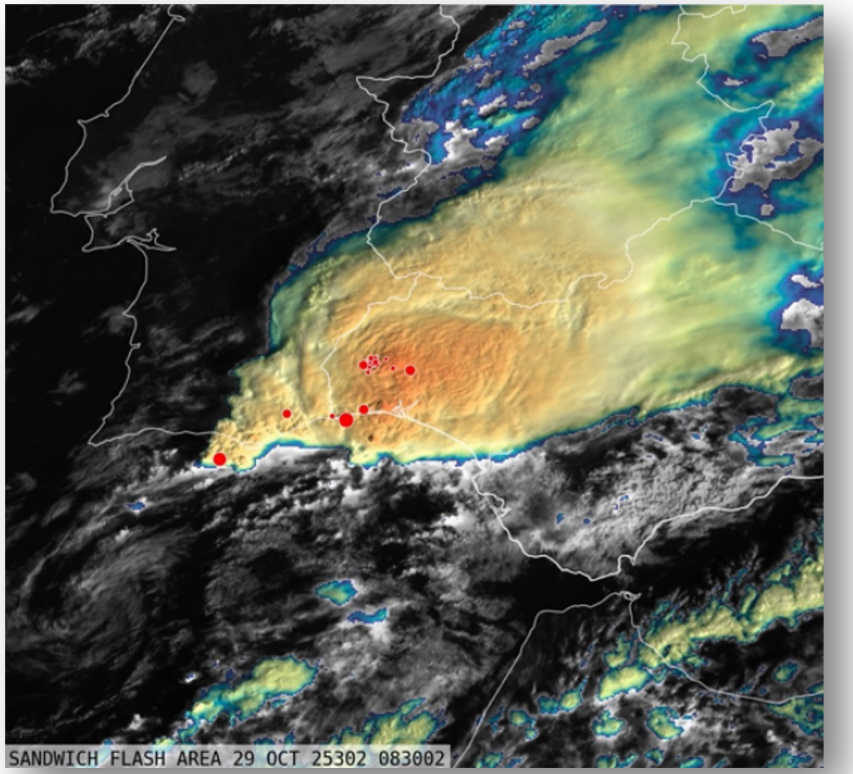
INLINE
Integrated pan-European rainfall and floods impact forecasts for cooperation in emergency management

Co-funded by the European Union

Cross-border event: Portugal-Spain 29th October 2025



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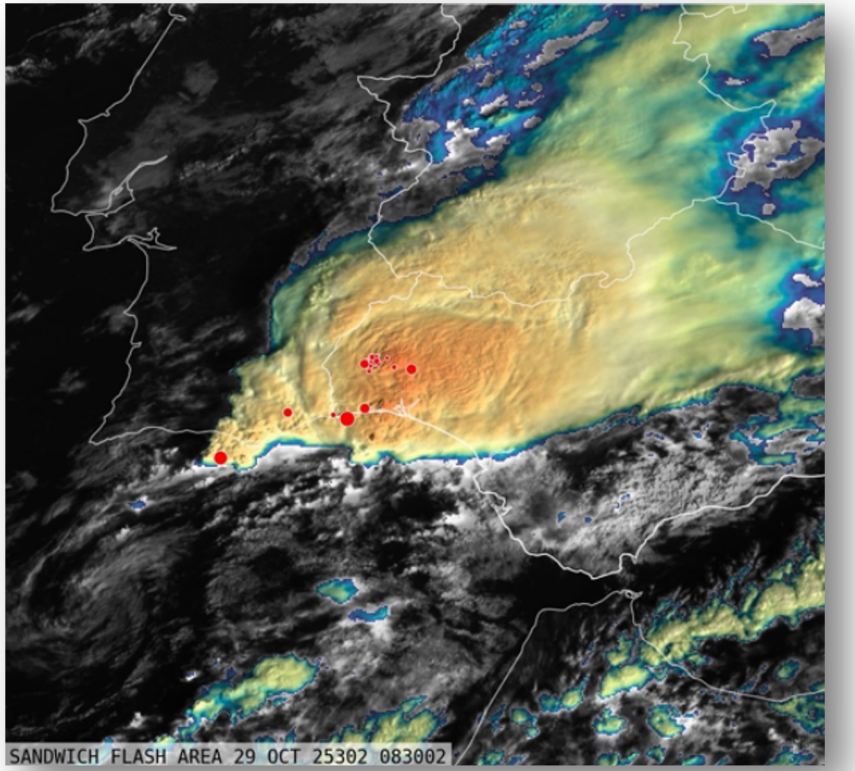
CRAHI
Centre de Recerca Aplicada en Hidrometeorologia
UNIVERSITAT POLITÈCNICA DE CATALUNYA
ECMWF
ILMATIETEEN LAITOS METEOROLOGISKA INSTITUTET FINNISH METEOROLOGICAL INSTITUTE
aemet
IPMA Instituto Português do Mar e da Atmosfera
EMA
Junta de Andalucía
GOBIERNO DE ESPAÑA MINISTERIO DEL INTERIOR
DIRECCIÓN GENERAL DE PROTECCIÓN CIVIL Y EMERGENCIAS
EMERGÊNCIA E PROTEÇÃO CIVIL AUTORIDADE NACIONAL

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

Summary

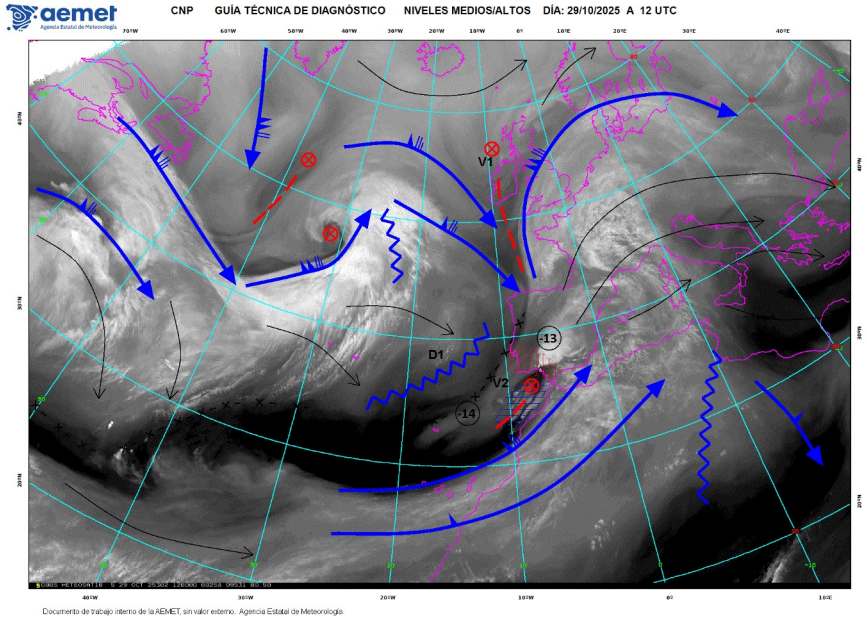


Synoptic situation
Numerical Weather Prediction Models
Oficial Warnings
INLINE Products
Observations and Impact
Conclusions

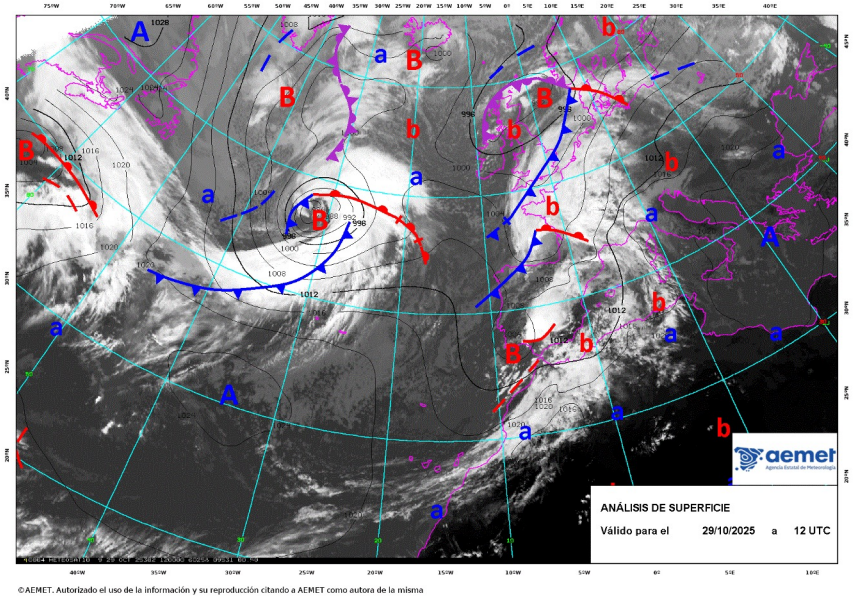
Co-funded by the European Union

Synoptic Situation

- Mid and high Levels



- Surface Analysis



27th October 28th October 29th October

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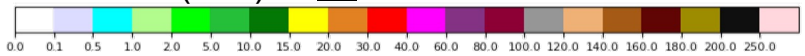
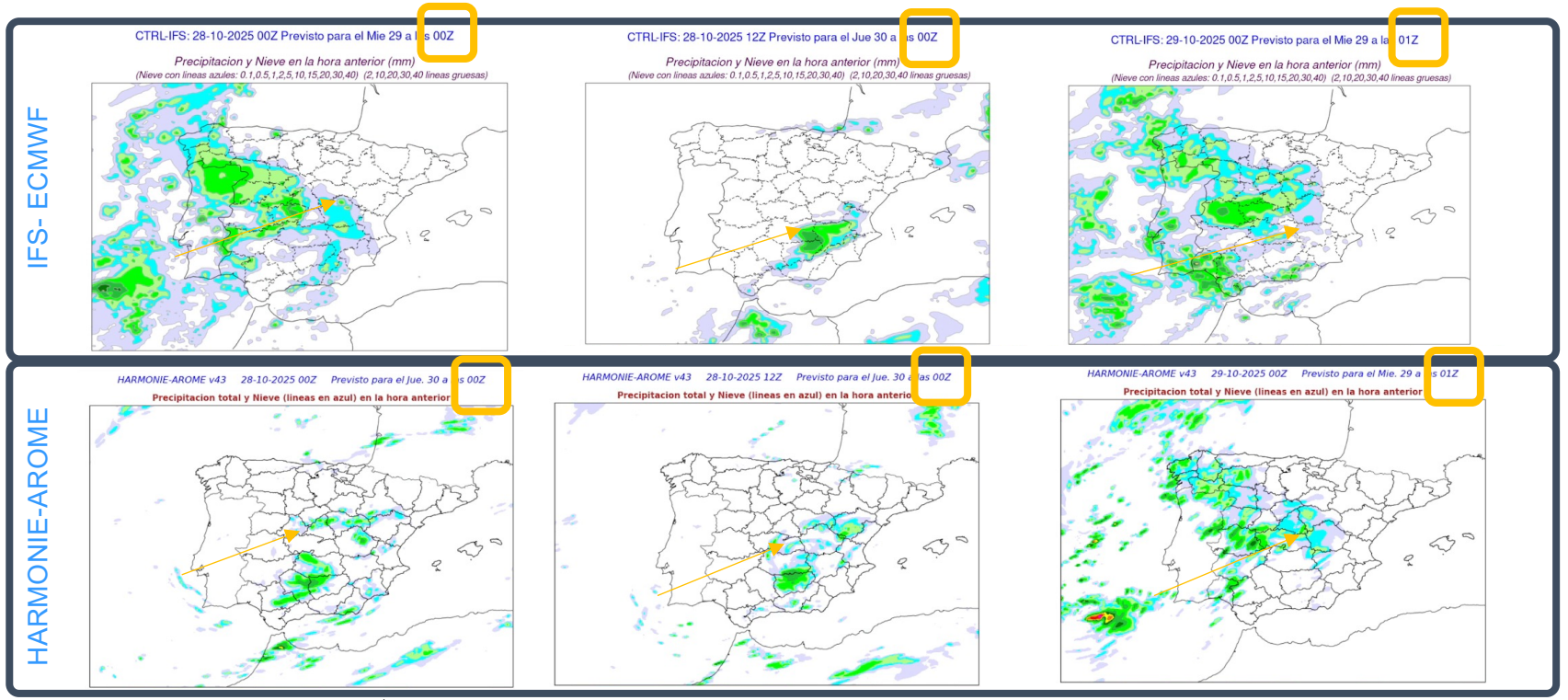
Numerical Weather Prediction Models

Acc PCP (mm) in 1h





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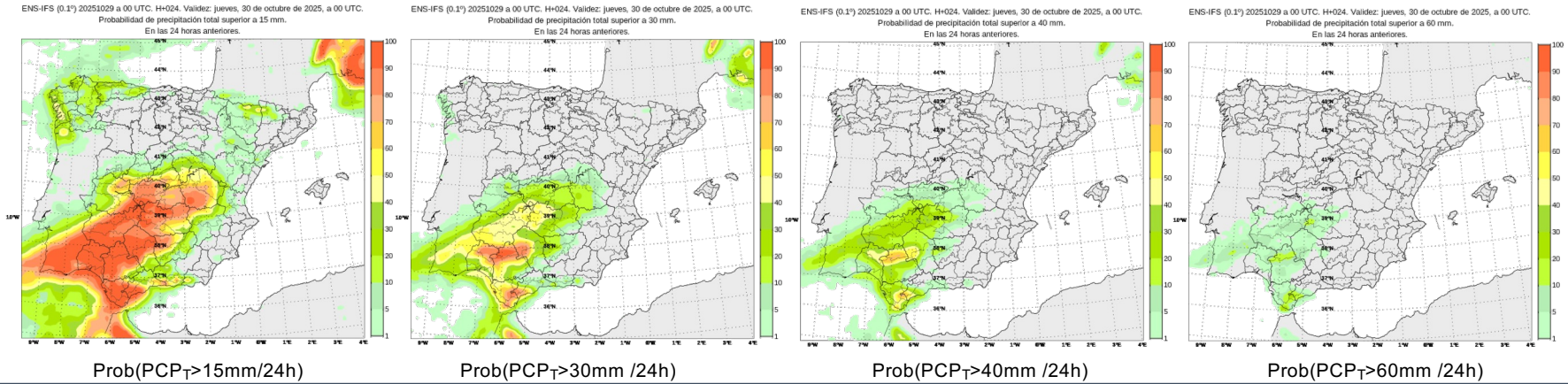
Numerical Weather Prediction Models

ENS- ECMWF



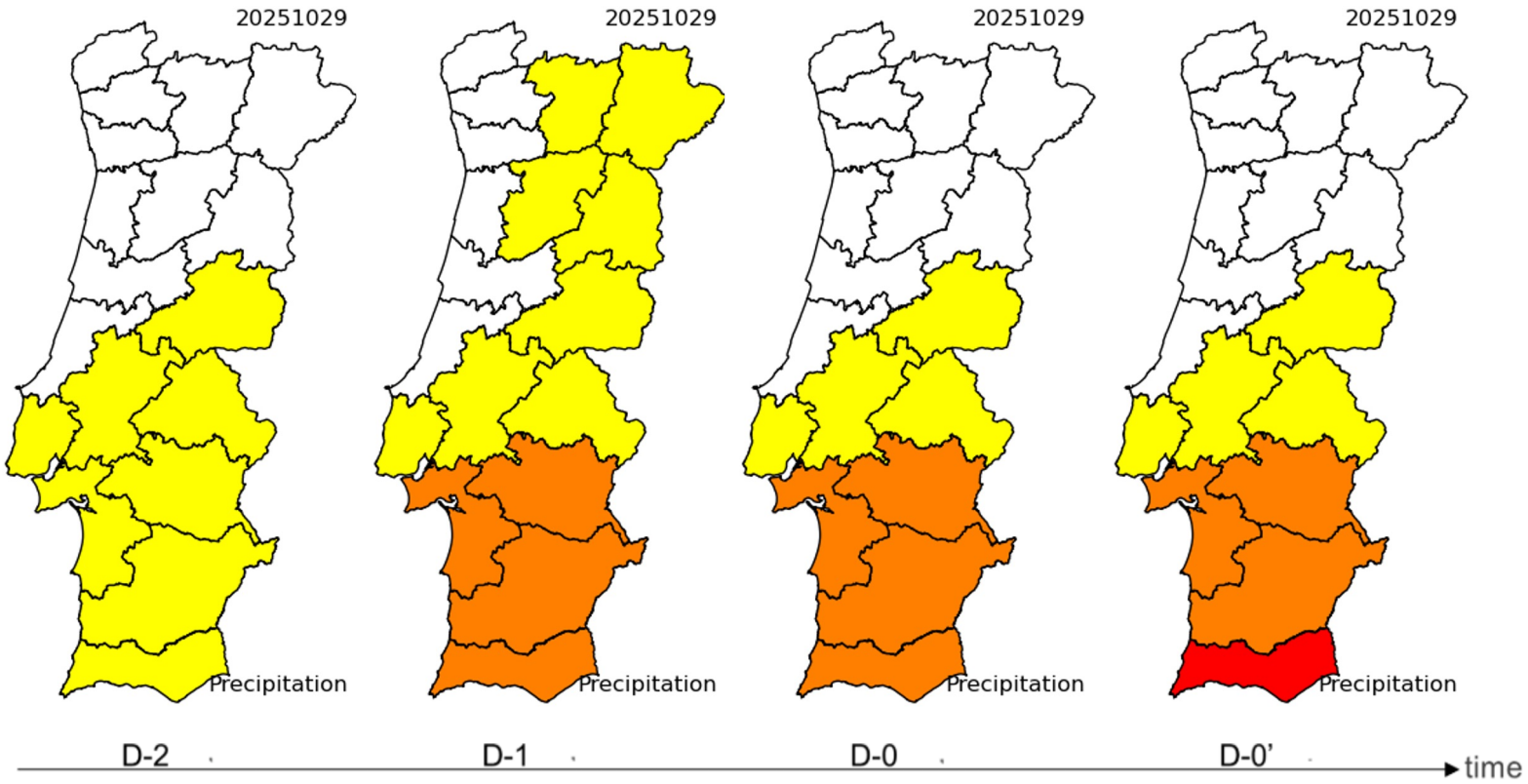
Prob(PCP_T>15mm/24h) Prob(PCP_T>30mm /24h) Prob(PCP_T>40mm /24h) Prob(PCP_T>60mm /24h)

The inherently low predictability of the very small-scale mesolow was reflected in a marked lack of consistency between successive model runs and among different numerical weather prediction models regarding the forecast location of maximum rainfall accumulations.

Co-funded by the European Union

IPMA Warnings

Acc. Precipitation in 1h or 6h: 10 / 20 / 40 or 30 / 40 / 60



27/10 28/10 29/10 Nowcasting

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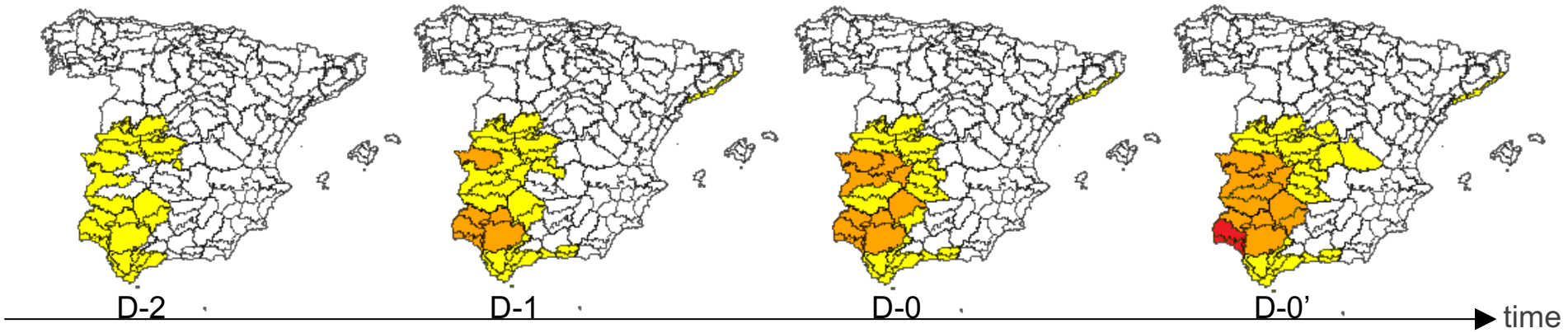
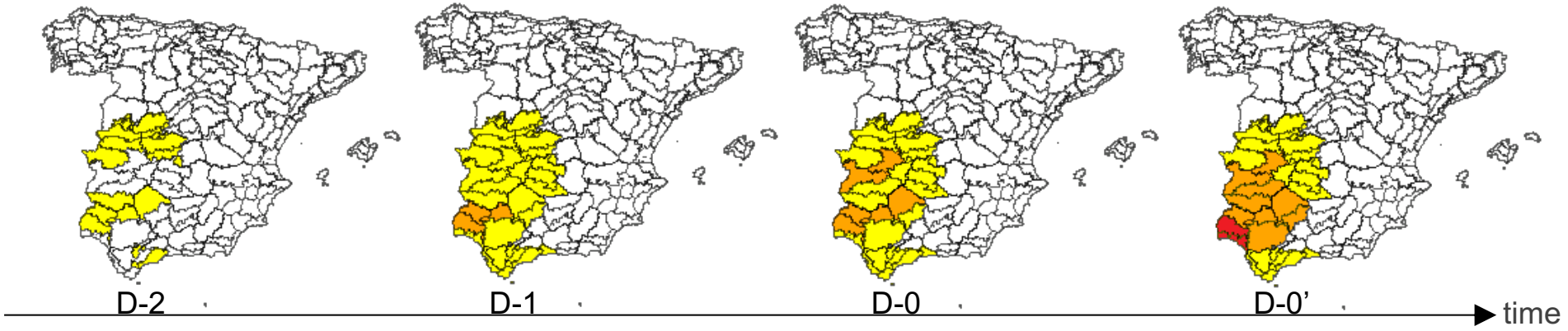
AEMET warnings

29th October

Acc PCP in 1h oficial warning 15|30|60 mm



Acc PCP in 12h oficial warning 40|80|120 mm



AEMET issued orange rainfall warnings ("severe weather hazard") for the provinces of Huelva and Seville on the morning of the previous day. Based on continuous monitoring and nowcasting activities, the warning level was subsequently upgraded to red ("extreme weather hazard") for the province of Huelva on the day of the event.

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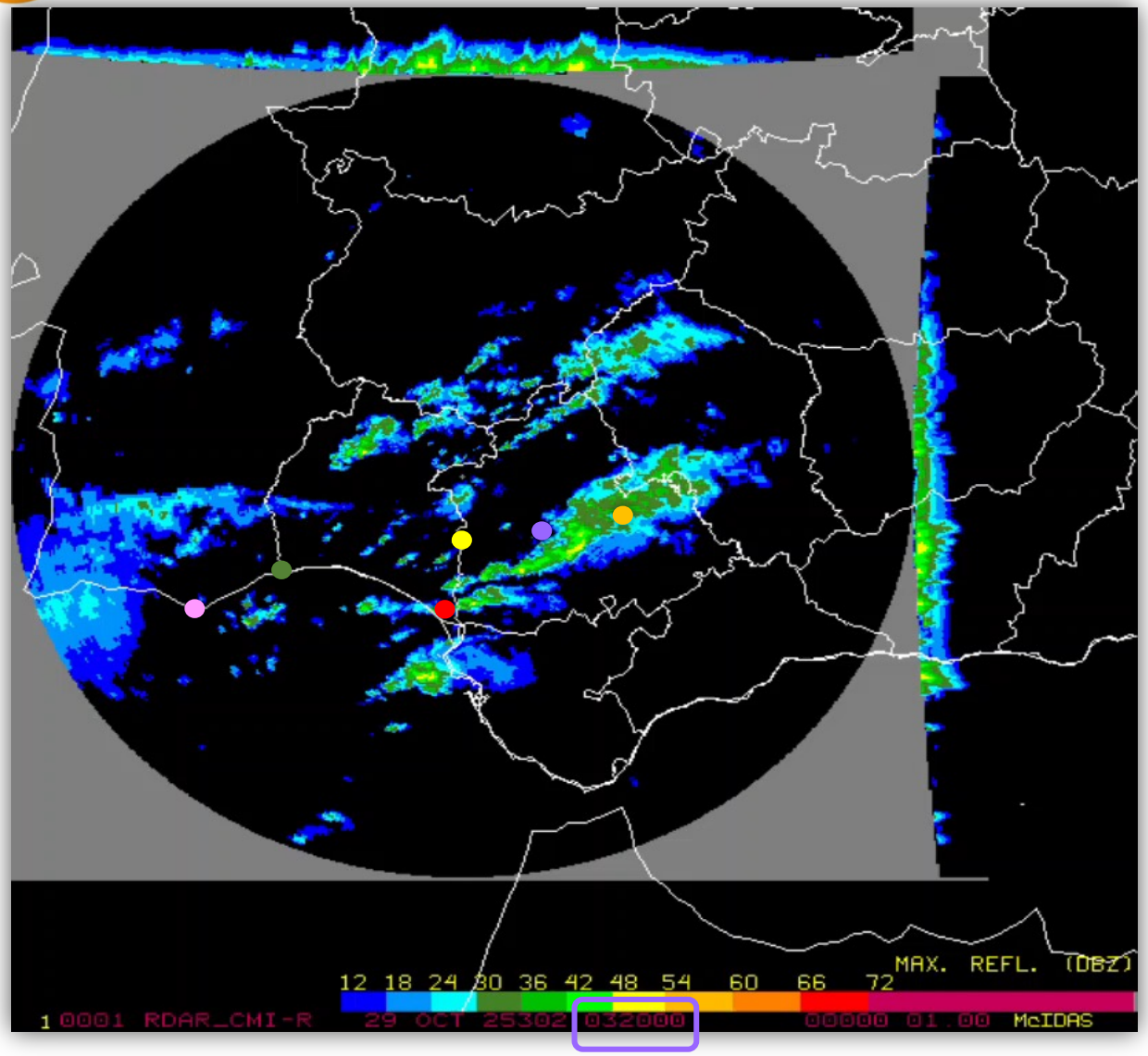
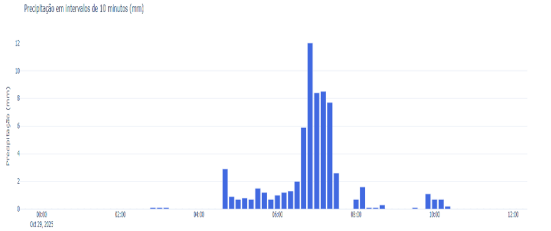
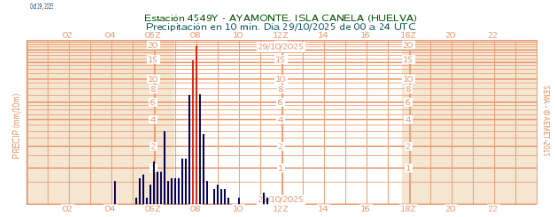
Observations
RADAR



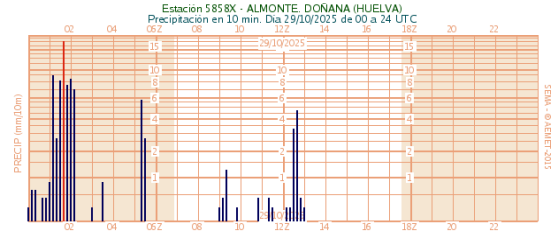
Maximum Reflectivity Loop from 3:20 to 16:20 UTC



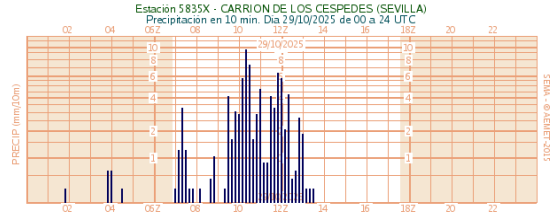
Faro Airport Station



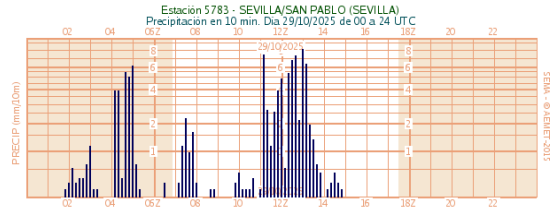
65,2 mm / 24 h
65,2 mm / 12 h



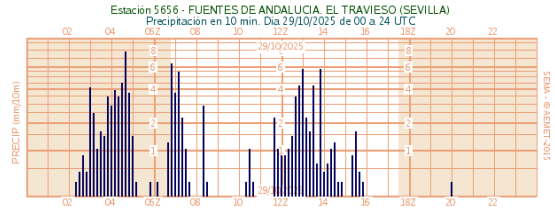
81,4 mm / 24 h
79,2 mm / 12 h



85,0 mm / 24 h
85,0 mm / 12 h



99,5 mm / 24 h
98,4 mm / 12 h



108,8 mm / 24 h
104,6 mm / 12 h

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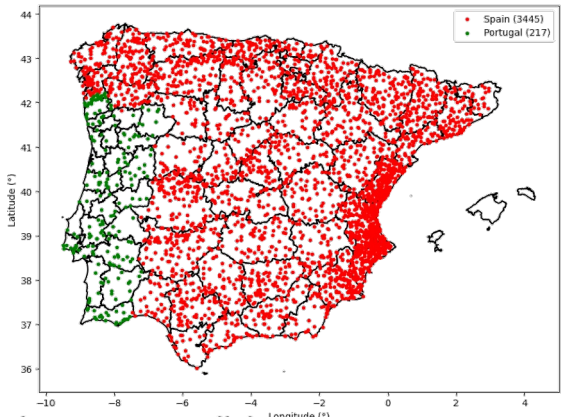
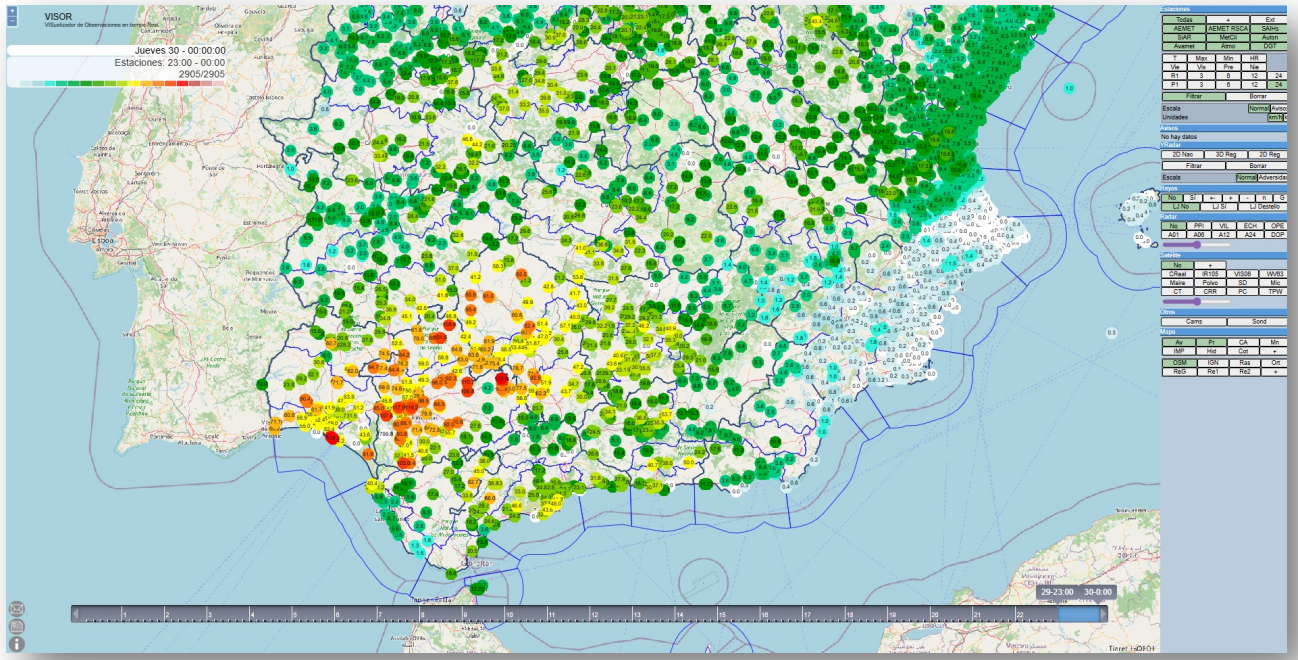
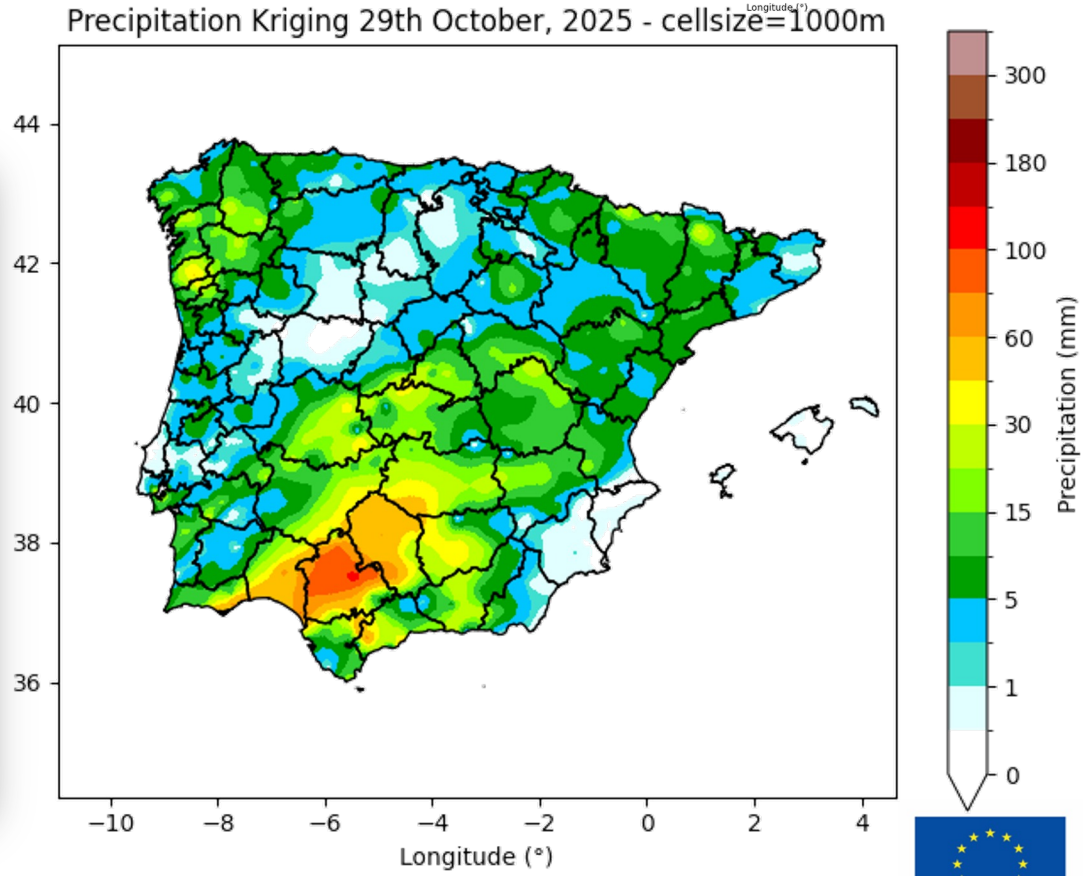
Observations

Rain-gauges





Accumulated precipitation in 24 h for the 29th of October 2025



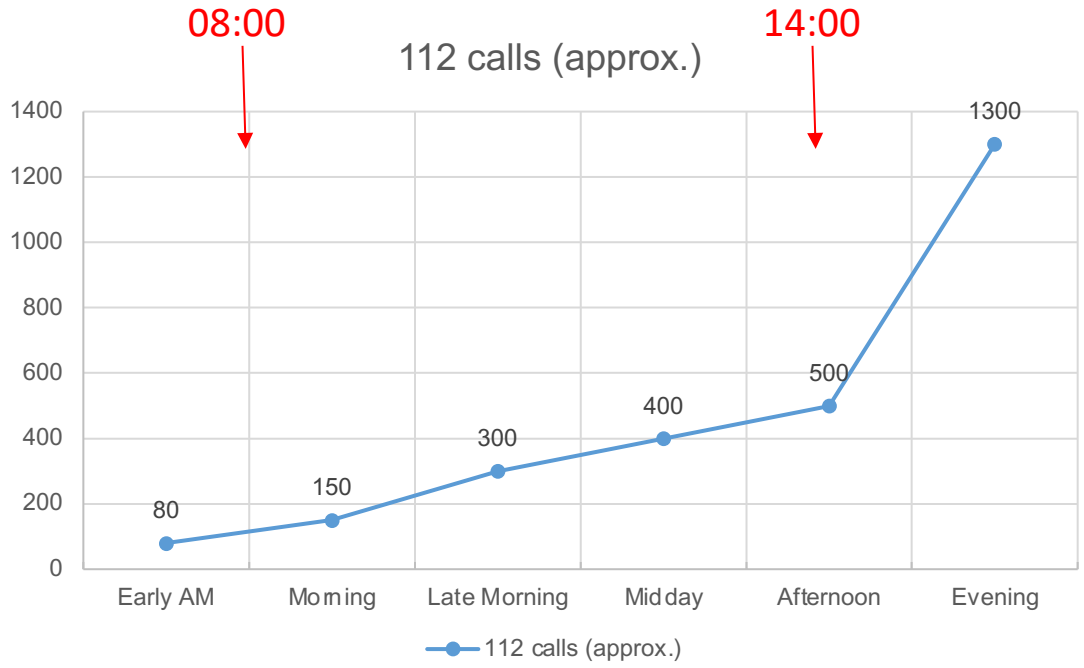
Co-funded by the European Union

Impact. Rapid escalation of rainfall impacts in Andalusia (Oct 29, 2025)

👉 *Emergency incidents scaled exponentially within <12 hours, exceeding 1,300 calls*

📌 **What is happening**

- Gradual build-up → **sharp acceleration at midday**
- Operational saturation in the second half of the day
- Strong geographic concentration (Seville & Huelva)



⚠️ **Why it matters**

- Critical response window: **12:00–18:00**
- Need for earlier anticipation vs. reactive response
- Simultaneous disruption across:
- Infrastructure
- Mobility
- Population safety

Source: 112 Andalusia (official communications on X)

Co-funded by the European Union

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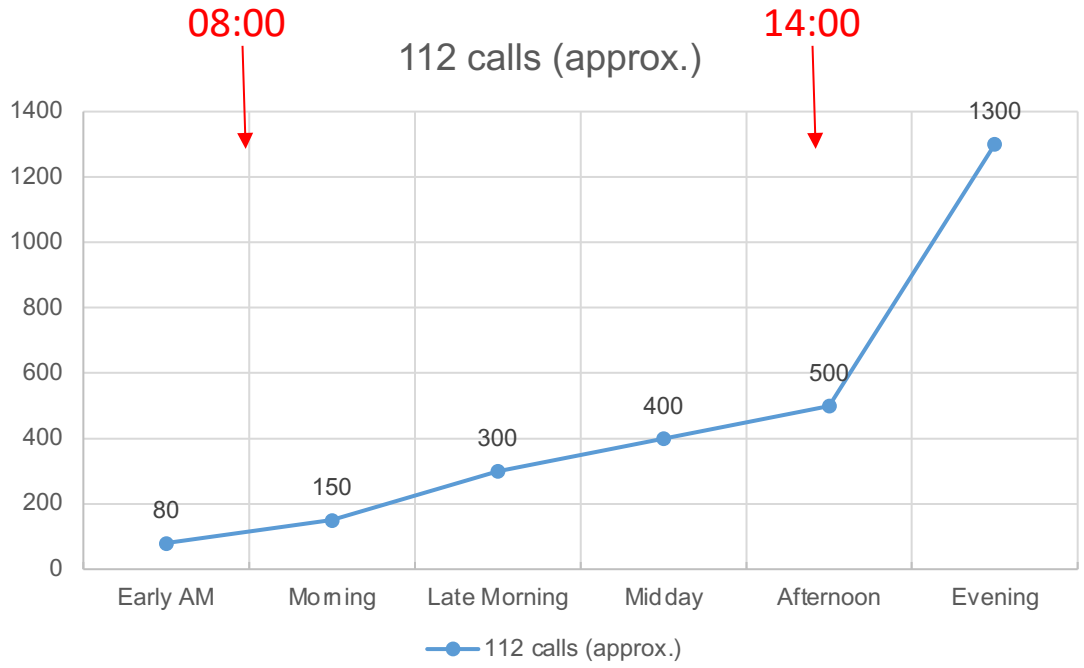

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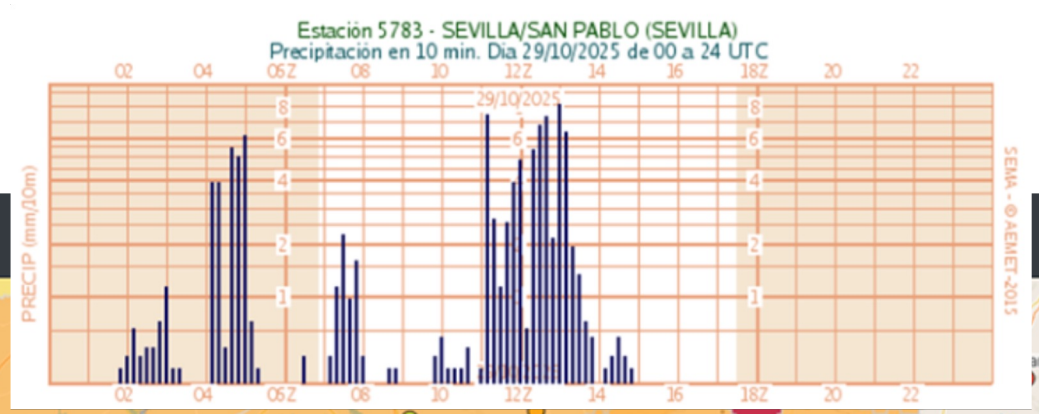
Impact.



INLINE Platform

Tools · Help · antonio.santiago.gahete

- Flash flood forecast summary (0-120h)
- Storm Impact
- Animated flash flood nowcasting
- Flash flood past 24-h summary
  - Official warnings (1)
    - Official warnings
  - Meteorological layers (3)
    - Precipitation accumulation (24h)
    - Flooded area
    - AEMET+SYNOP Raingauge accum. (24h)
  - Flash flood impact layers (3)
    - Flash flood impact over the river network 24h
    - Flash flood impact over sub-catchment
    - Pluvial flood hazard in urban areas
- EFAS (4)

Impacts in Seville city

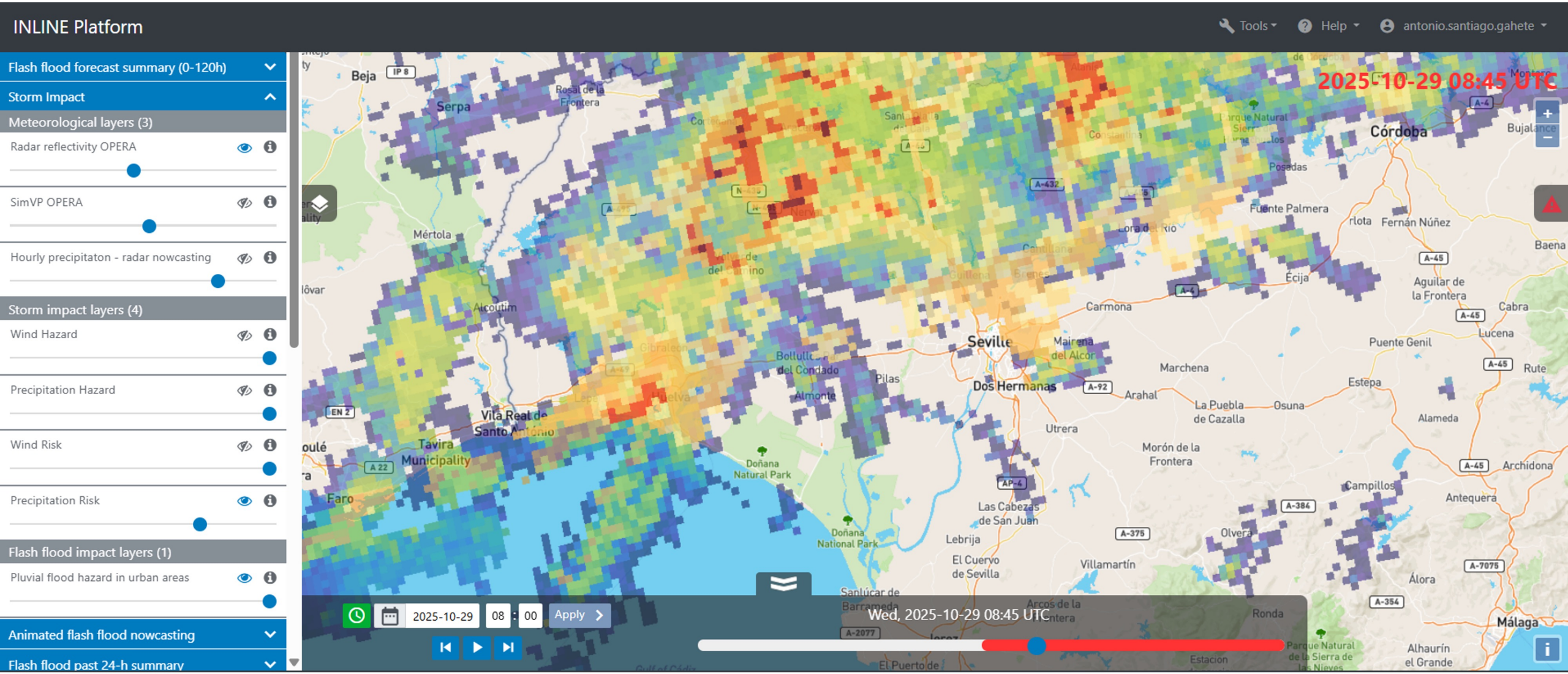
Red level AEMET + ES-Alert messages

Puntual impacts in other places

Expand

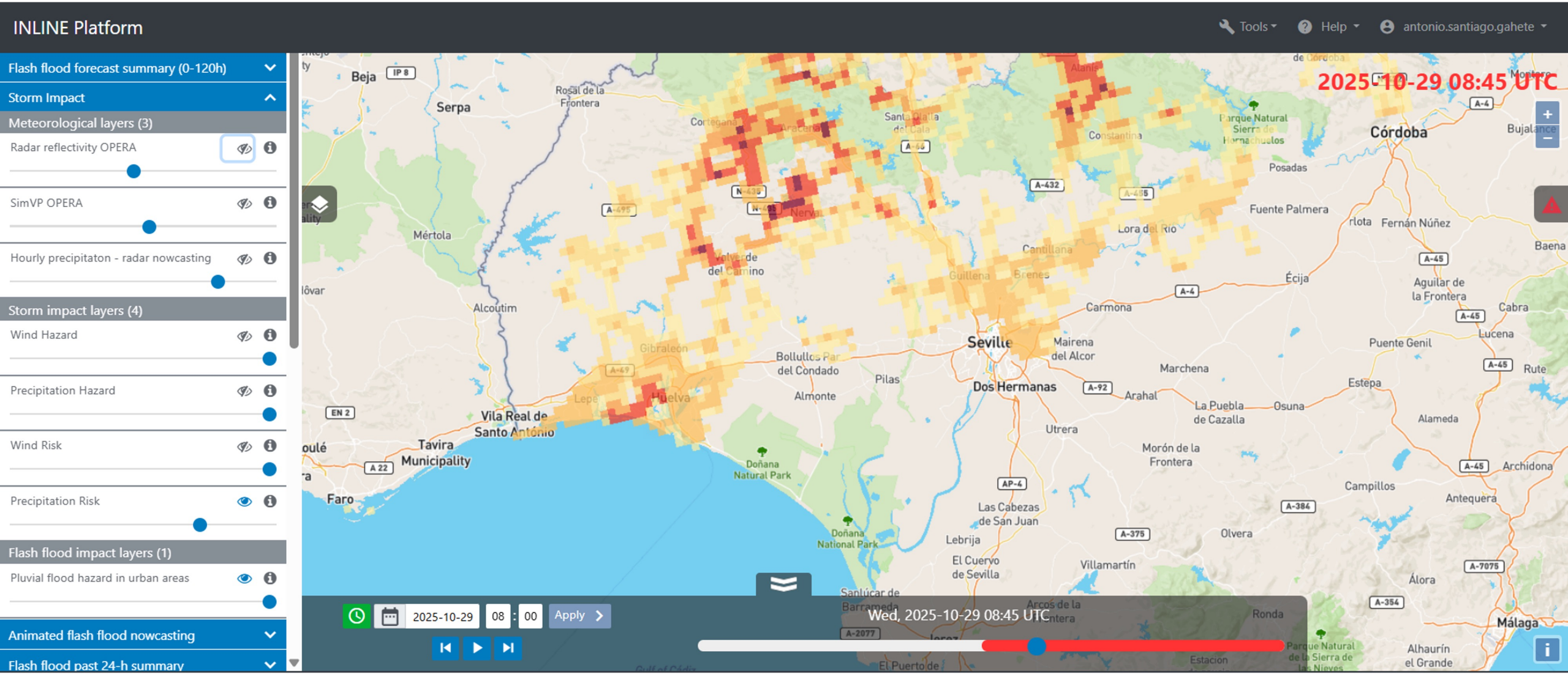
CRAHI · UPC · ECMWF · Finnish Meteorological Institute · AEMet · IPMA · EMA

INLINE



CRAHI UPC ECMWF FINNISH METEOROLOGICAL INSTITUTE AEMet IPMA EMA

INLINE



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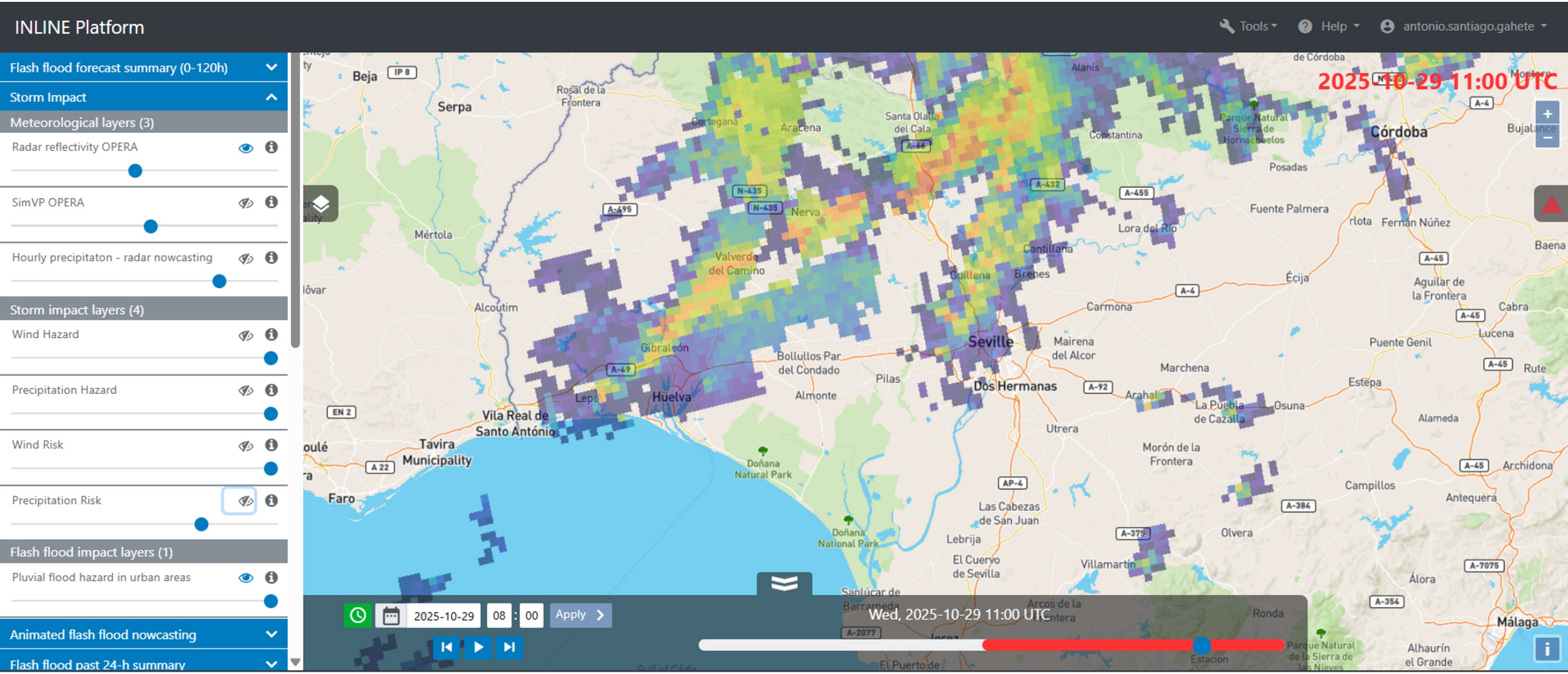
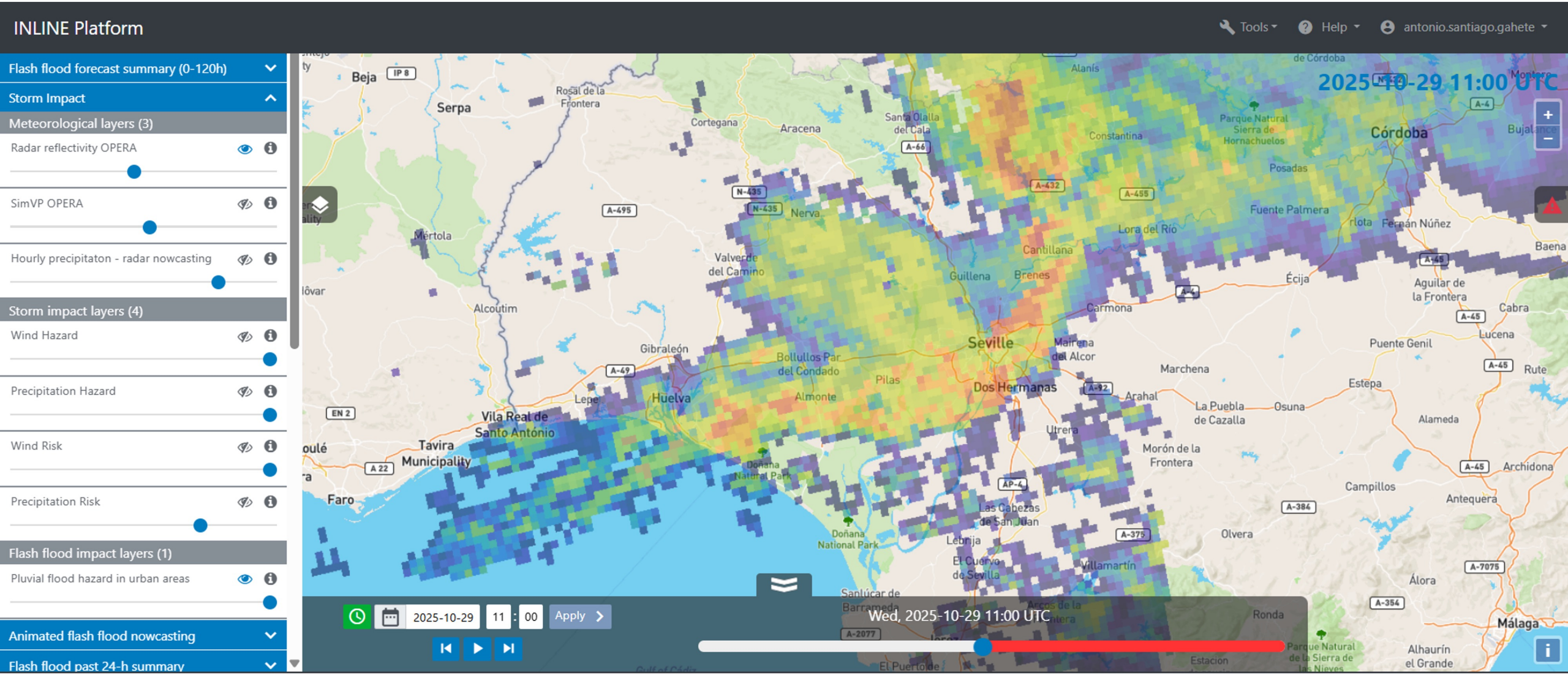


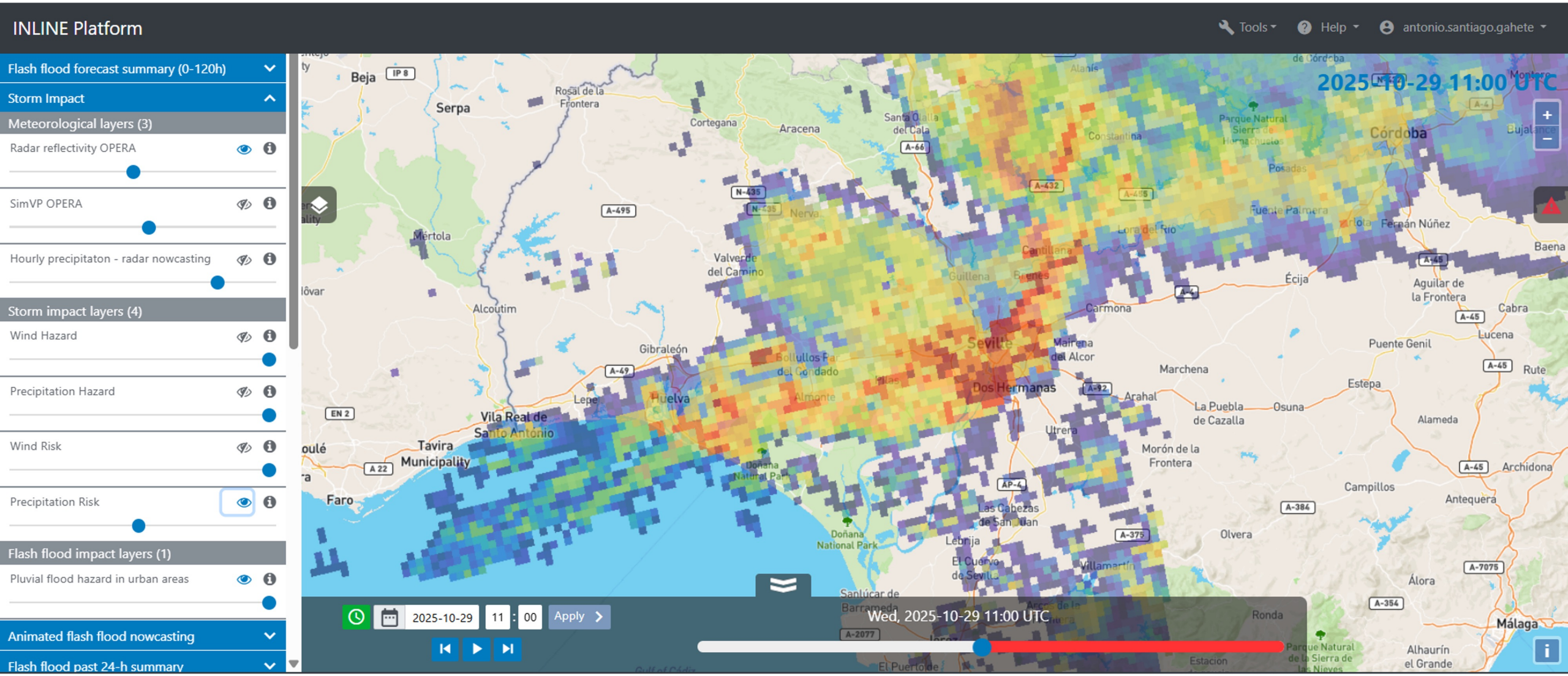
ECMWF · FINNISH METEOROLOGICAL INSTITUTE · AEMet · IPMA · EMA

INLINE



CRAHI UPC ECMWF FINNISH METEOROLOGICAL INSTITUTE AEMet IPMA EMA

INLINE



CRAHI UPC ECMWF FINNISH METEOROLOGICAL INSTITUTE AEMet IPMA EMA

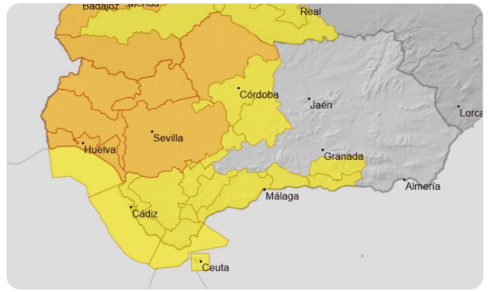
Impact.

EMA 112
@E112Andalucia

#ACTUALIZACION

🟠Ampliado el aviso naranja por #lluvias para #Córdoba (Sierra y Pedroches) para mañana miércoles

🌧️ Mantén la precaución y sigue nuestros #Consejos112



8:00 p. m. · 28 oct. 2025 · **22,2 mil** Visualizaciones

EMA 112
@E112Andalucia

📢¡¡No caigas en bulos!!
No hay suspensión de clases 👮

Si te llega un mensaje de este tipo, contrasta y consulta fuentes oficiales. Rompe la cadena de la desinformación ✋

#StopBulos

11:28 p. m. · 28 oct. 2025 · **63,8 mil** Visualizaciones

EMA 112
@E112Andalucia

#Lluvias🌧️ #Consejos112

💧Evita transitar cerca de ríos, riberas y aguas embalsadas

🚗 No aparques ni acampes cerca de éstos. ¡No te la juegues!

6:46 p. m. · 28 oct. 2025 · **7.961** Visualizaciones

EMA 112
@E112Andalucia

El consejero @interiorjunta eleva a fase de emergencia, situación operativa 1 el Plan ante el Riesgo de Inundaciones en #Andalucía #PERI
▶️ Activado aviso rojo en litoral #Huelva. Se esperan lluvias torrenciales en el entorno #Ayamonte
▶️ Evita desplazamientos, sigue #Consejos112

9:42 a. m. · 29 oct. 2025 · **10 mil** Visualizaciones

EMA 112
@E112Andalucia

Enviada a 12 municipios costeros de Huelva alerta masiva de mensaje a móviles #EsAlert informando del aviso rojo en la costa onubense.
✅Si estás en la zona, evita desplazamientos y sigue los #Consejos112 recuerda que la prevención salva vidas.
✅En caso de emergencia 📲 112

10:07 a. m. · 29 oct. 2025 · **15,3 mil** Visualizaciones

EMA 112
@E112Andalucia

🔴 Se eleva a medio millar las incidencias por #lluvia en #Andalucía, la mayoría en #Huelva y #Sevilla

🚑 Herido grave un hombre en Gibraleón al que se le ha caído un toldo

Toda la información 🔗

De juntadeandalucia.es

2:06 p. m. · 29 oct. 2025 · **6.904** Visualizaciones

EMA 112
@E112Andalucia

🔴 Las lluvias dejan más de un millar de incidencias en #Andalucía, la mayoría en #Sevilla y #Huelva

🌧️ Toda la información, balance de emergencias y recomendaciones las tienes en este enlace 👇

De juntadeandalucia.es

8:38 p. m. · 29 oct. 2025 · **4.401** Visualizaciones

EMA 112
@E112Andalucia

🔴 Ascienden a más de 600 las incidencias por #lluvias en #Sevilla, la mayoría en la capital

Registradas anegaciones de vías, viviendas y comercios

⚠️⚠️ Extrema la precaución y evita desplazamientos

2:54 p. m. · 29 oct. 2025 · **174,4 mil** Visualizaciones

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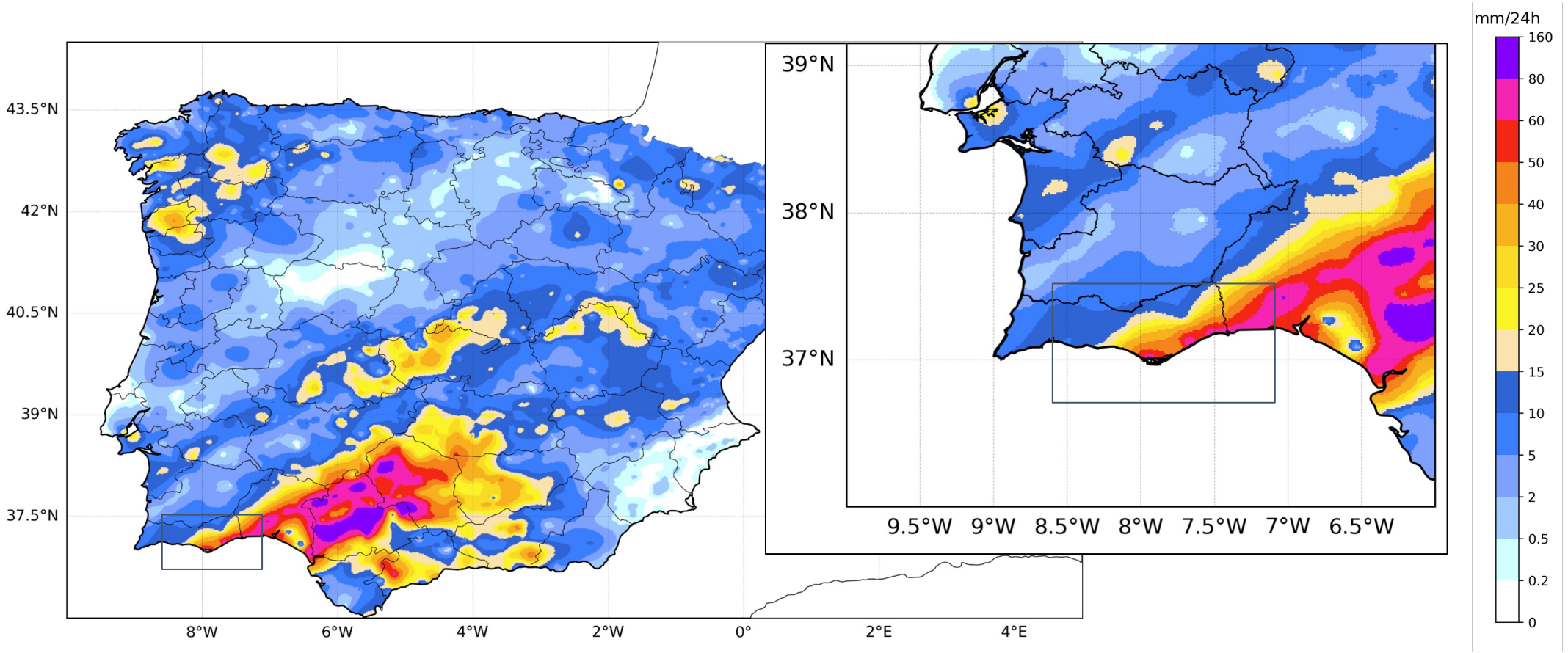
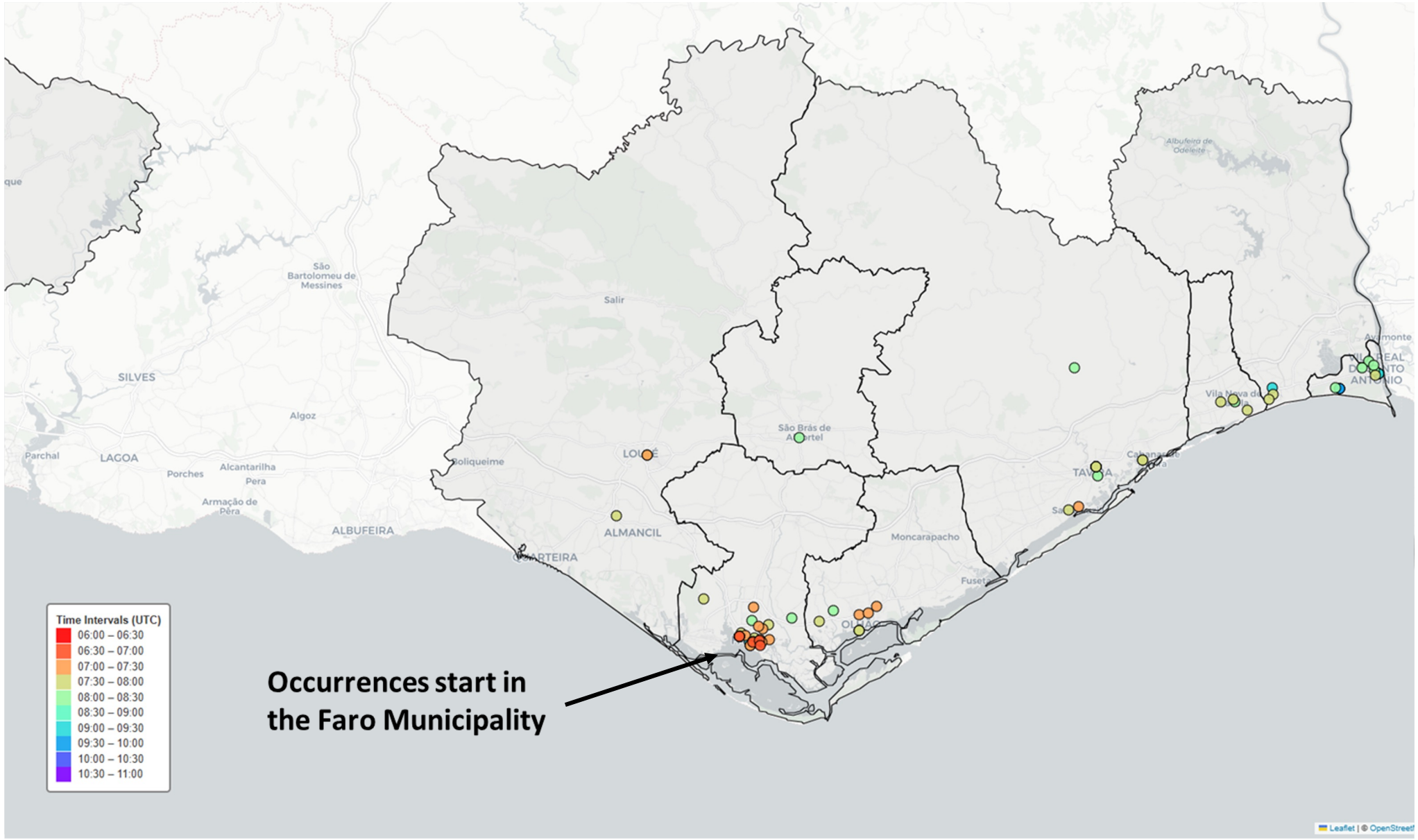
Observations



Data Sources:
IPMA, AEMET and partners (e.g. CCDR)

Co-funded by the European Union

Flooding of structures or surface due to heavy precipitation



Co-funded by the European Union

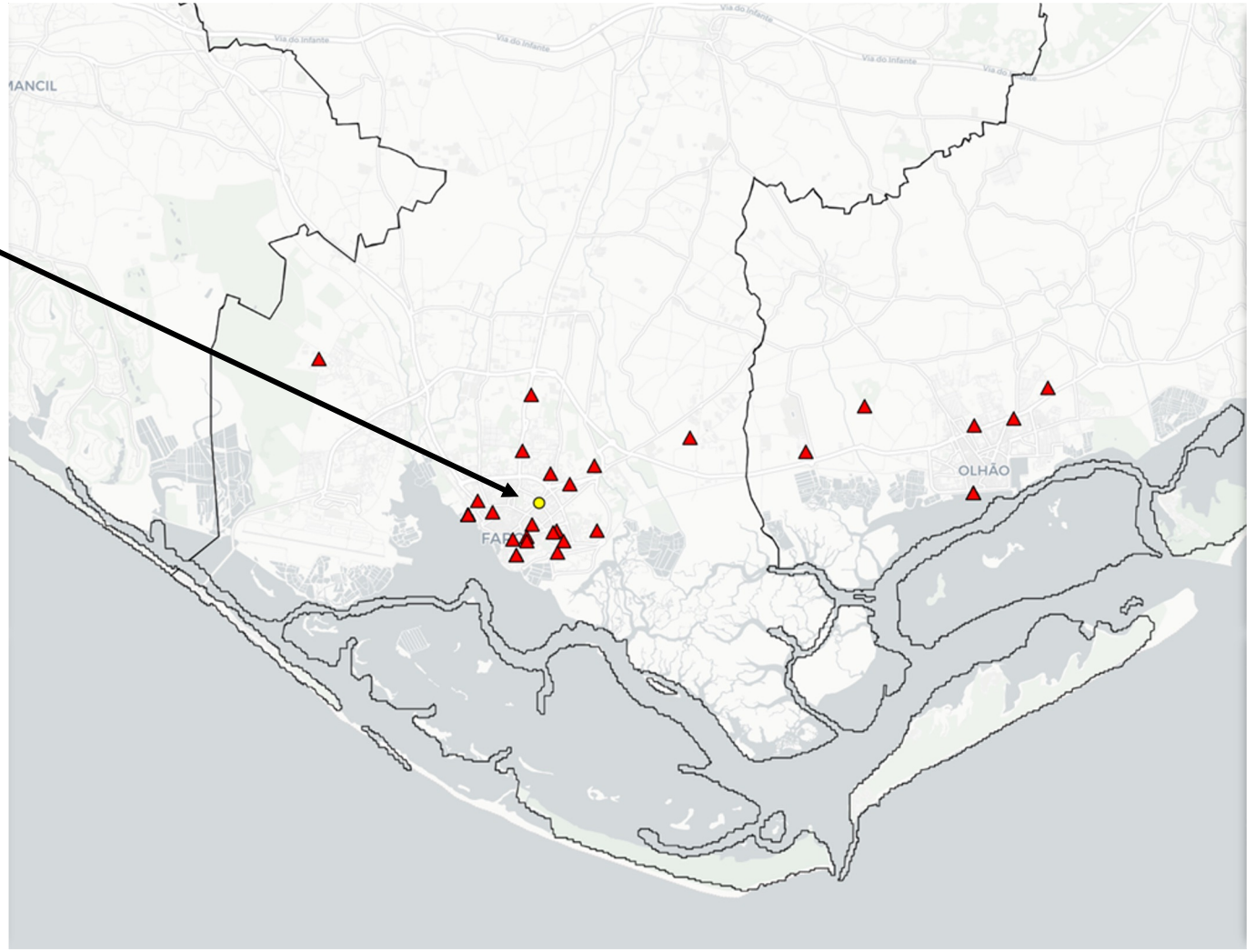
***On the News**: "Heavy rain hits **Faro** leaving streets flooded, roads waterlogged and cars almost fully submerged."*

Source: *"Chuva intensa chega a Faro e deixa ruas inundadas, estradas alagadas e carros praticamente submersos", Correio da Manhã, 29 October 2025.*

Co-funded by the European Union

***On the News**: "Heavy rain hits Faro leaving streets flooded, roads waterlogged and cars almost fully submerged."*

Photos taken in this area



Source: *"Chuva intensa chega a Faro e deixa ruas inundadas, estradas alagadas e carros praticamente submersos", Correio da Manhã, 29 October 2025.*

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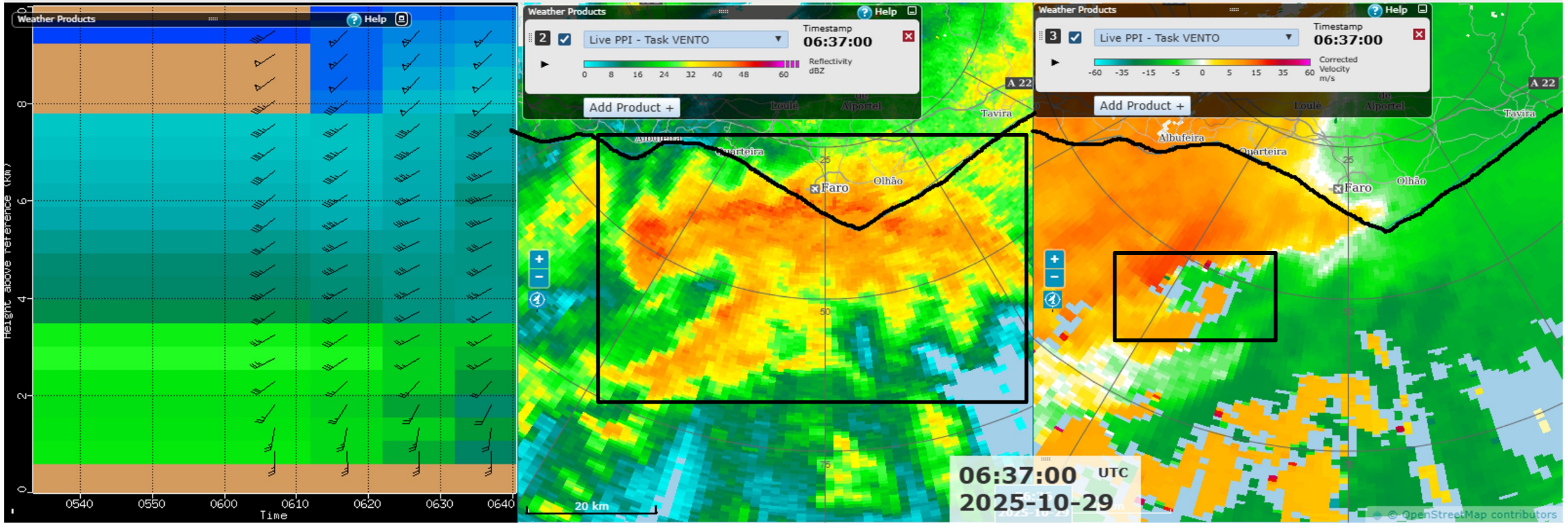
MESOVORTEX at 06:36 UTC

“shallow structure” and some wind shear

Precipitation bands
related to the Mesovortex

Mesovortex **rotation** couplet
identified on radar doppler wind

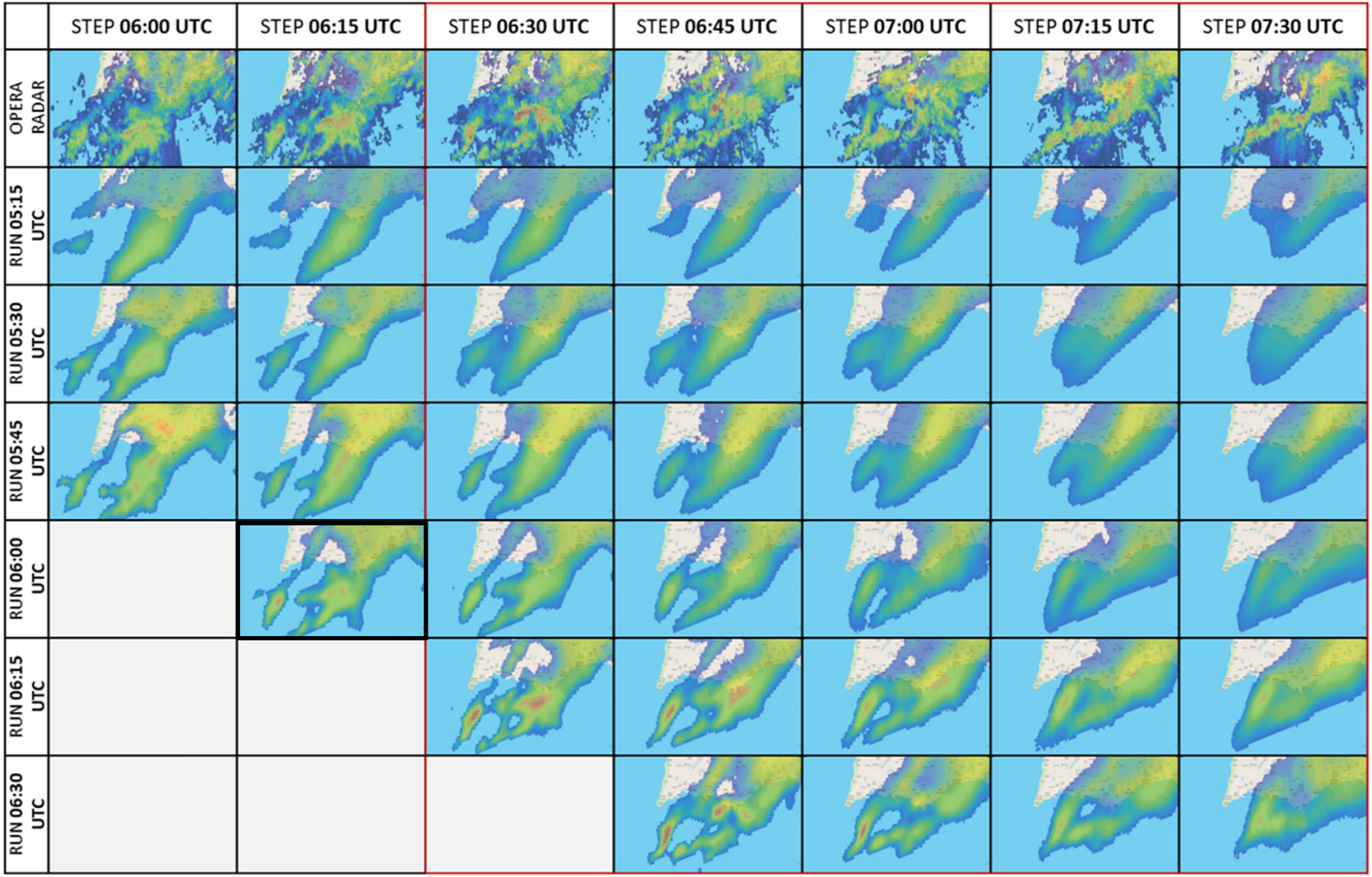


Co-funded by
the European Union

INLINE – SimVP Precipitation

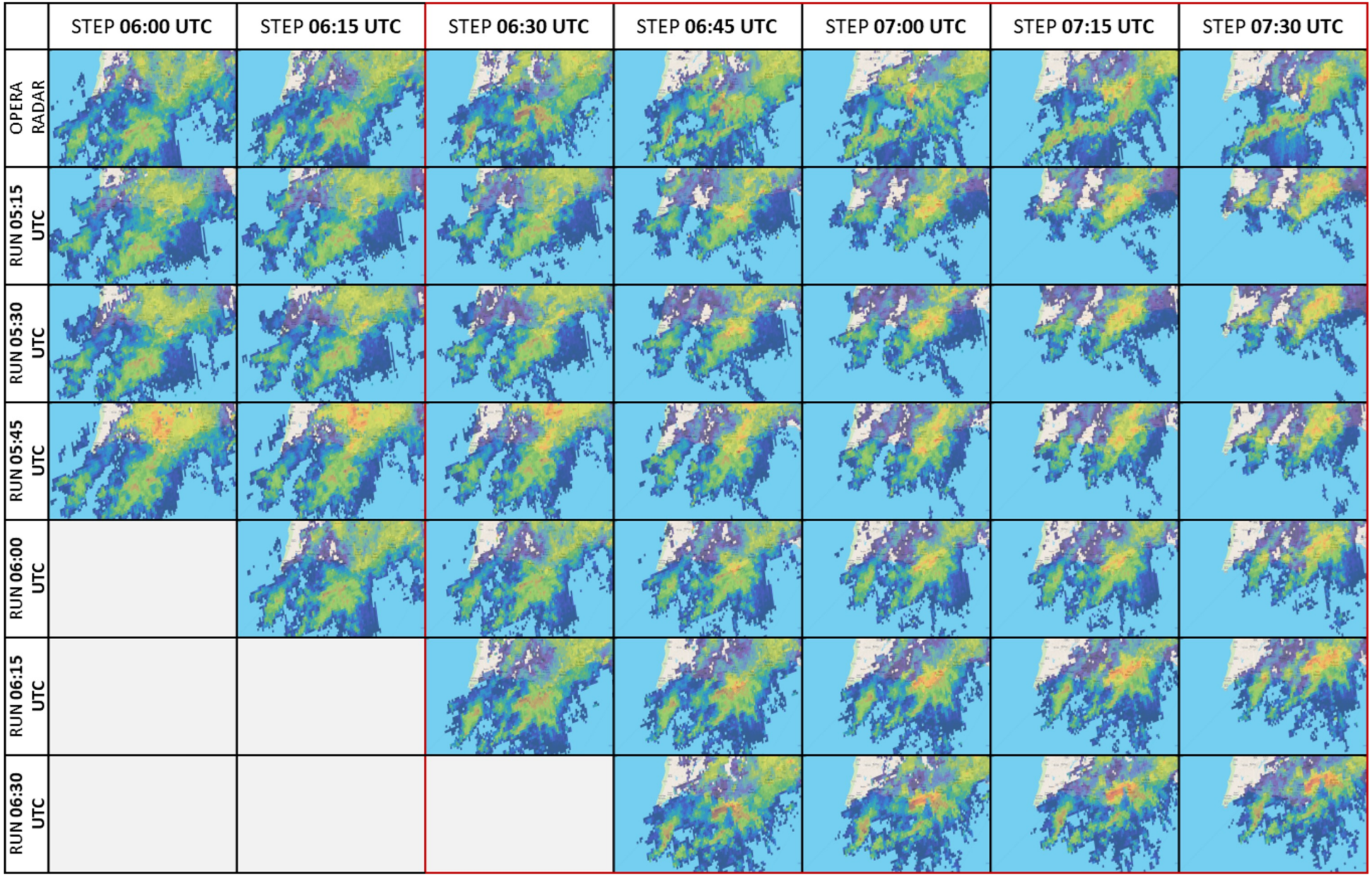
Persistent precipitation predicted for Faro

Mesovortex rainfall pattern first detected



Co-funded by the European Union

INLINE – SBMcast Precipitation (Extrapolation)



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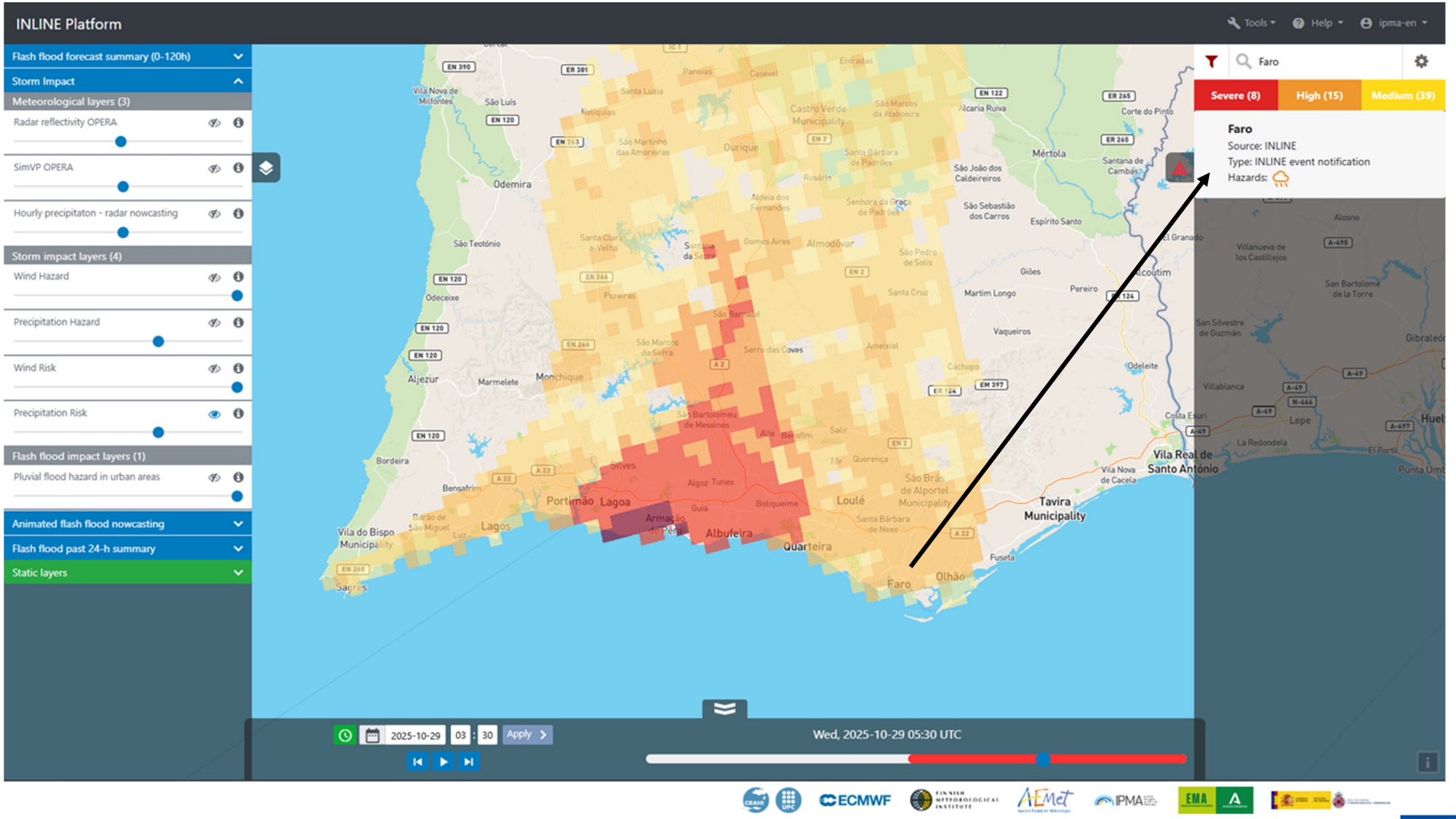
INLINE – Storm Impact Notifications

15-min update

highest risk in the next 3h



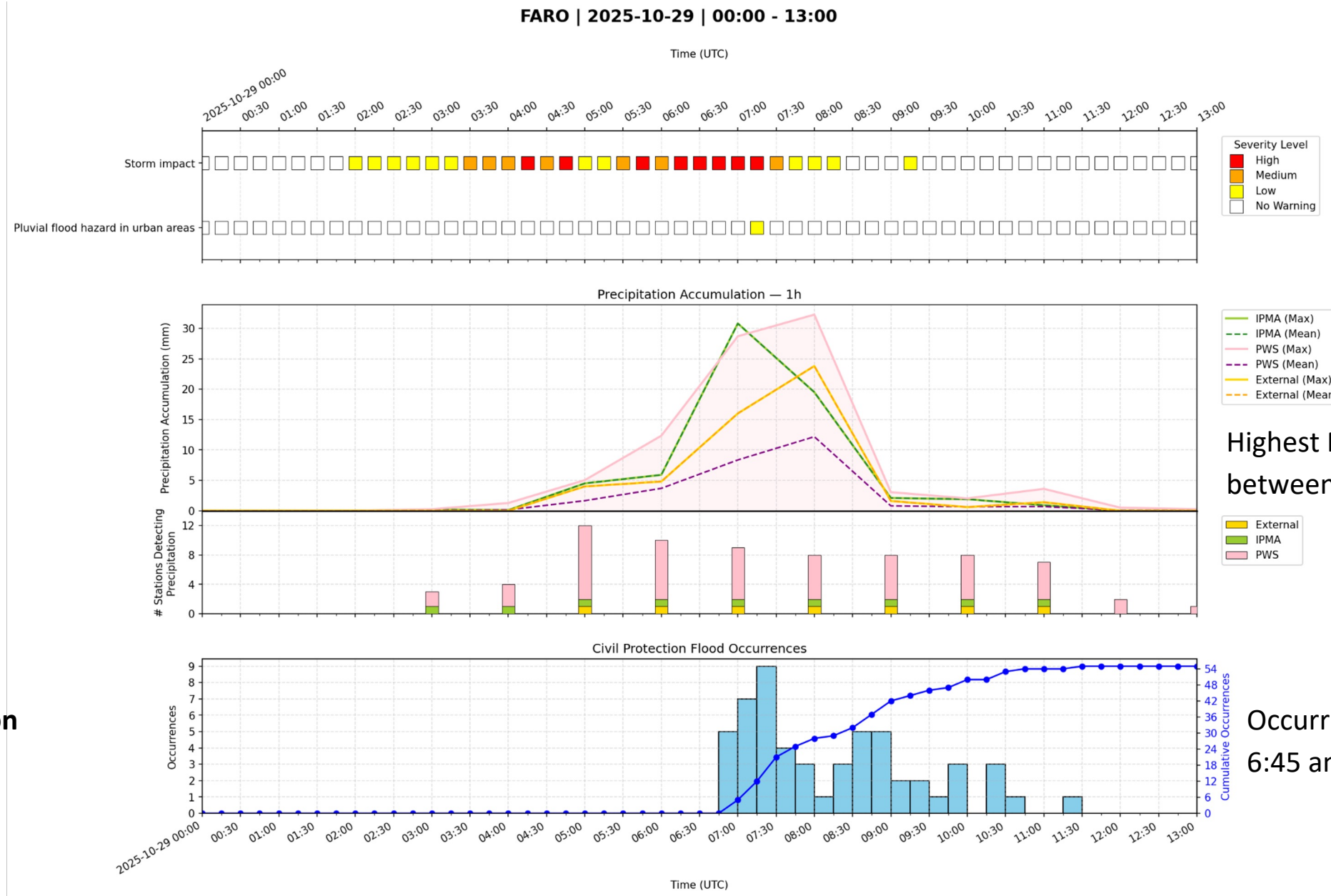
Co-funded by the European Union

INLINE – Event timeline for Faro Municipality

INLINE
Notifications

AWS
Precipitation

Civil Protection
Occurrences



Highest Precipitation between 6:00 and 8:00 UTC

Occurrences start between 6:45 and 7:00 UTC

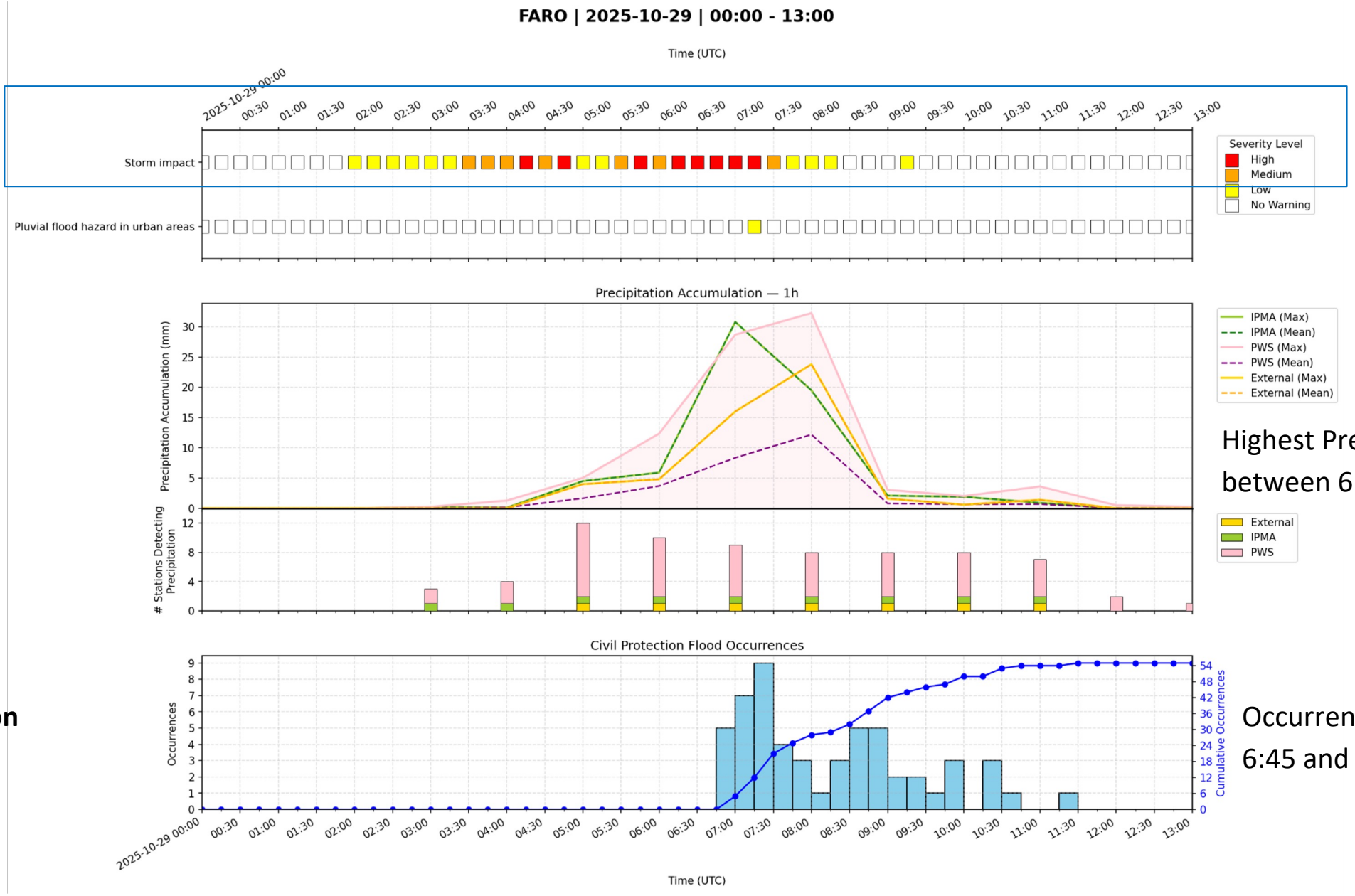
Co-funded by the European Union

INLINE – Event timeline for Faro Municipality

INLINE
Notifications

AWS
Precipitation

Civil Protection
Occurrences



Highest Precipitation between 6:00 and 8:00 UTC

Occurrences start between 6:45 and 7:00 UTC

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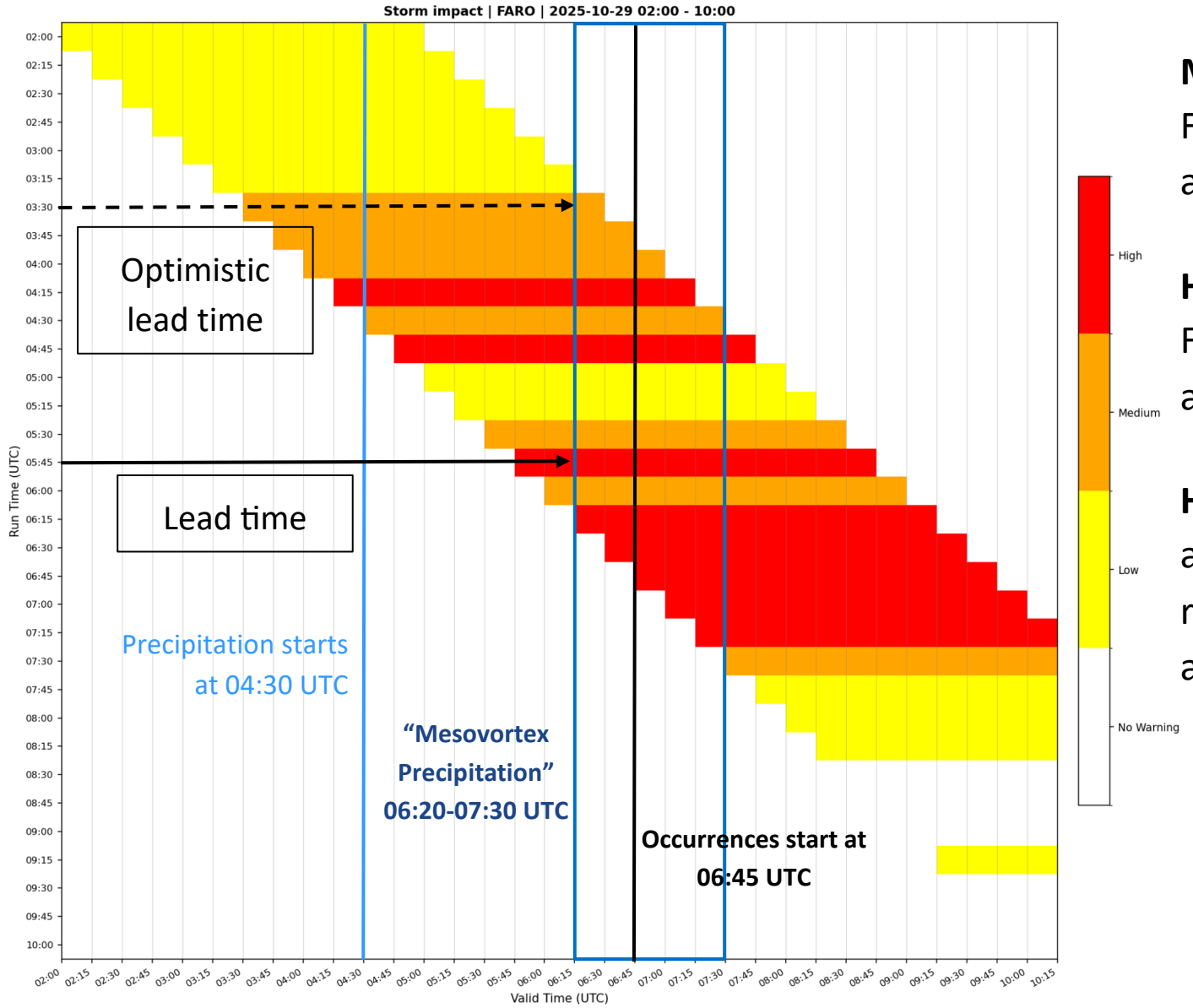
INLINE – Storm Notification timeline for Faro Municipality



Model Update Time

Forecast period

Medium Storm impact
First notification
at **03:30 UTC**

High Storm impact
First notification
at **04:15 UTC**

High Storm Impact
after pre-mesovortex reflectivity detected by radar
at **05:30/05:45 UTC**

… 1 hour ahead of the start of occurrences
at **06:45 UTC**

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Summary

- The most likely scenario predicted by meteorological models was that the storm would enter the Iberian Peninsula through Portugal's Alentejo region but it ultimately came in from the sea, south of Cape St. Vincent.
- It was a low predictability event.
- This highlights the usefulness of nowcasting (short-term prediction: 0-6h lead time) and the advantage of the INLINE platform.
- In the case of Faro: 1 hour ahead of the start of occurrences at 06:45 UTC
- In the case of Seville: 1 hour ahead of the start of worst occurrences at 11:00 UTC.

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

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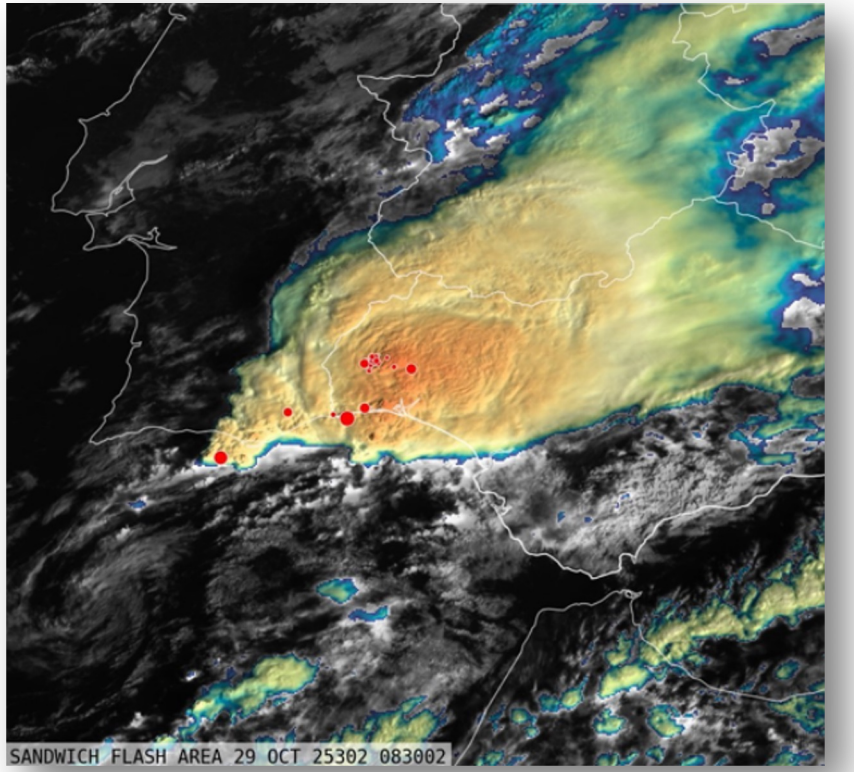

Thank you!