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

Co-funded by the European Union

EDERA products and tools: Demonstration on an event in Andalusia

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ECMWF
ILMATIETEEN LAITOS METEOROLOGISKA INSTITUTET FINNISH METEOROLOGICAL INSTITUTE
Junta de Andalucía
GOBIERNO DE ESPAÑA MINISTERIO DEL INTERIOR DIRECCIÓN GENERAL DE PROTECCIÓN CIVIL Y EMERGENCIAS
EMERGÊNCIA E PROTEÇÃO CIVIL AUTORIDADE NACIONAL

Introduction

The Olive Press

WATCH: TERROR IN SOUTHERN SPAIN'S JEREZ AS STREETS BECOME RIVERS AND CHILD IS ALMOST SWEPT AWAY AMID LIFE-THREATENING RED ALERT FOR RAIN

BY LAURENCE DOLLIMORE

LA VOZ DE CÁDIZ Provincia

Vecinos achican agua en Jerez. // FRANCIS JIMÉNEZ

The Junta activates the EsAlert warning system for the municipalities of the province of Cádiz.

Contacto Mapa web

Junta de Andalucía

BUSCAR MENÚ

Noticias >

Emergencias 112

TEMPORAL

La Junta activa el sistema de avisos 'EsAlert' para los municipios de la campiña gaditana

Los móviles localizados en ese área han recibido un mensaje informado del avisc rojo por lluvias e instando a extremar la precaución y evitar desplazamientos

30/10/2024

La Consejería de la Presidencia, Interior, Diálogo Social y Simplificación Administrativa ha activado esta tarde, entre las 16.23 y las 18.23 horas, el sistema de envío de avisos masivos 'EsAlert', más conocido como 112 inverso, **a los once municipios gaditanos afectados por el aviso rojo por precipitaciones**

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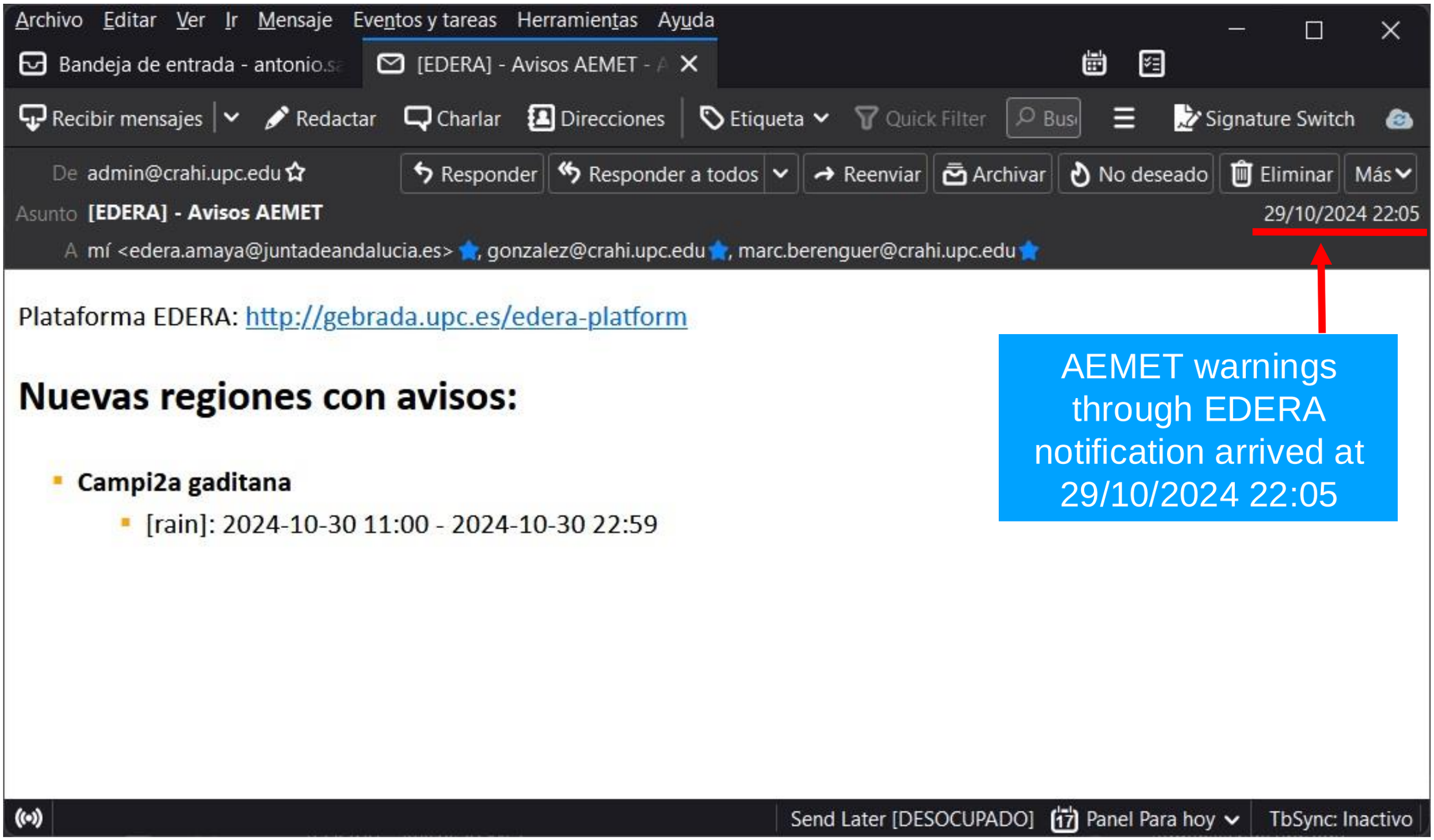
Notification by email: official warnings



AEMET warnings through EDERA notification arrived at 29/10/2024 22:05

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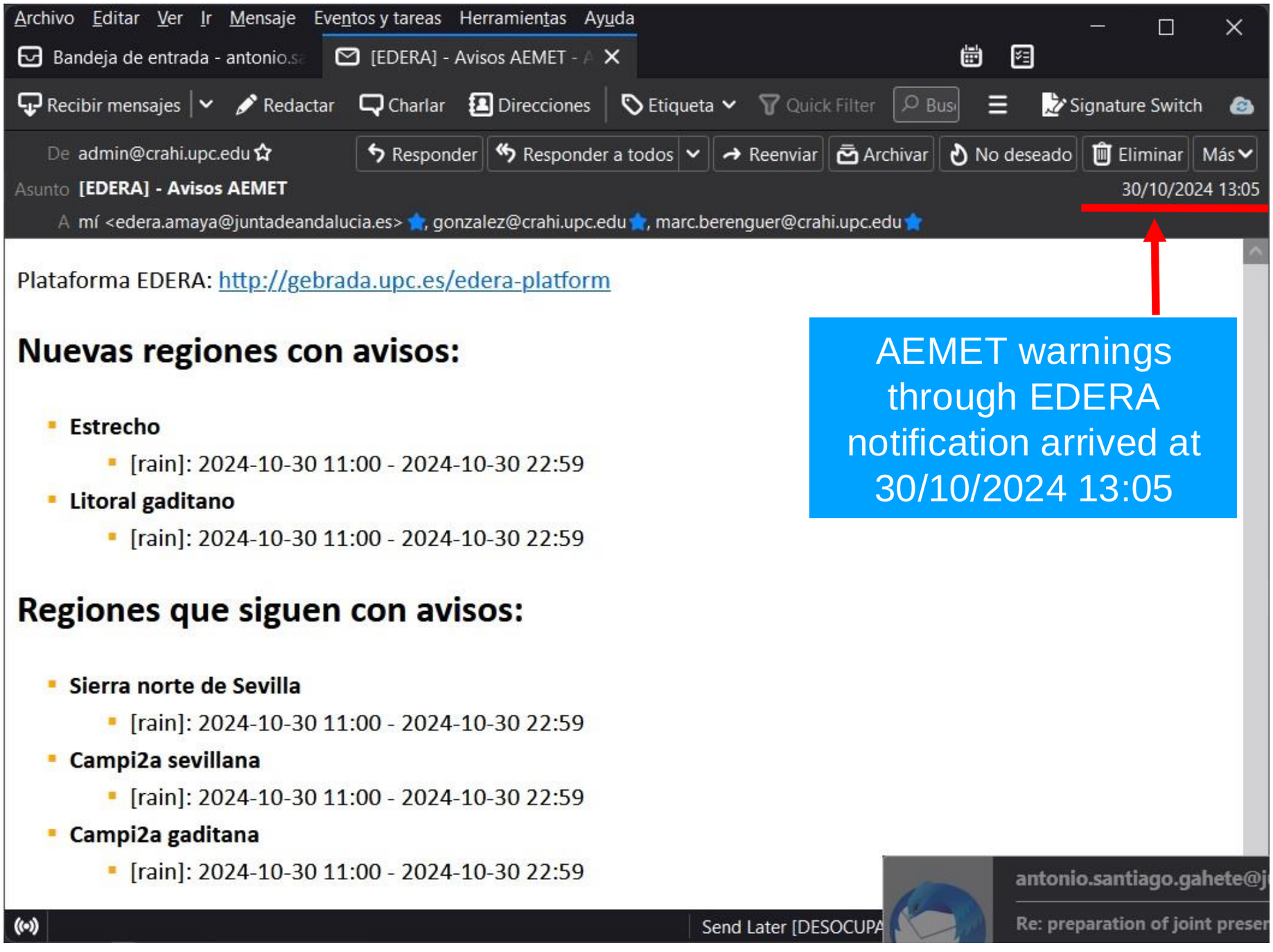
Notification by email: official warnings



AEMET warnings through EDERA notification arrived at 30/10/2024 13:05

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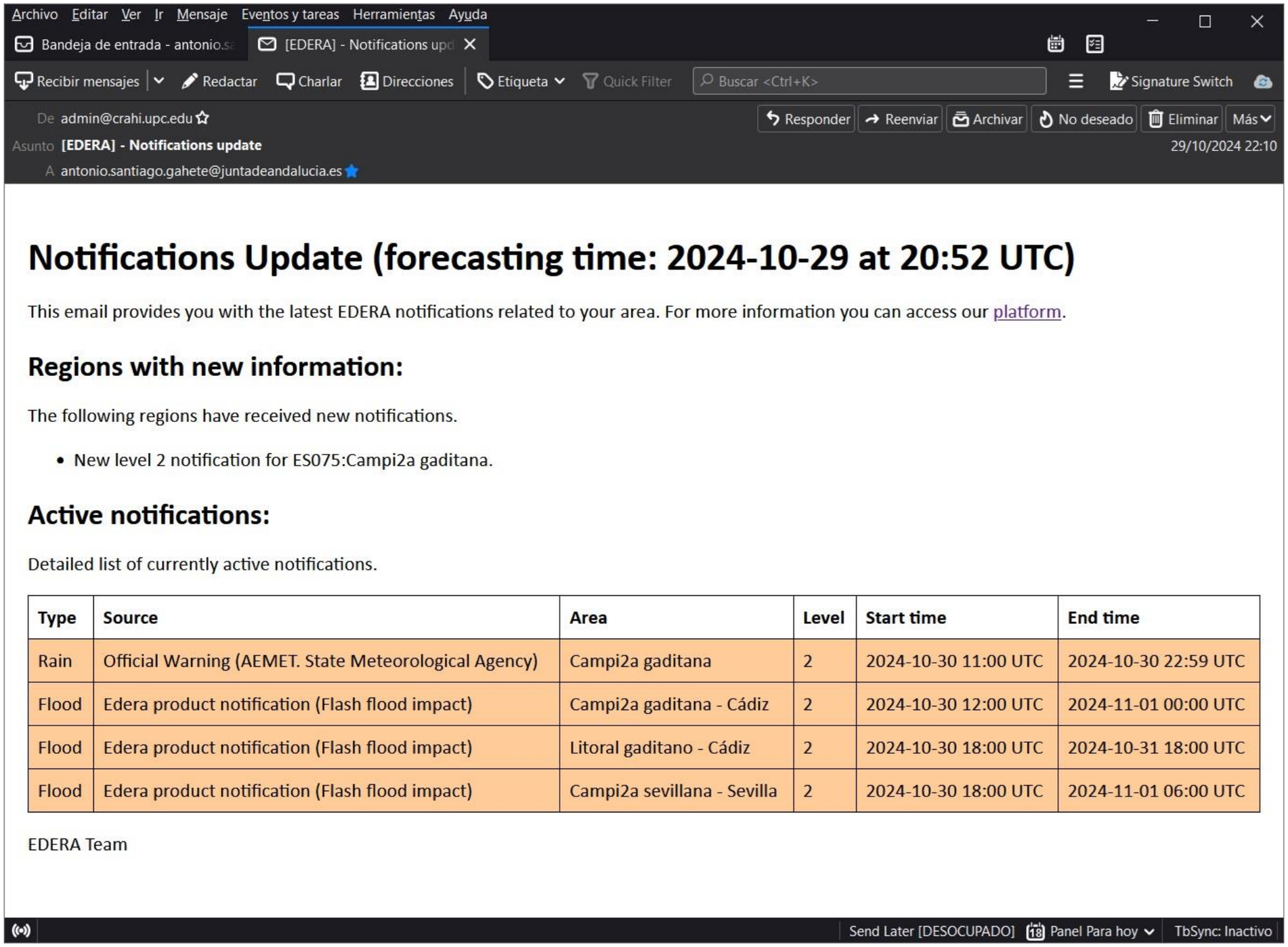
Notification by email: Warnings+notifications



Archivo Editar Ver Ir Mensaje Eventos y tareas Herramientas Ayuda

Bandeja de entrada - antonio.s [EDERA] - Notifications upd

Recibir mensajes | Redactar | Charlar | Direcciones | Etiqueta | Quick Filter | Buscar <Ctrl+K> | Signature Switch

De admin@crahi.upc.edu

Asunto **[EDERA] - Notifications update**

A antonio.santiago.gahete@juntadeandalucia.es

Responder | Reenviar | Archivar | No deseado | Eliminar | Más

29/10/2024 22:10

Notifications Update (forecasting time: 2024-10-29 at 20:52 UTC)

This email provides you with the latest EDERA notifications related to your area. For more information you can access our platform.

Regions with new information:

The following regions have received new notifications.

- New level 2 notification for ES075:Campi2a gaditana.

Active notifications:

Detailed list of currently active notifications.

Type	Source	Area	Level	Start time	End time
Rain	Official Warning (AEMET. State Meteorological Agency)	Campi2a gaditana	2	2024-10-30 11:00 UTC	2024-10-30 22:59 UTC
Flood	Edera product notification (Flash flood impact)	Campi2a gaditana - Cádiz	2	2024-10-30 12:00 UTC	2024-11-01 00:00 UTC
Flood	Edera product notification (Flash flood impact)	Litoral gaditano - Cádiz	2	2024-10-30 18:00 UTC	2024-10-31 18:00 UTC
Flood	Edera product notification (Flash flood impact)	Campi2a sevillana - Sevilla	2	2024-10-30 18:00 UTC	2024-11-01 06:00 UTC

EDERA Team

Send Later [DESOCUPADO] | Panel Para hoy | TbSync: Inactivo

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Notification by email: Warnings+notifications

Archivo Editar Ver Ir Mensaje Eventos y tareas Herramientas Ayuda

Bandeja de entrada - antonio.s | [EDERA] - Notifications upd

Recibir mensajes | Redactar | Charlar | Direcciones | Etiqueta | Quick Filter | Buscar <Ctrl+K> | Signature Switch

De admin@crahi.upc.edu

Asunto **[EDERA] - Notifications update**

A antonio.santiago.gahete@juntadeandalucia.es

Responder | Reenviar | Archivar | No deseado | Eliminar | Más

30/10/2024 7:59

Notifications Update (forecasting time: 2024-10-30 at 06:00 UTC)

This email provides you with the latest EDERA notifications related to your area. For more information you can access our platform.

Regions with new information:

The following regions have received new notifications.

- New level 3 notification for Cádiz.
- New level 2 notification for Granada.
- New level 3 notification for Málaga.

Regions with updated information:

Followings regions have been notified of a raise in the warning level.

- Increased level for Impact notification at Huelva to level 3.

Active notifications:

Detailed list of currently active notifications.

Type	Source	Area	Level	Start time	End time
Flood	Edera product notification (Flash flood impact)	Aljarafe - Sevilla	3	2024-10-30 06:00 UTC	2024-10-30 13:00 UTC
Flood	Edera product notification (Flash flood impact)	Campiña de Jerez - Cádiz	3	2024-10-30 06:00 UTC	2024-10-30 13:00 UTC
Flood	Edera product notification (Flash flood impact)	Campo de Gibraltar - Cádiz	2	2024-10-30 06:00 UTC	2024-10-30 13:00 UTC
Flood	Edera product notification (Flash flood impact)	El Condado (Huelva) - Huelva	3	2024-10-30 06:00 UTC	2024-10-30 13:00 UTC
Flood	Edera product notification (Flash flood impact)	Huelva	3	2024-10-30 06:00 UTC	2024-10-30 13:00 UTC
Flood	Edera product notification (Flash flood impact)	Huéscar - Granada	2	2024-10-30 06:00 UTC	2024-10-30 07:00 UTC
Flood	Edera product notification (Flash flood impact)	Serranía de Ronda - Málaga	3	2024-10-30 06:00 UTC	2024-10-30 13:00 UTC
Flood	Edera product notification (Flash flood impact)	Sierra de Cádiz - Cádiz	3	2024-10-30 06:00 UTC	2024-10-30 13:00 UTC
Flood	Edera product notification (Flash flood impact)	Area Metropolitana de Sevilla - Sevilla	3	2024-10-30 07:00 UTC	2024-10-30 13:00 UTC
Flood	Edera product notification (Flash flood impact)	Costa Occidental - Huelva	2	2024-10-30 08:00 UTC	2024-10-30 13:00 UTC
Rain	Official Warning (AEMET. State Meteorological Agency)	Campi2a gaditana	2	2024-10-30 11:00 UTC	2024-10-30 22:59 UTC

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Send Later [DESOCUPADO] | Panel Para hoy | TbSync: Inactivo

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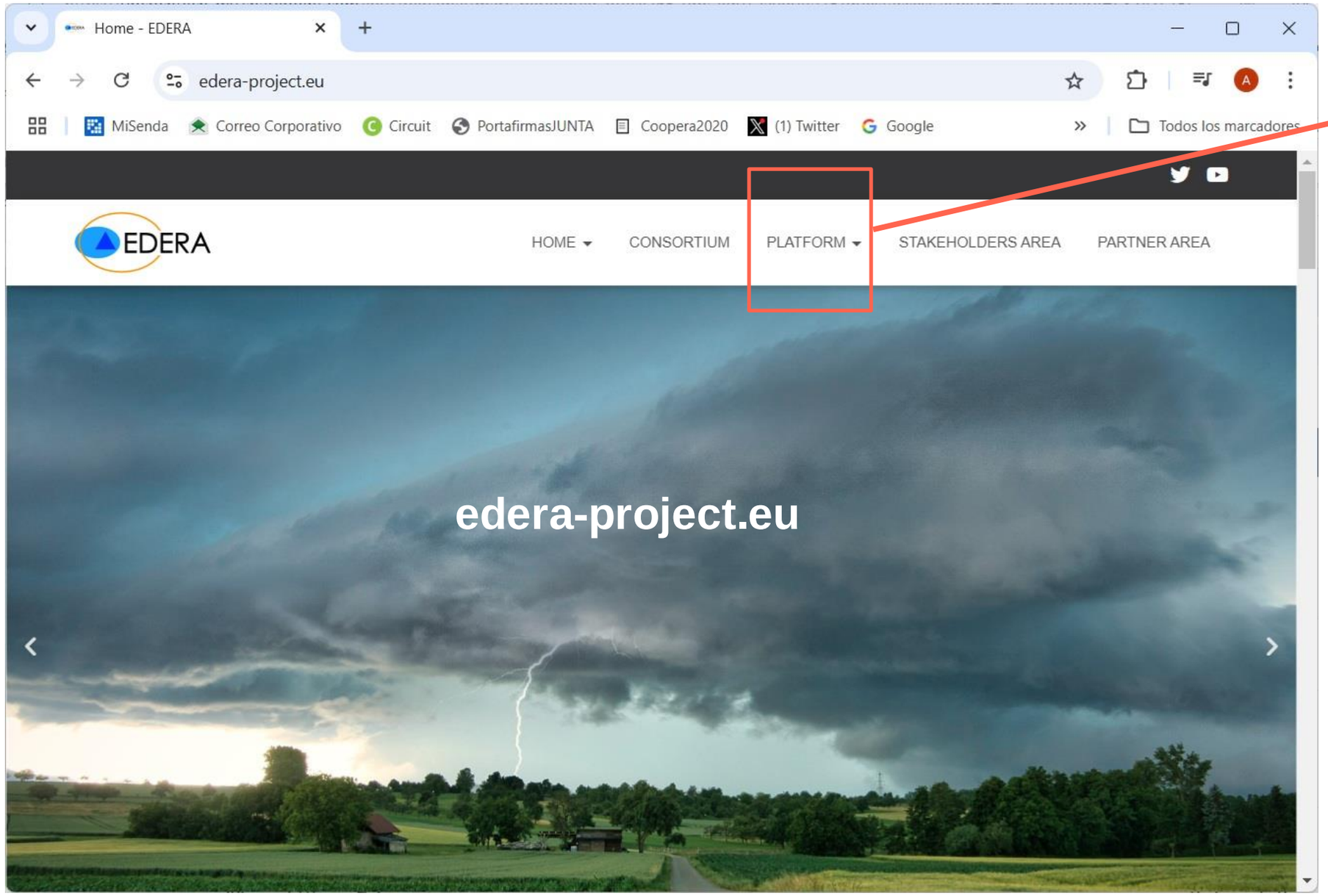
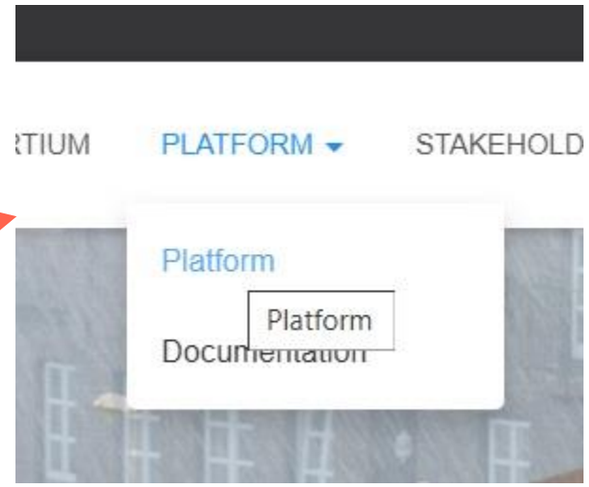
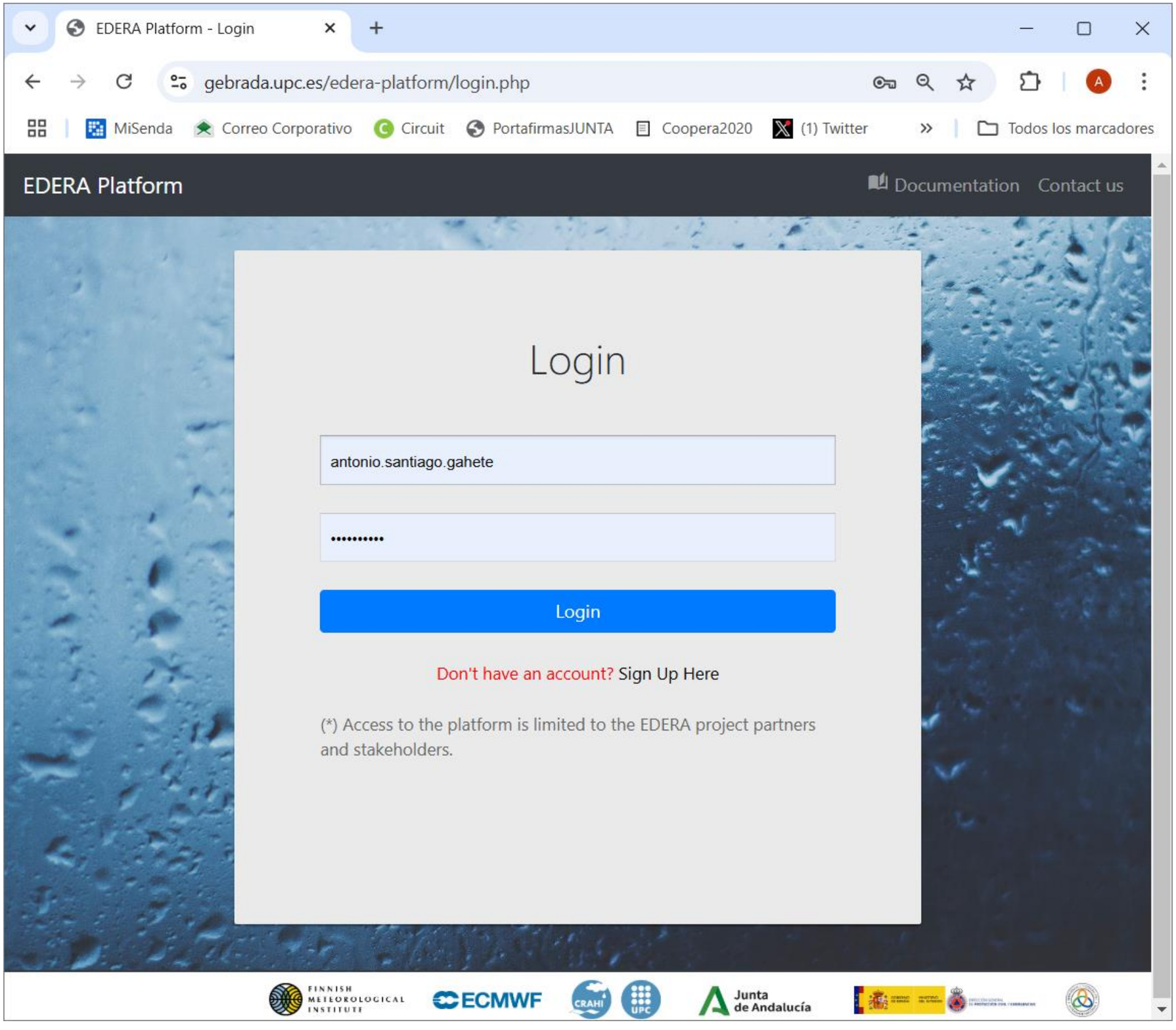
Accessing the platform and default display

How to access the platform and landing page (AS)





Accessing the platform and default display



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Accessing the platform and default display

EDERA Platform

http://gebrada.upc.es/edera-platform

Tools Help aristotle

Flash flood forecast summary (0-120h)

Official warnings (1)

Official warnings

Meteorological layers (1)

Seamless precipitation accumulation

Flash flood impact layers (1)

Flash flood impact over sub-catchment

Storm Impact

Animated flash flood nowcasting

Flash flood past 24-h summary

Static layers

Exposure (1)

Exposure

Product selector

2024-10-30 09:00 - 2024-10-30 15:00 UTC

Notifications

Date & time selector

2024-10-30 09 : 00 Apply

Forecasting time: Wed, 2024-10-30 09:00 UTC

Leadtime(h) 0-6h 6-24h 24-48h 48-120h

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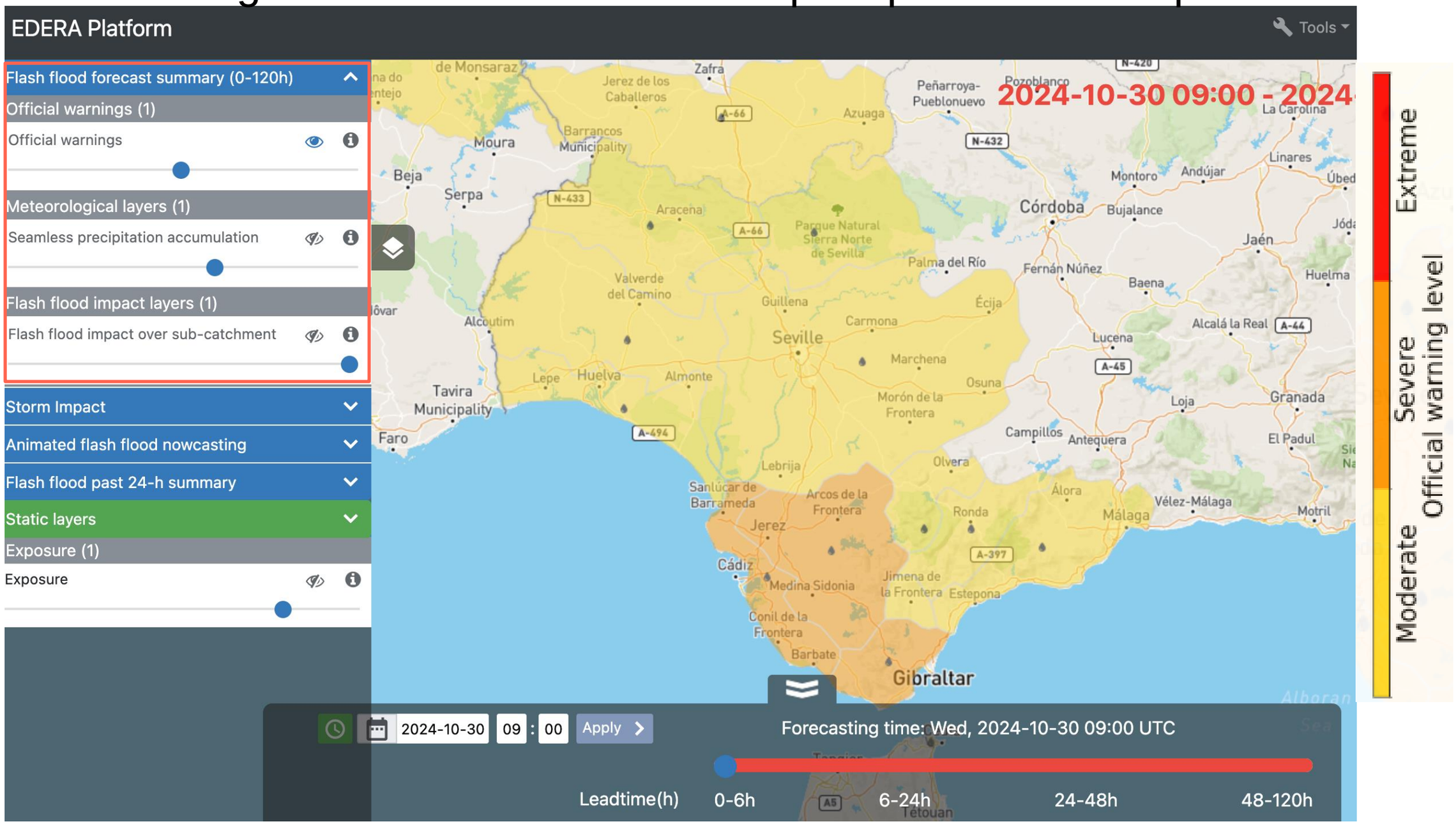
Default display – FF forecasting summary

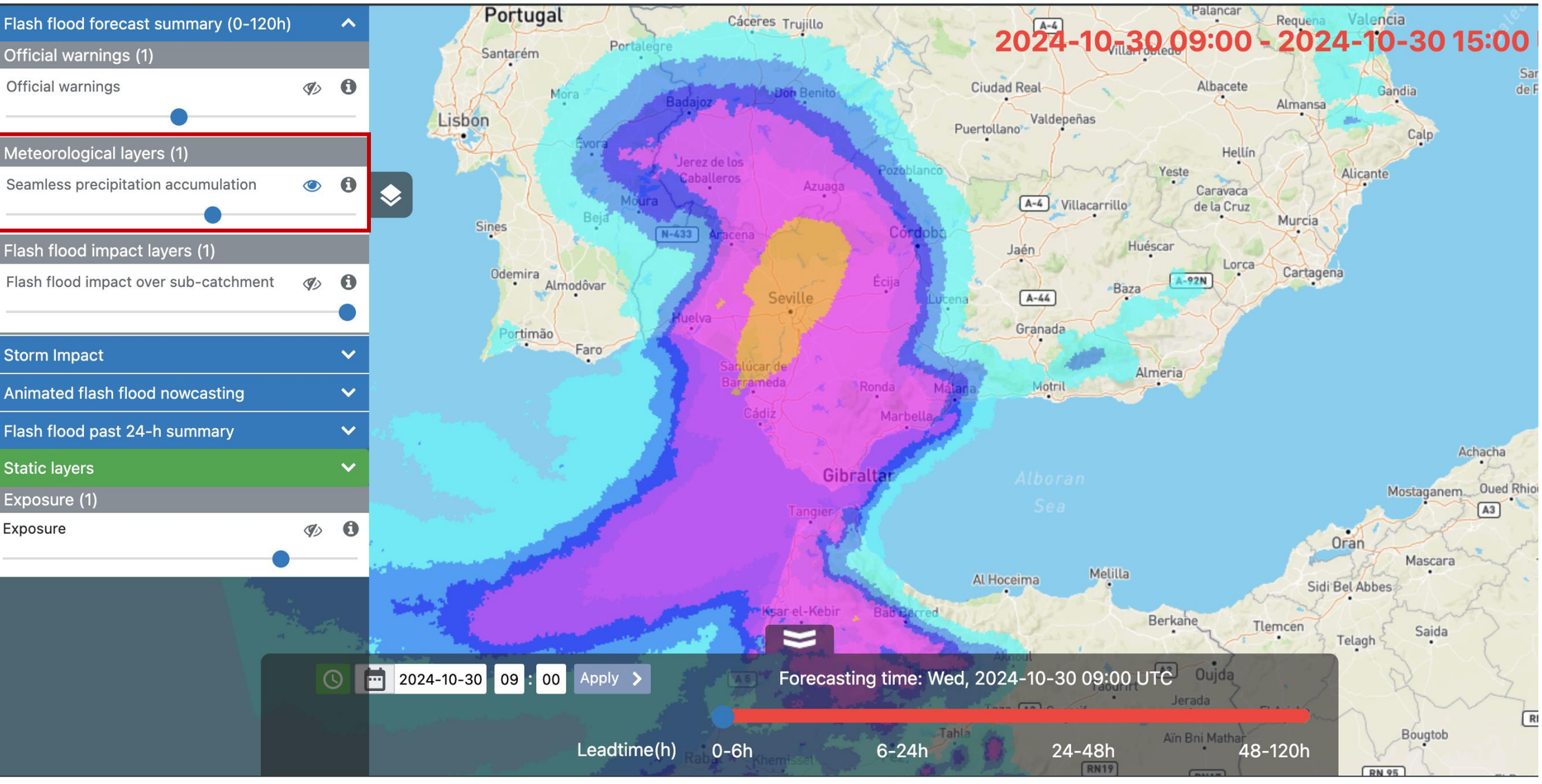
Official warnings+Seamless accumulated precipitation+FF impact in subasins



Default display – FF forecasting summary

Seamless precipitation accumulation

Shows the forecasted precipitation over next 0-6, 7-24, 25-48 & 49-120h



Select accumulation period

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Default display – FF forecasting summary

Methodology – Seamless precipitation accumulation

Blending of radar nowcasts of precipitation with medium-range NWP

Radar:

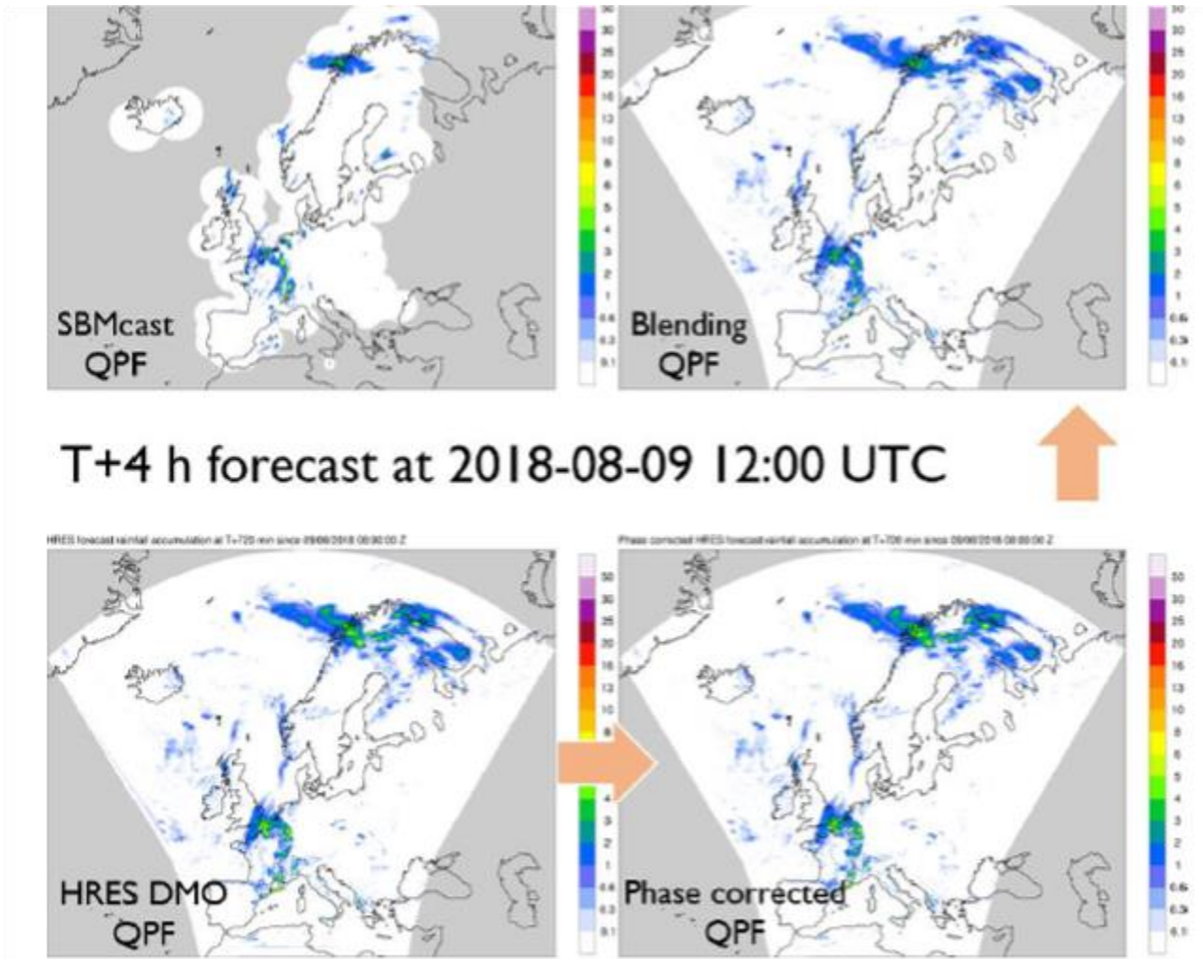
- 2 km pan-European OPERA network
- Updated hourly
- Nowcasts out to 5h ahead
- 20-member ensemble

NWP:

- ECMWF 51-member ensemble
- Updated 4x per day
- 9 km resolution
- 120 hour lead time (used in the project)

NWP is bias corrected and phase shifted to match radar

Lead time dependent weighting between radar and NWP over first 5 hours, only NWP afterwards



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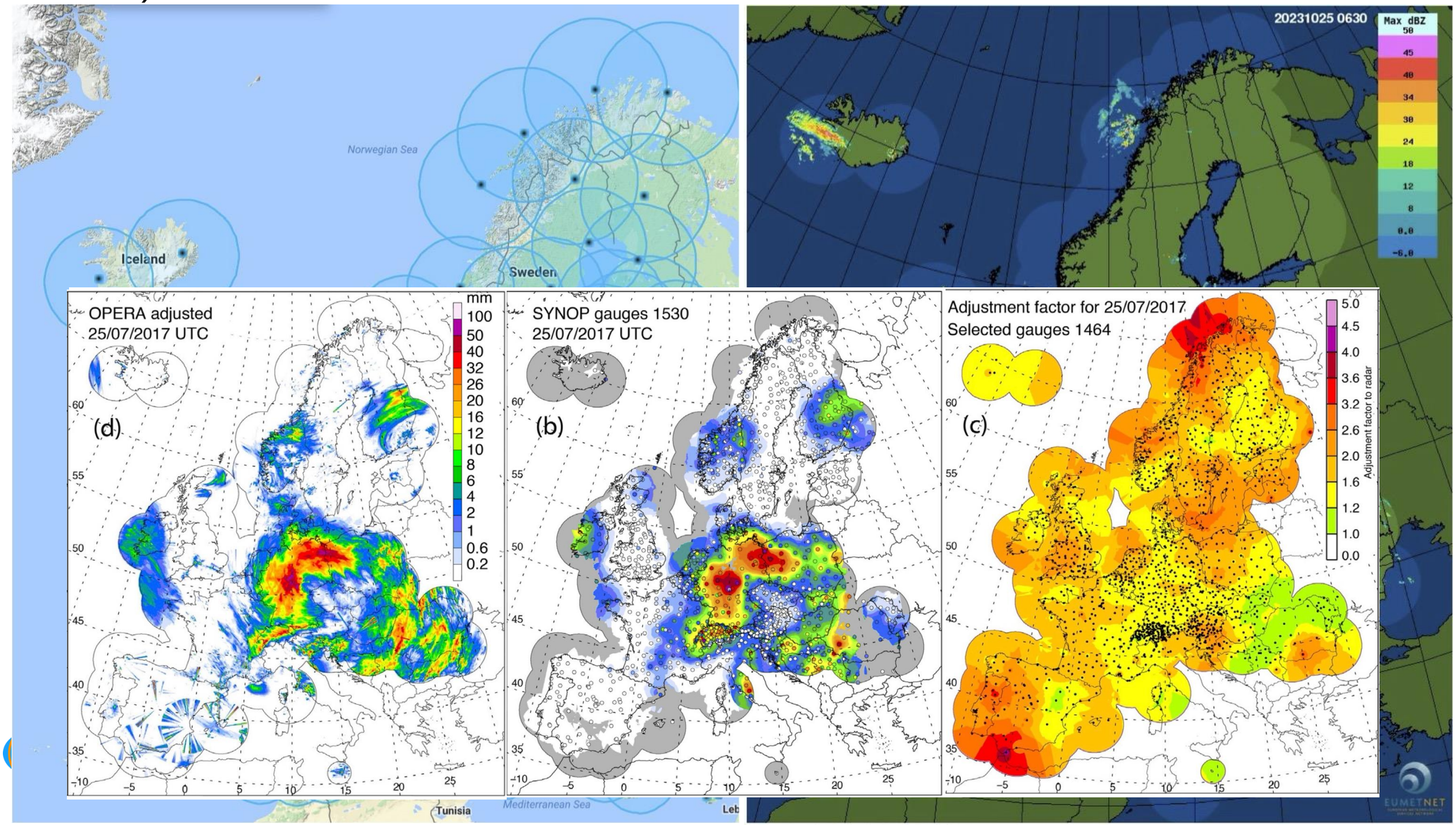
Default display – FF forecasting summary

Precipitation observations and nowcasts

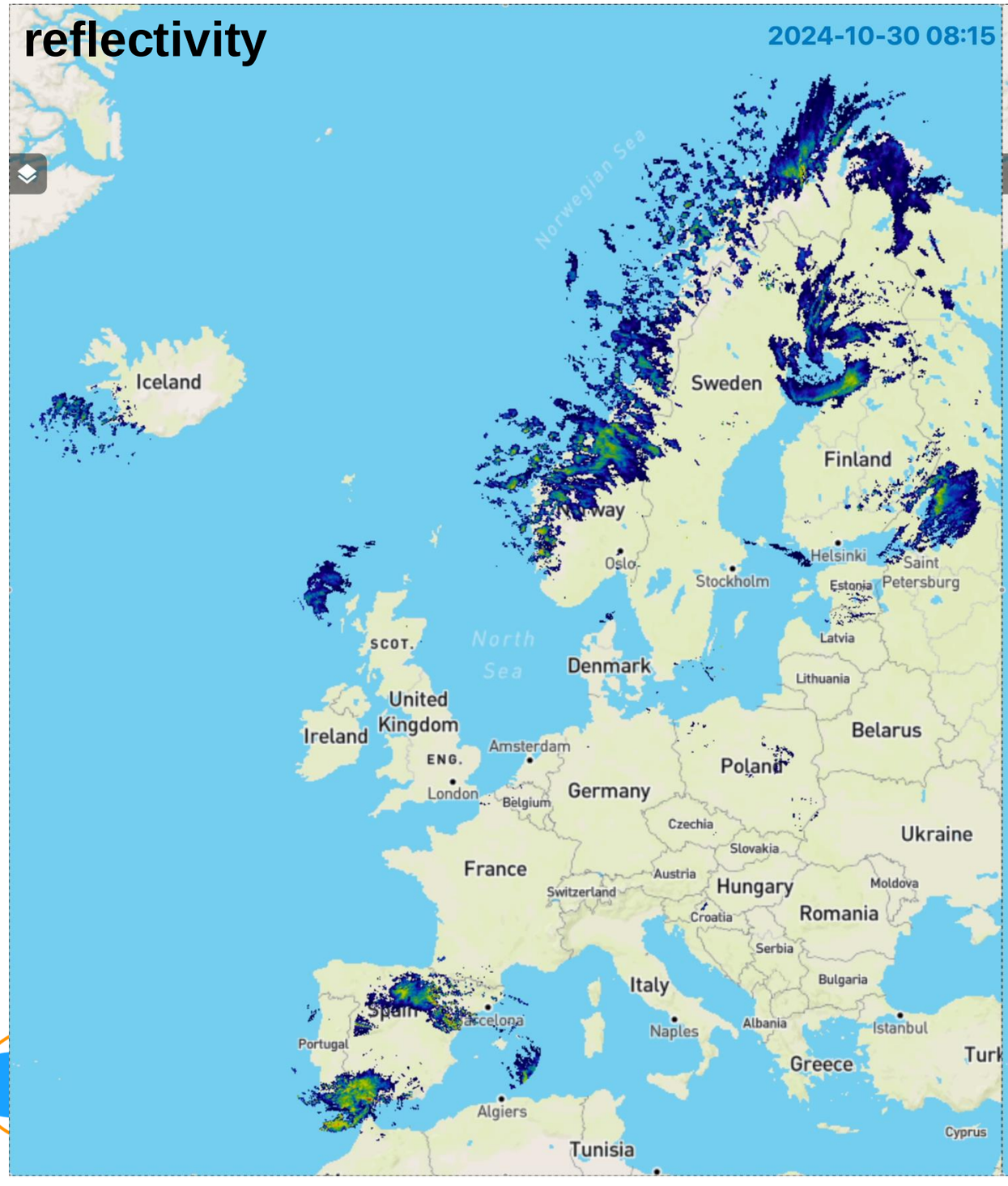
based on EUMETNET OPERA radar composites at the European scale (2 km and 15 minutes) since mid-2012

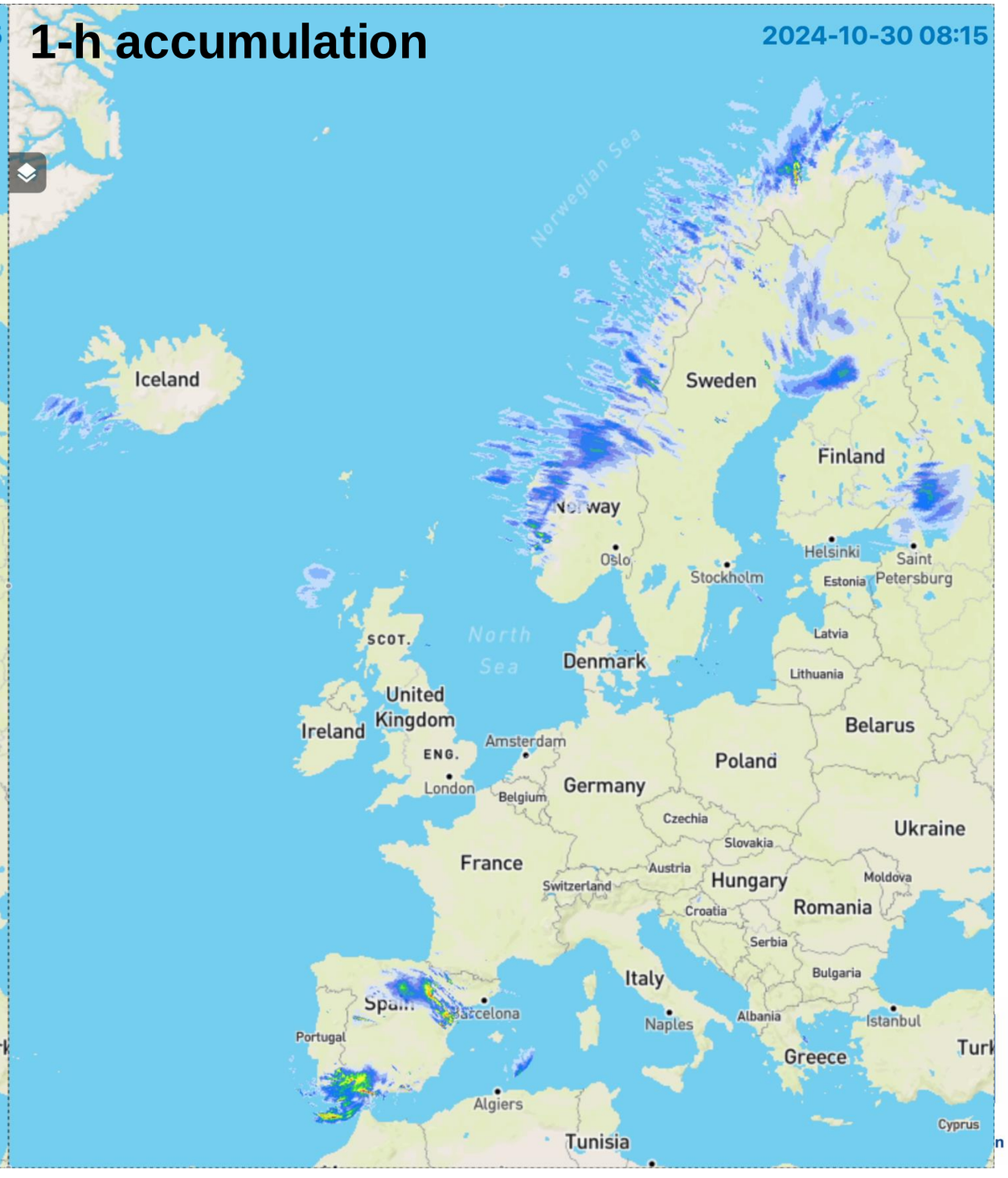


Default display – FF forecasting summary

Precipitation observations and nowcasts

from OPERA reflectivity to gauge-adjusted accumulations + nowcasting

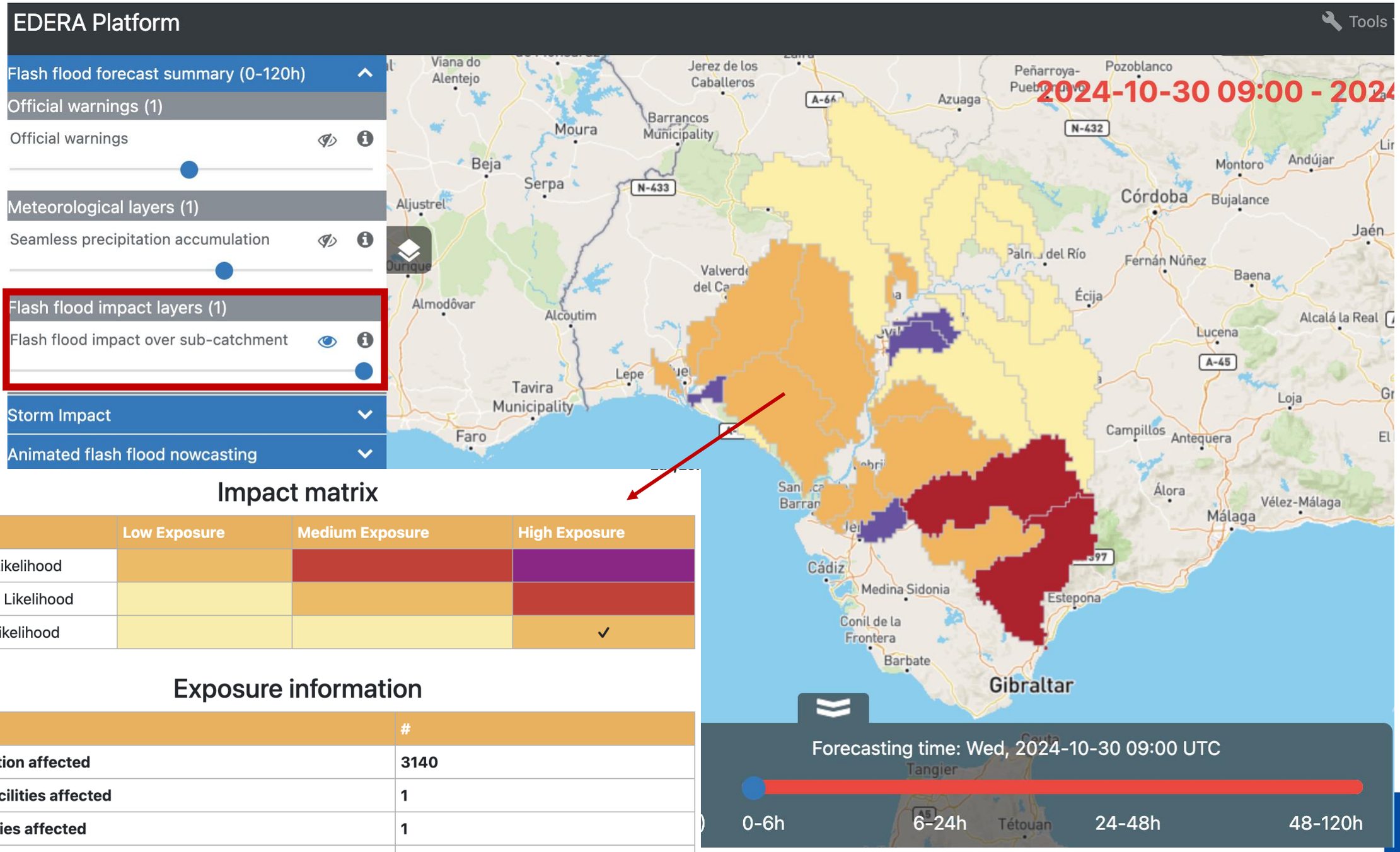




Default display – FF forecasting summary

Flash flood impact over sub-catchment

- Summarises the potential flash flood impacts over 0-6, 7-24, 25-48 and 49-120 hours in each sub-catchment



Impact matrix

	Low Exposure	Medium Exposure	High Exposure
High Likelihood			
Medium Likelihood			
Low Likelihood			✓

Exposure information

	#
Total population affected	**3140**
Education facilities affected	**1**
Health facilities affected	**1**
Energy generation facilities affected	
Time of the event peak	**2024/10/30 10:00:00**

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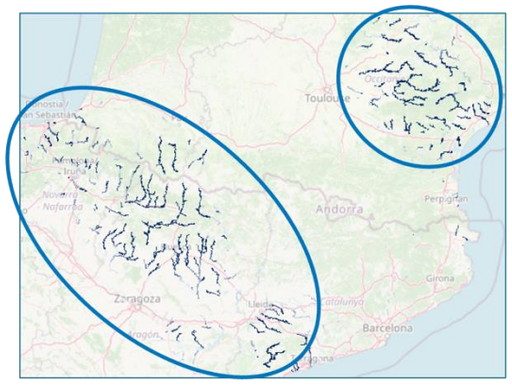
Default display – FF forecasting summary

Methodology – Flash flood impact over subcatchment

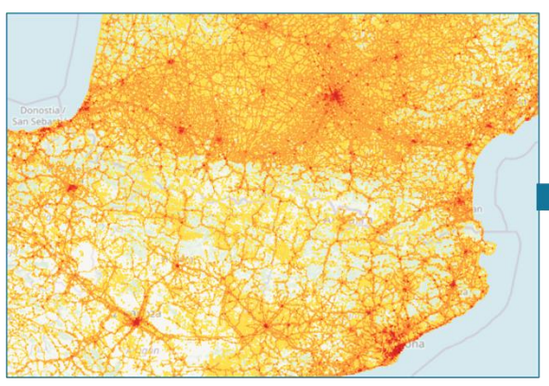
- Flash flood hazard computed used EPIC method (from EFAS):
- Precipitation is accumulated on the channel network, its return period is computed using historical data – repeat for all ensemble members and compute probability of exceeding 2 yr return period

- Combined exposure computed from combination of population and critical infrastructure data
- Flash flood impact computed on a matrix
- Summarise the resulting impact over sub-catchments – shaded according to 90th percentile

Flood hazard forecast

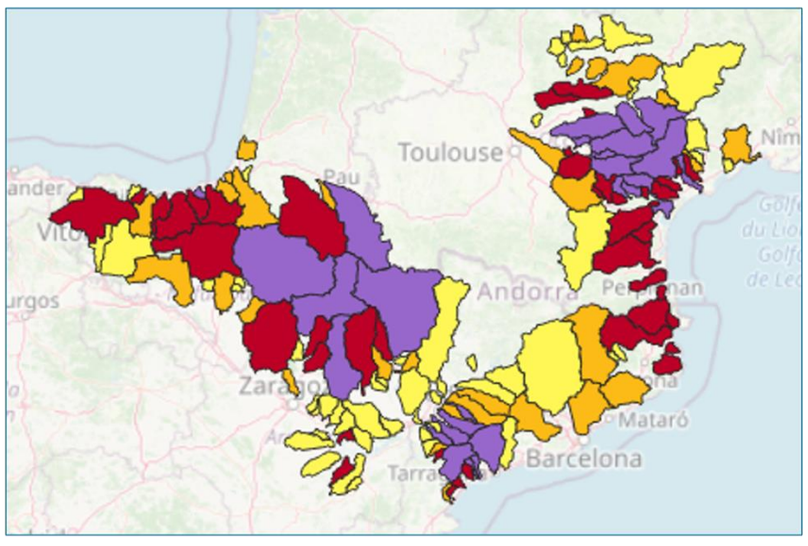


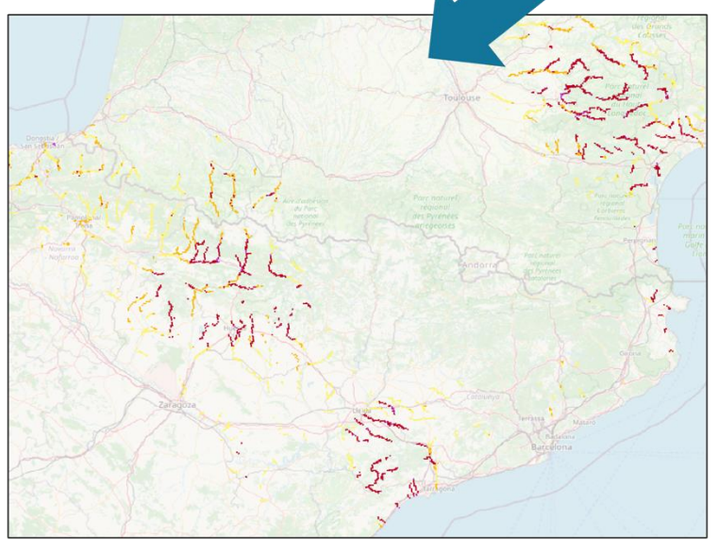
Combined exposure



Impact Matrix

Flood Hazard Probability	Combined Exposure: Low Exposure	Medium Exposure	High Exposure
High Likelihood			
Medium Likelihood			
Low Likelihood			





Flash Flood impact

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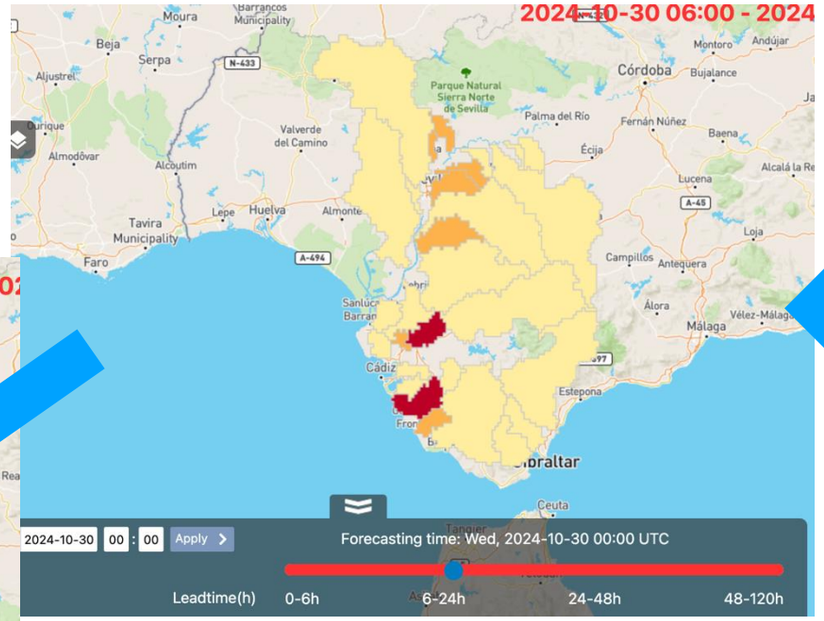
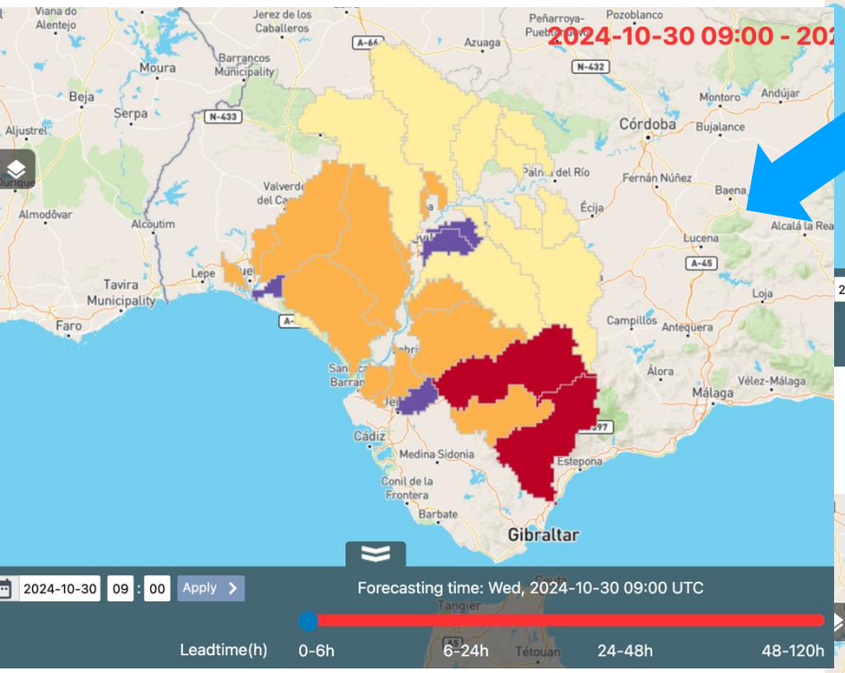
Default display – Forecasts a few days ahead

Description of the forecasts – what can be seen at the chosen time and what is the response to it?

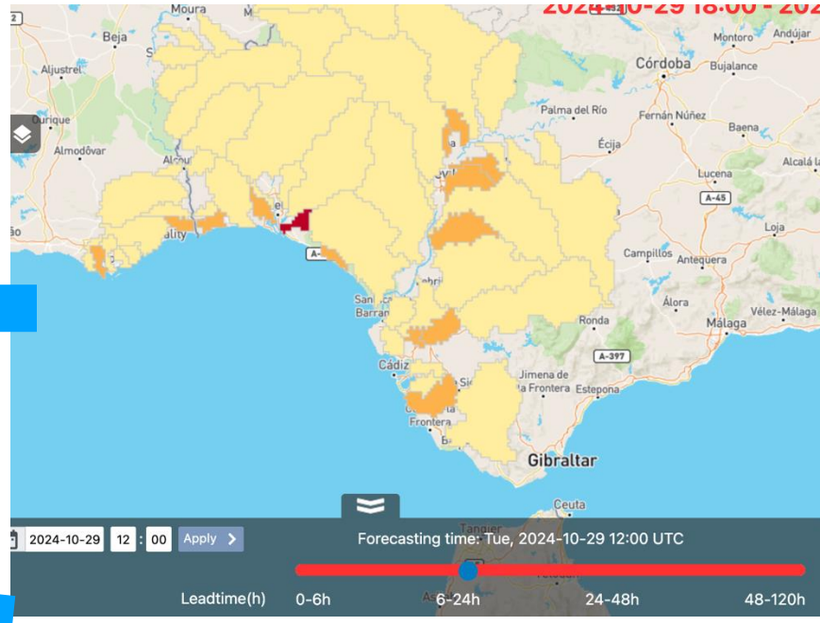
30th Oct 00:00 UTC



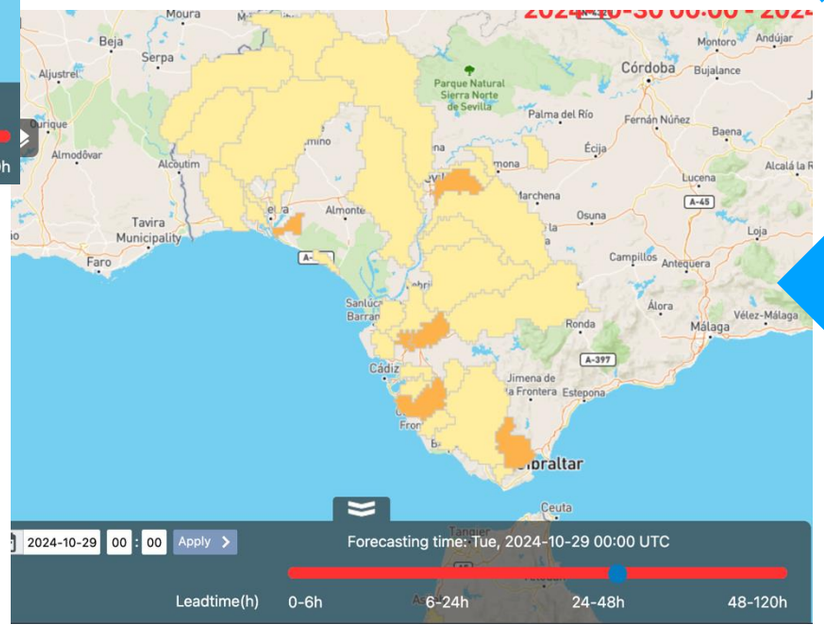
30th Oct 09:00 UTC



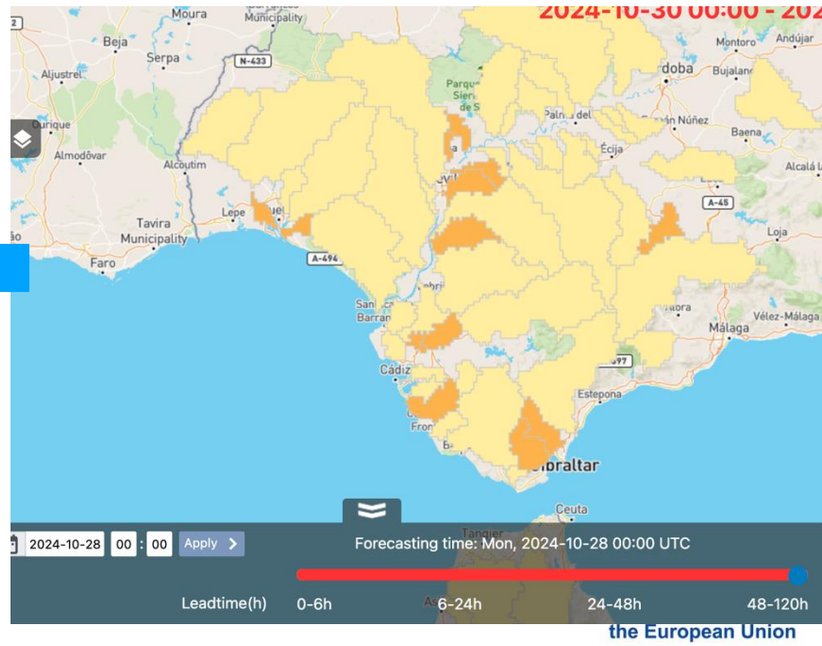
29th Oct 12:00 UTC



29th Oct 00:00 UTC



28th Oct 00:00 UTC



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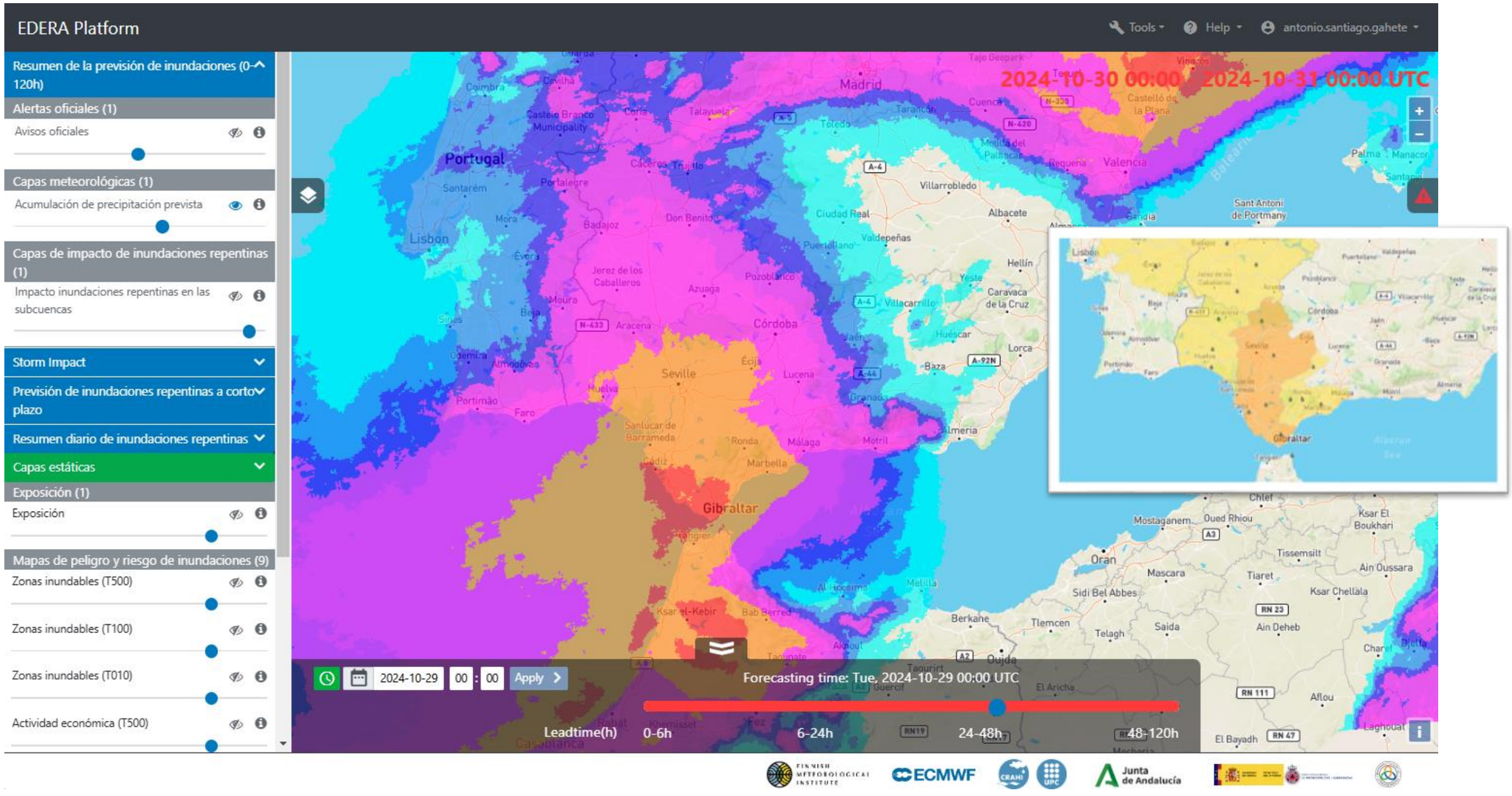
the European Union

Default display – Forecasts the day before

Description of the forecasts – what can be seen at the chosen time and what is the response to it? (AS)



Check personal protective equipment, tools and resources for on-call staff.

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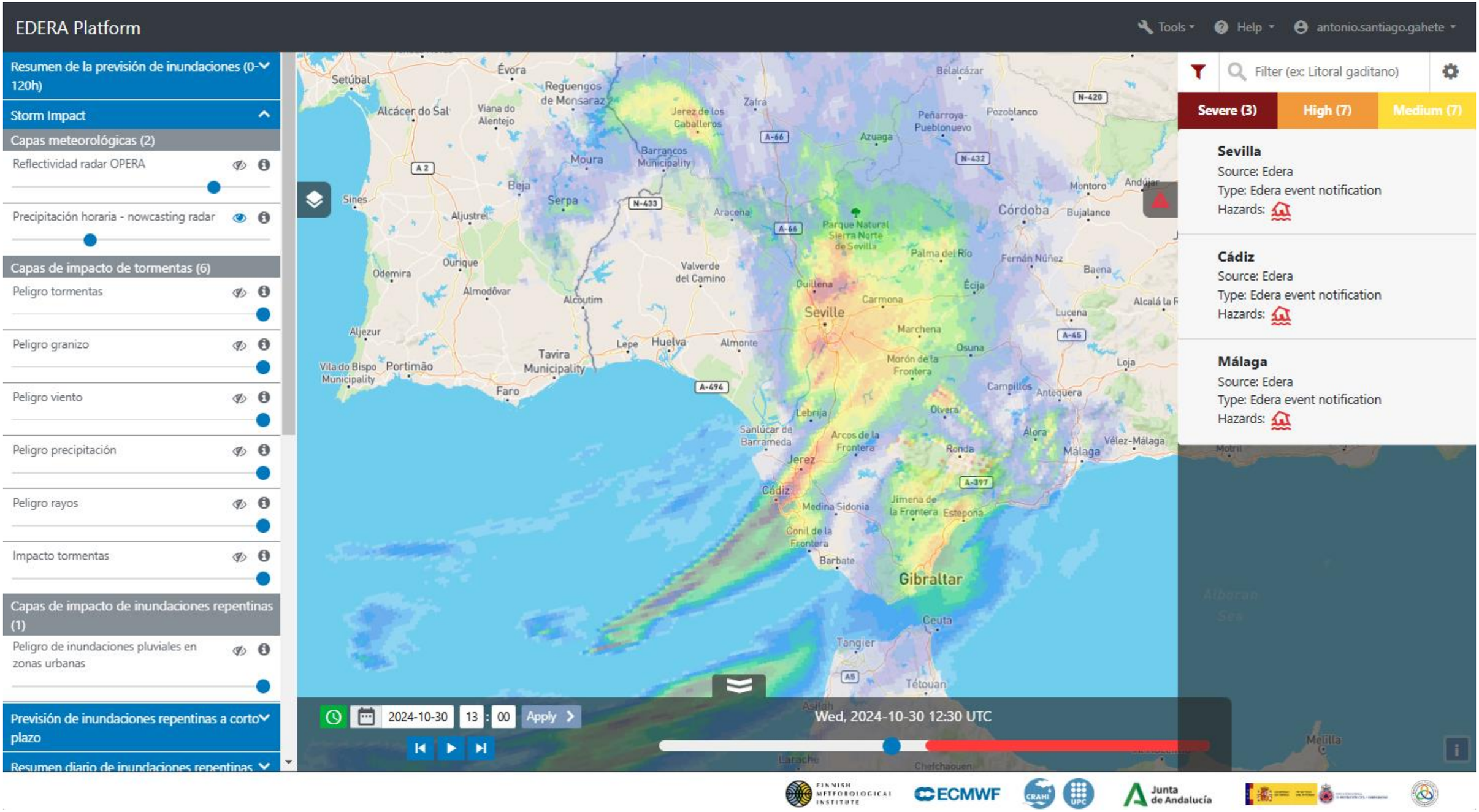
Block 2: Storm impact nowcasting

Presentation of the block of storm nowcasting (AS):



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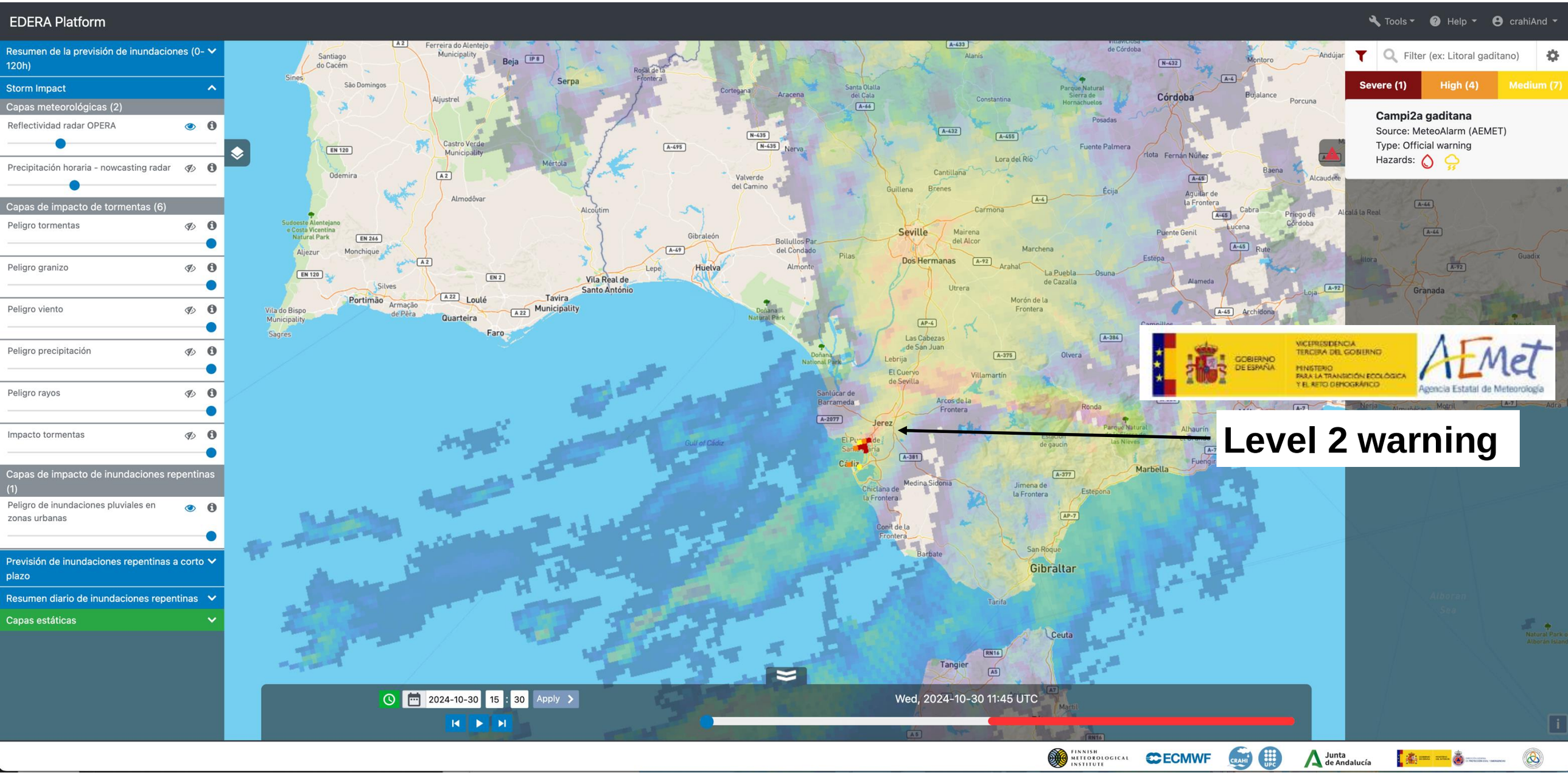
Block 2: Storm impact nowcasting



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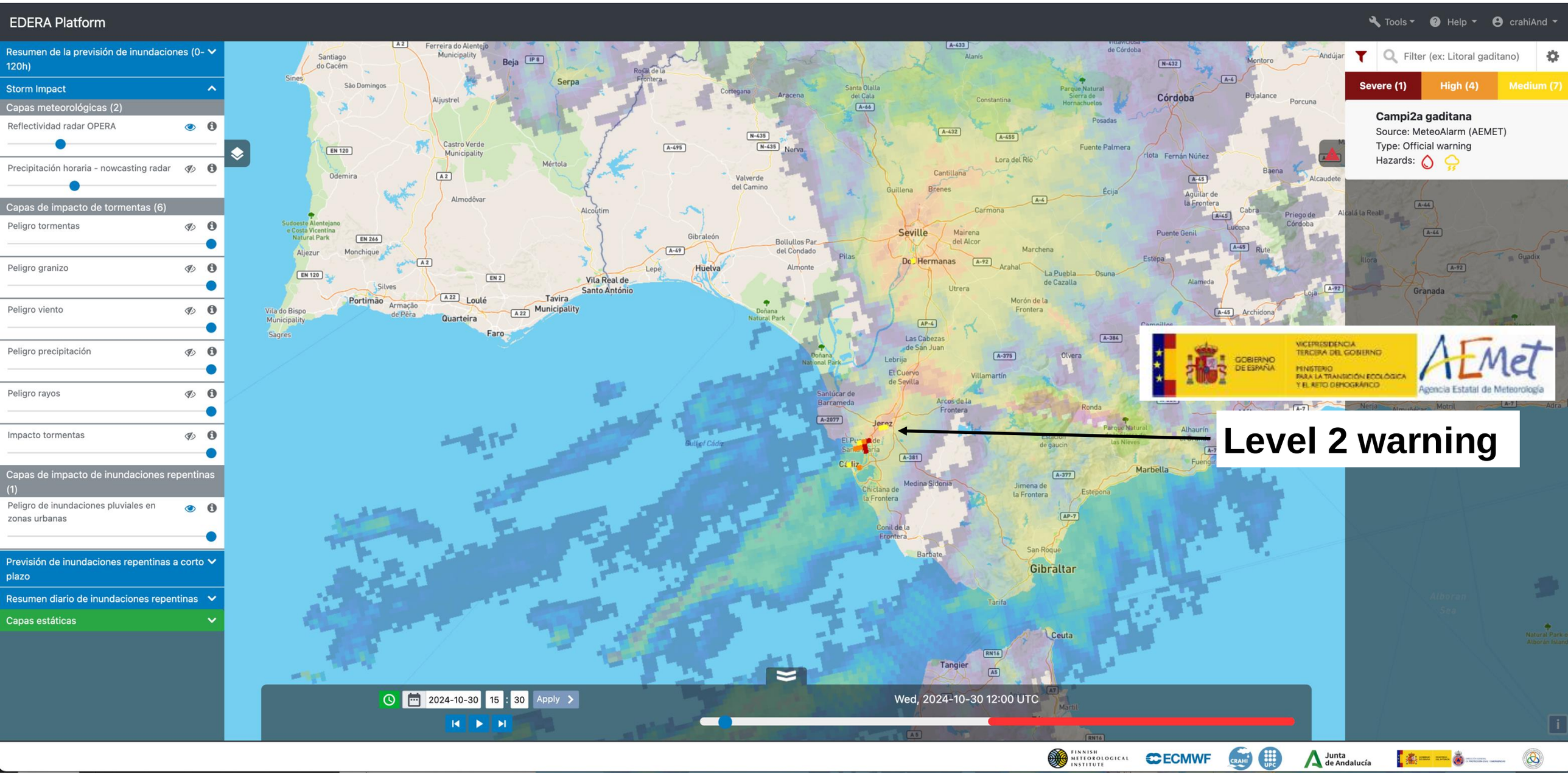
Block 2: Storm impact nowcasting



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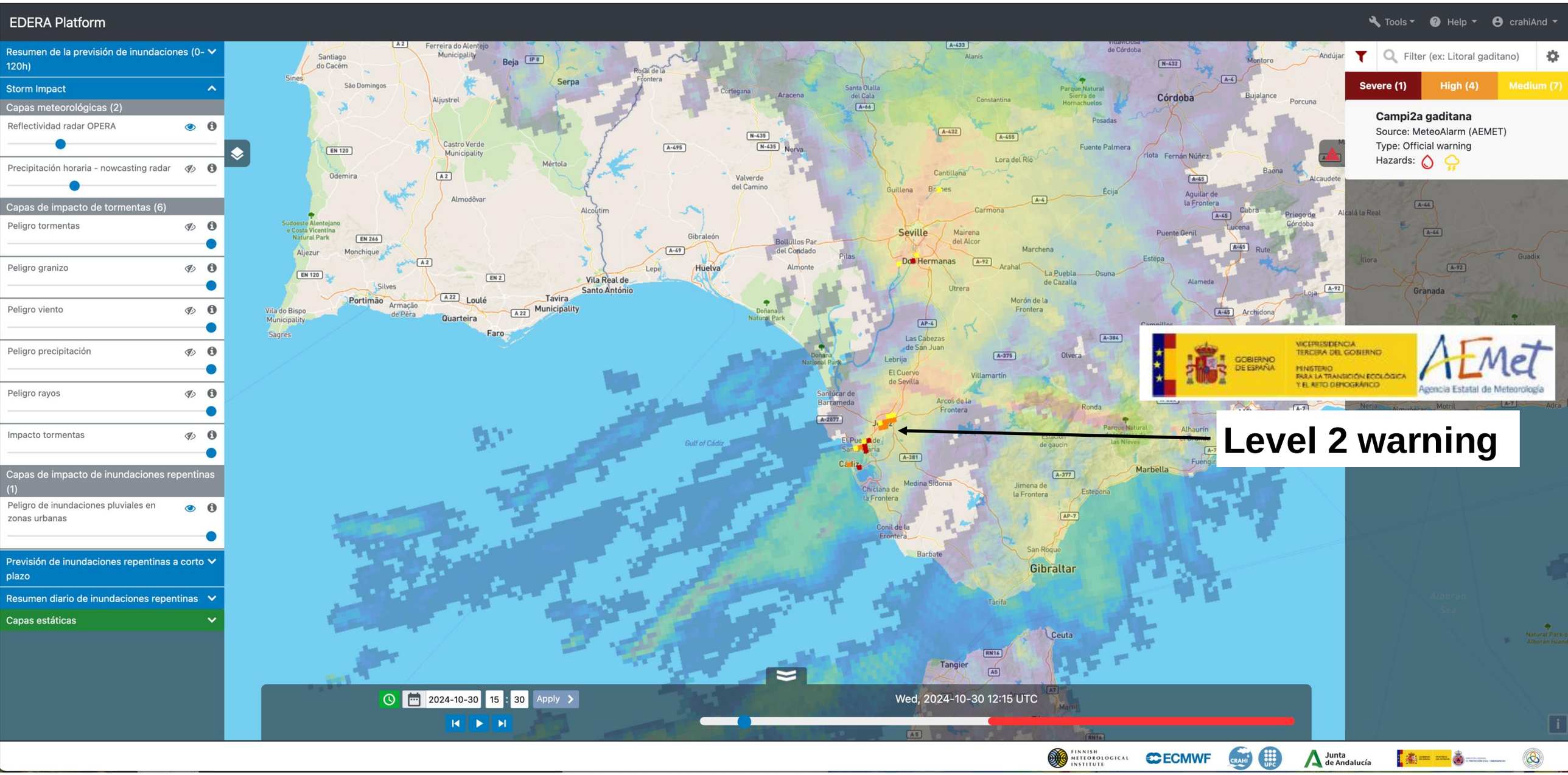
Block 2: Storm impact nowcasting



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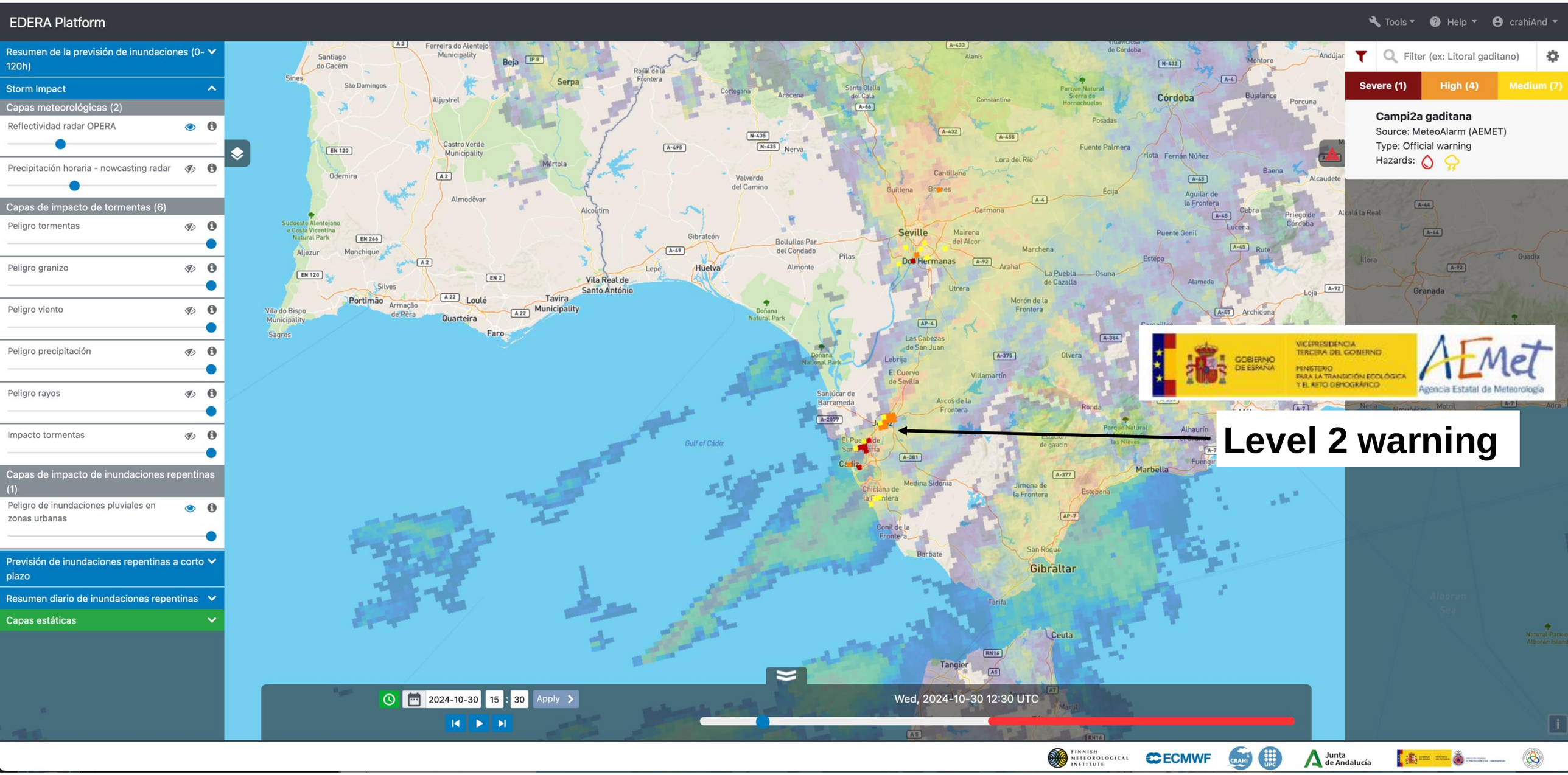
Block 2: Storm impact nowcasting



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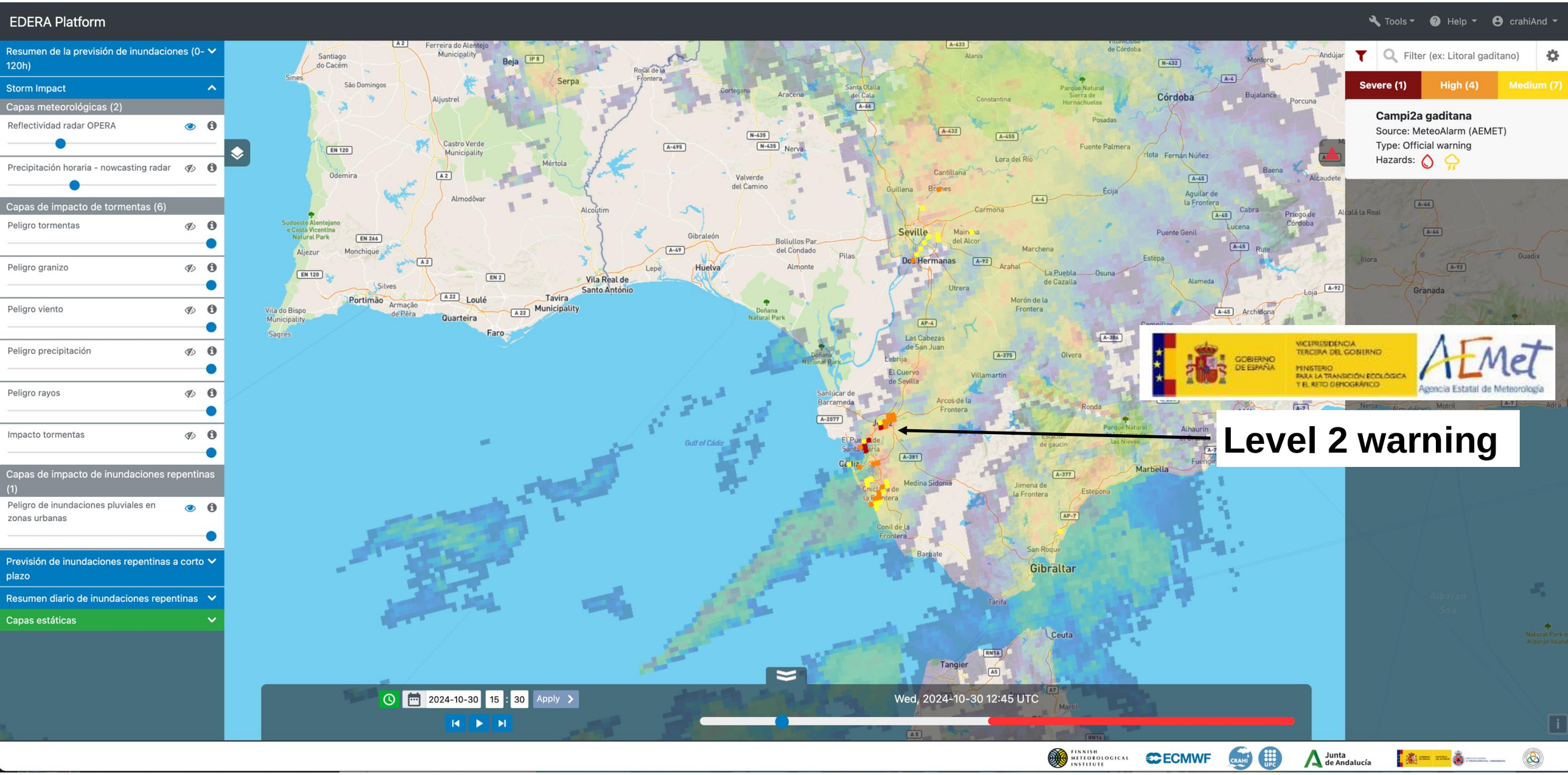
Block 2: Storm impact nowcasting



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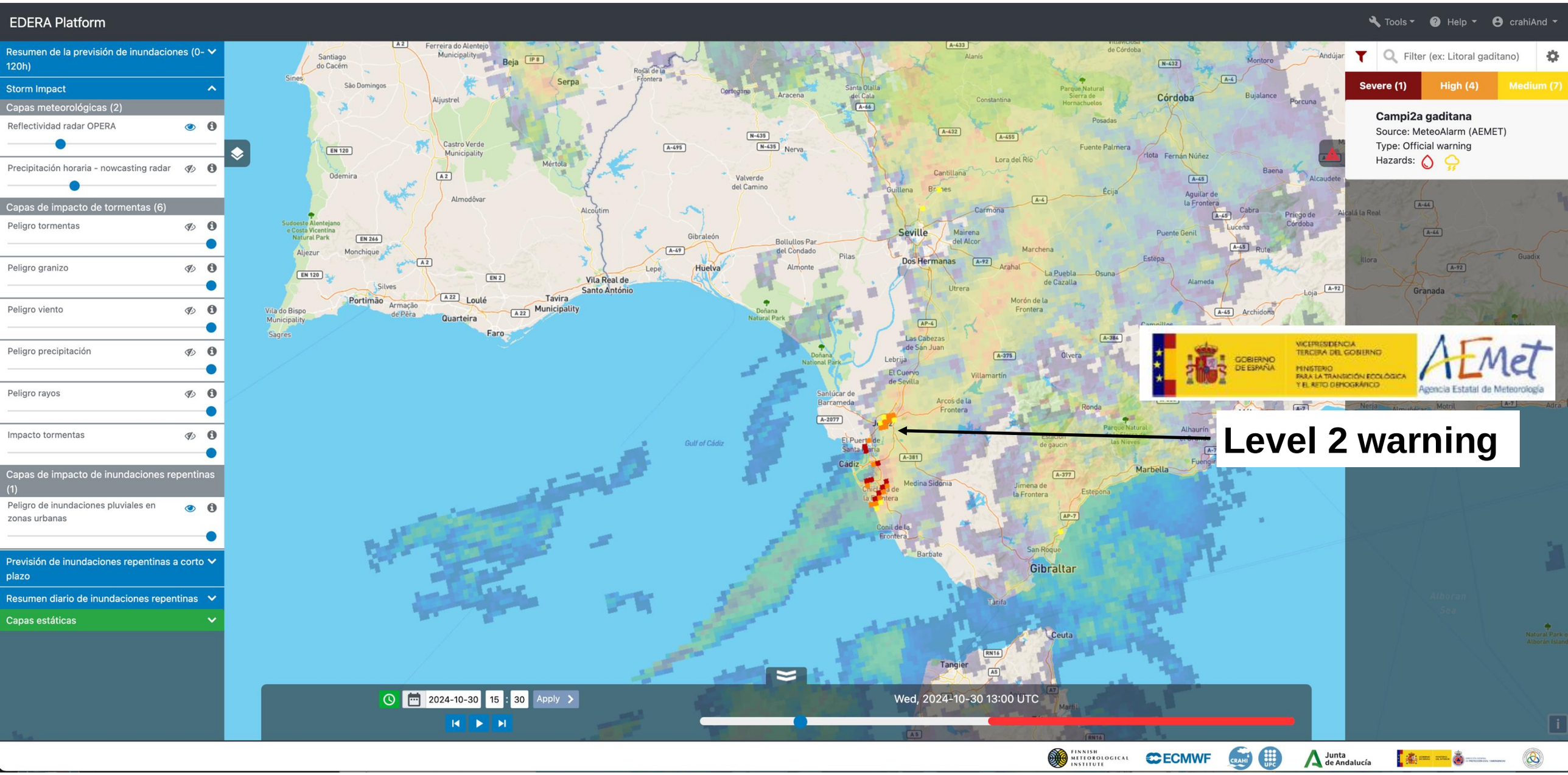
Block 2: Storm impact nowcasting



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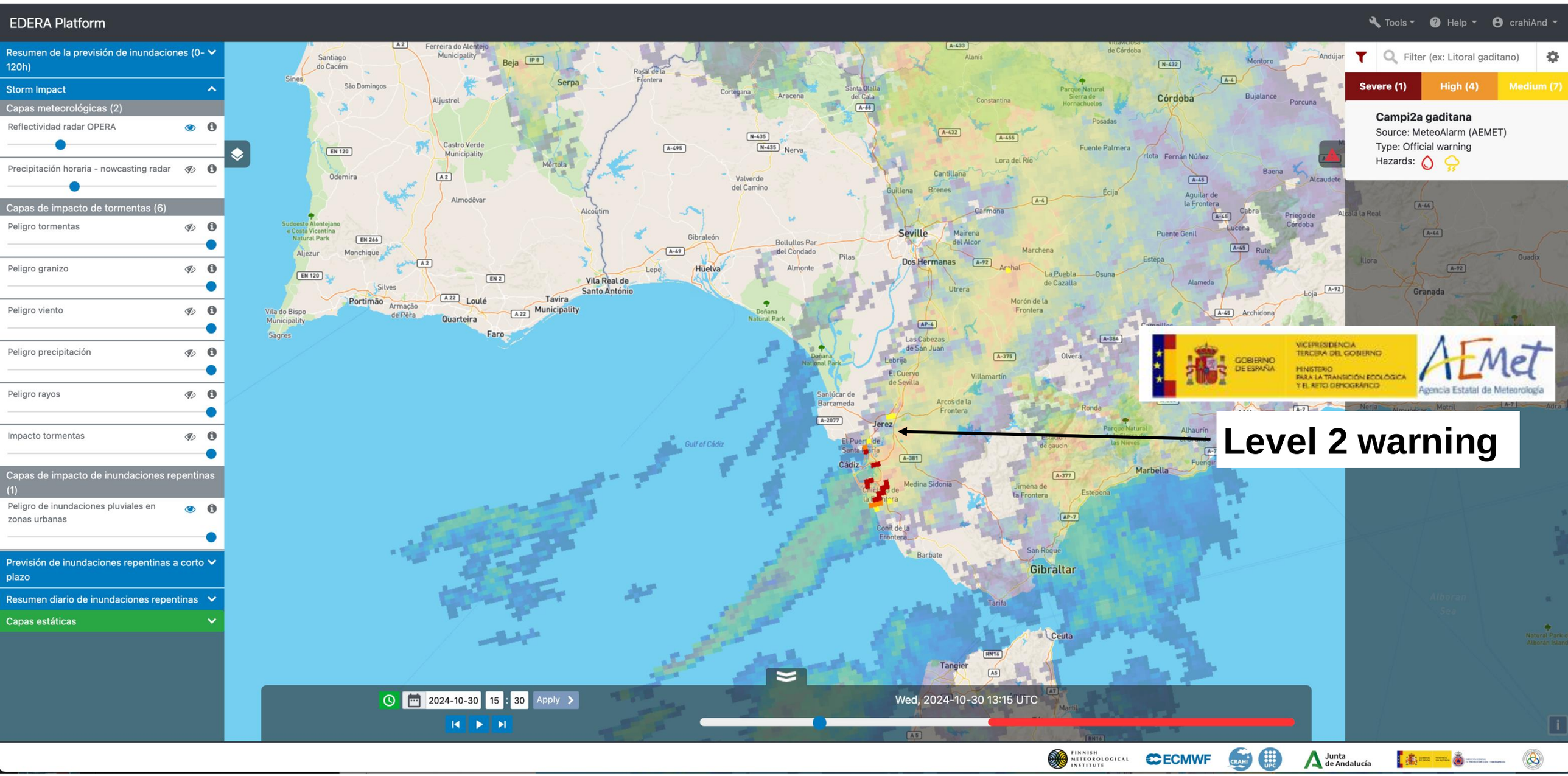
Block 2: Storm impact nowcasting



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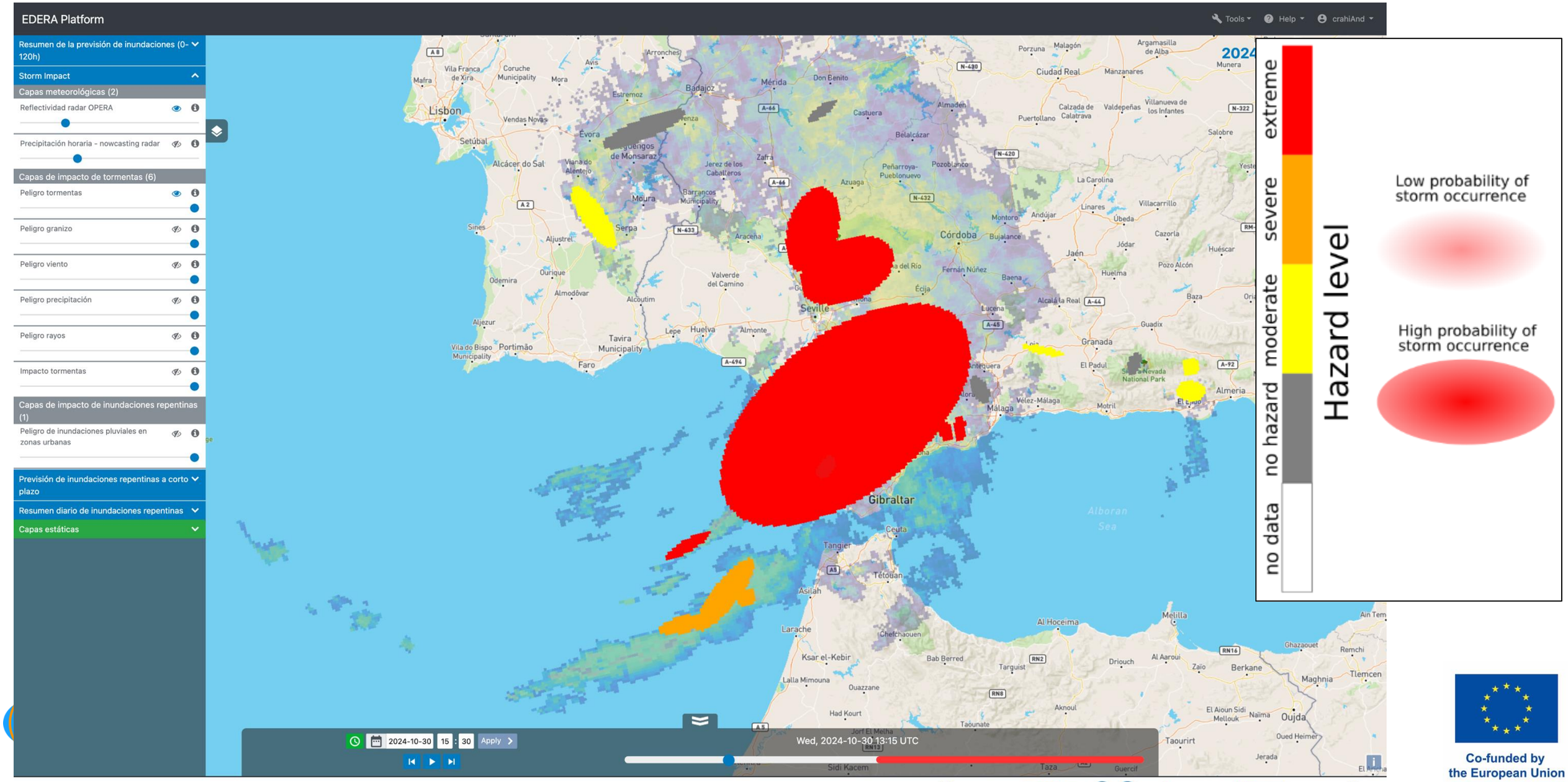
Block 2: Storm hazard nowcasts

- Hazardous storm cells are represented by ellipses
- Color-coded hazard levels predicted by machine learning model
- Available at 2 km spatial resolution every 15 minutes
- Most useful for the next hour



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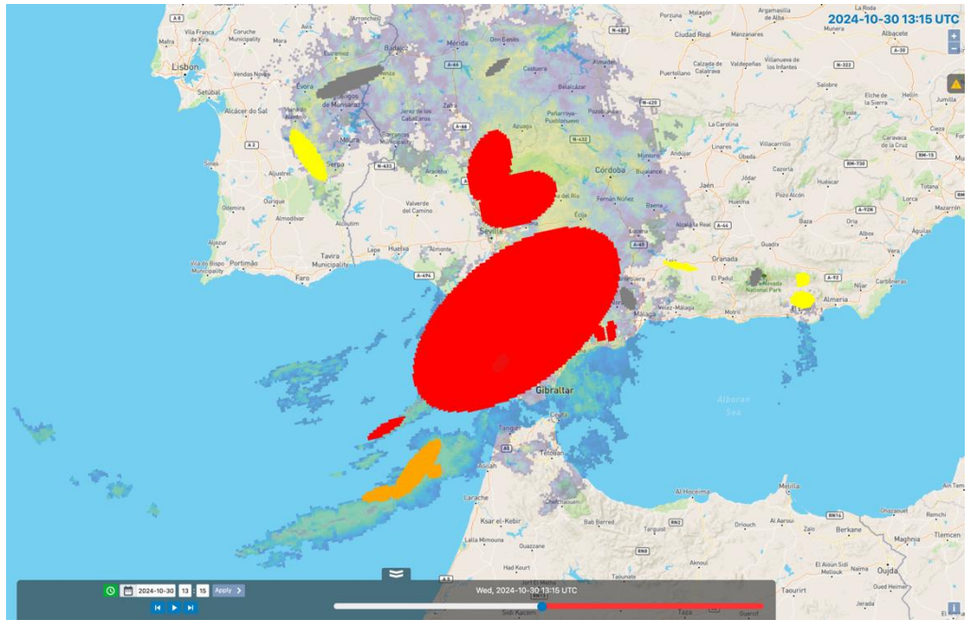
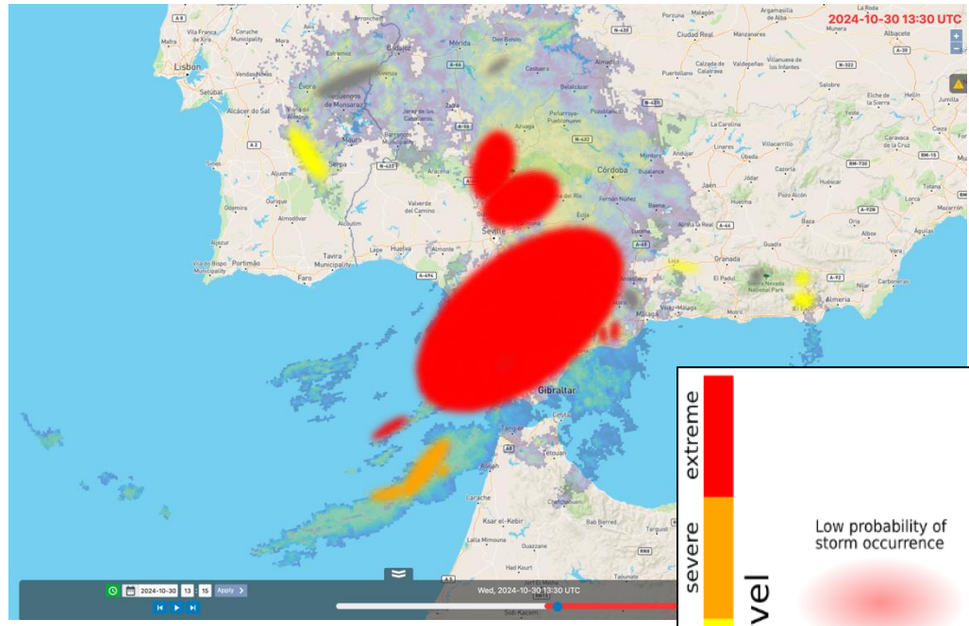
Block 2: Storm hazard nowcasts

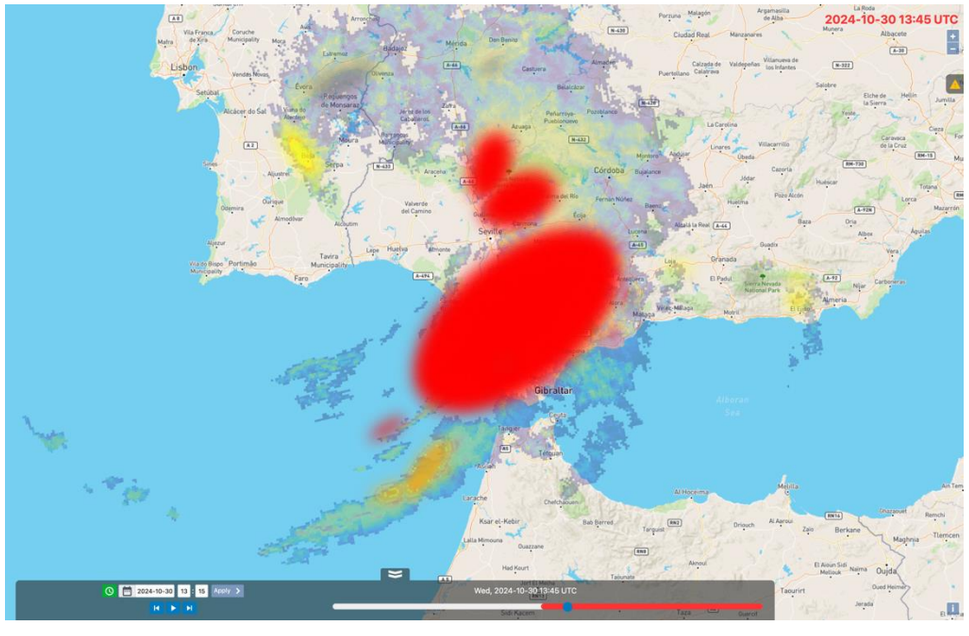
- The nowcasts show motion of cells together with uncertainty
- Blurring of storm ellipses visualizes increasing uncertainty
- Fading of the cells depends on their area: large cells are potentially hazardous for longer time



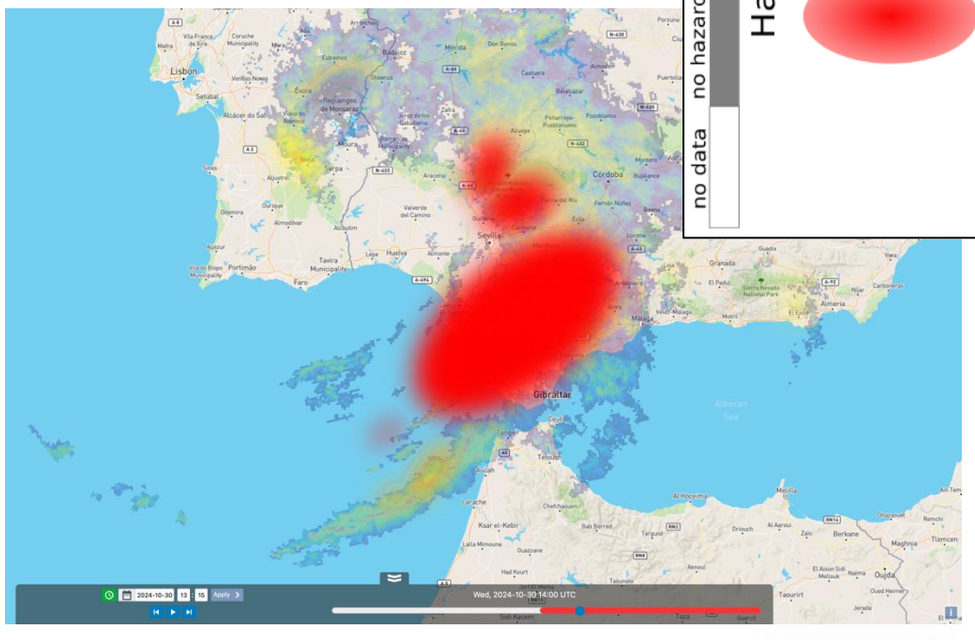
Current time



15 minutes



30 minutes



45 minutes

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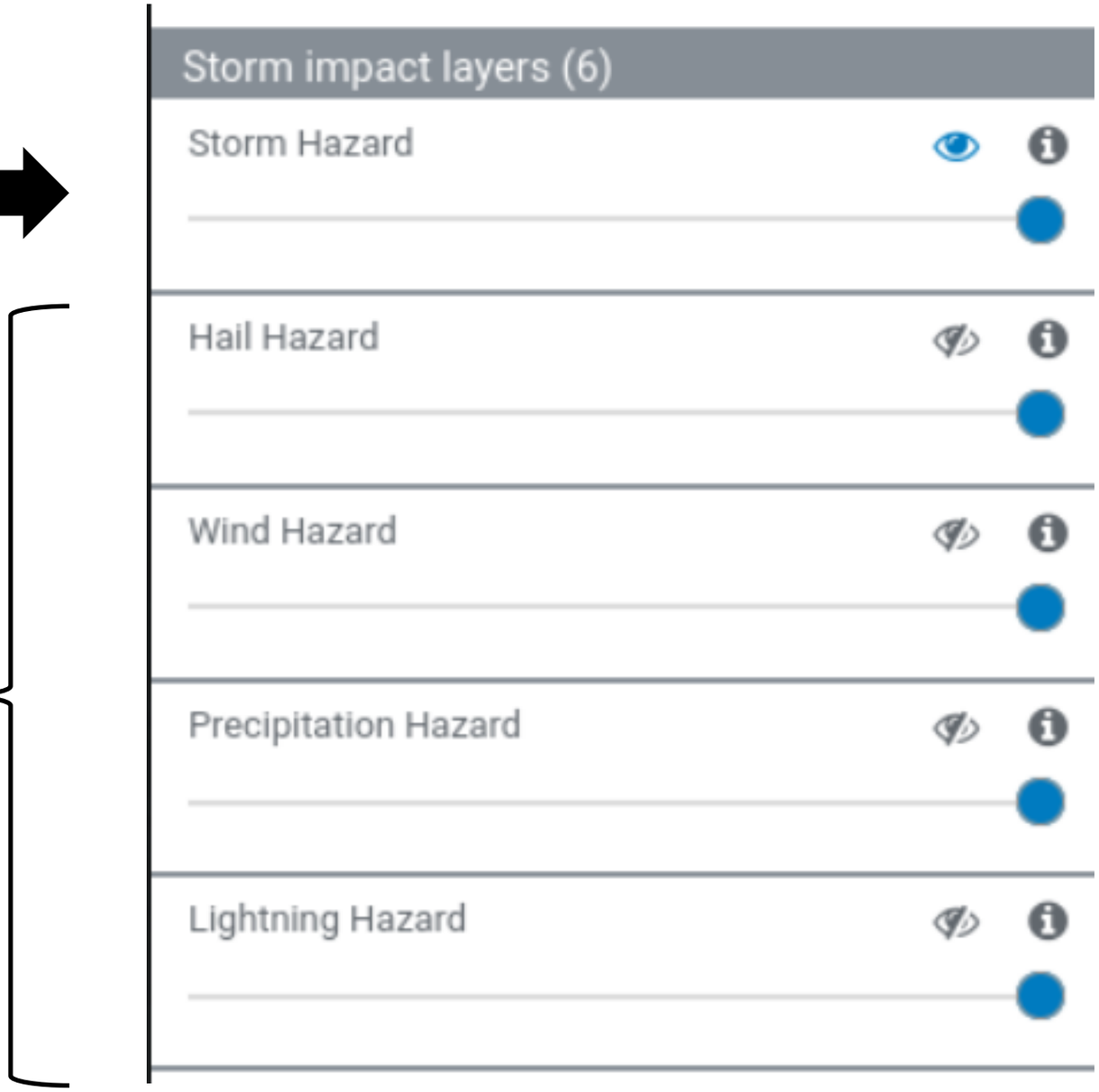
Block 2: Storm hazard nowcasts

Different hazard types

Maximum hazard level from each category

Separate models trained for predicting hazard level in each category



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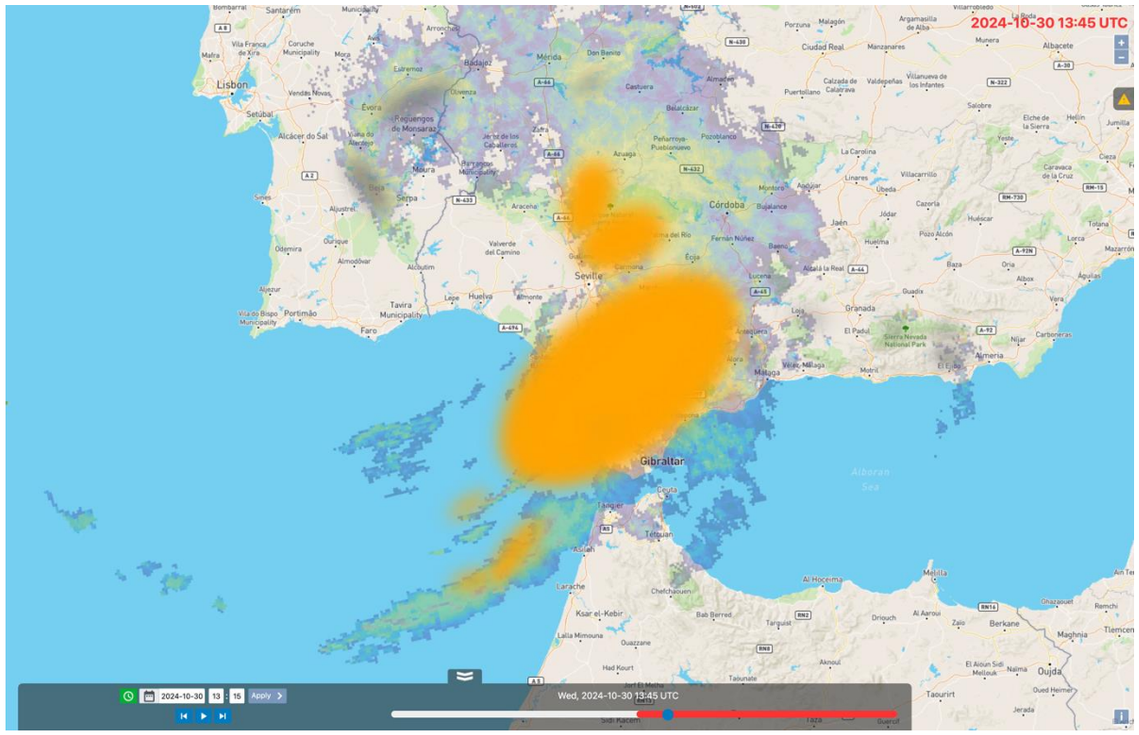
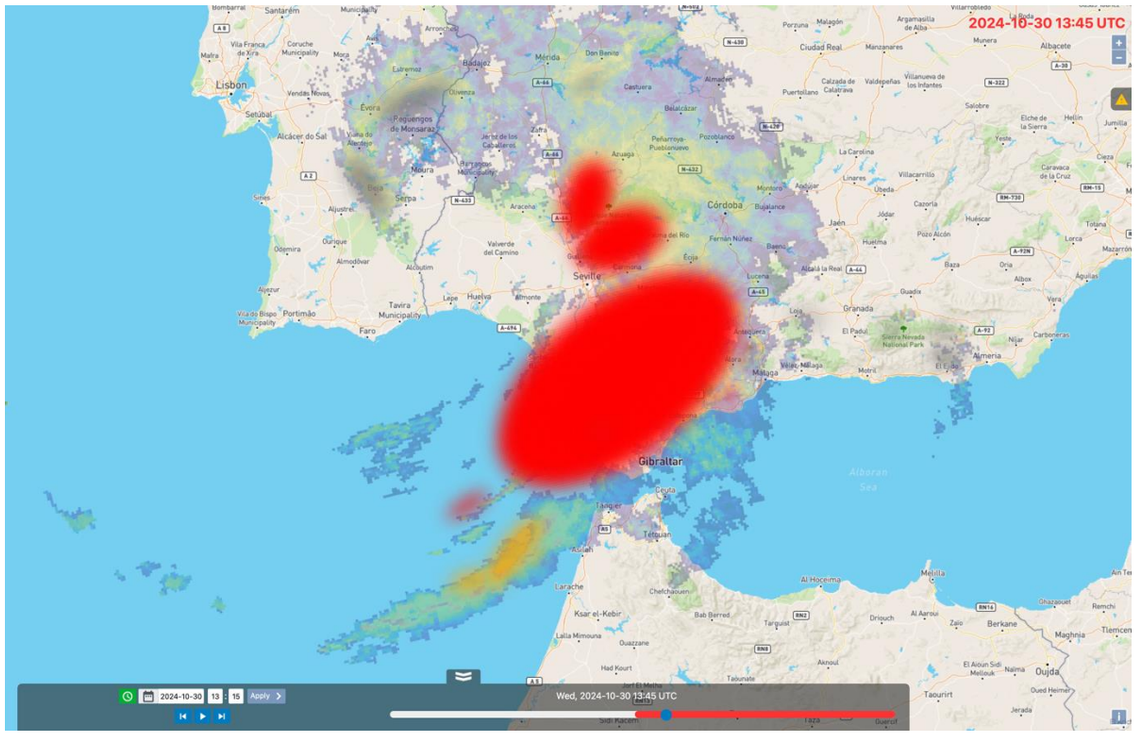
Block 2: Storm hazard nowcasts

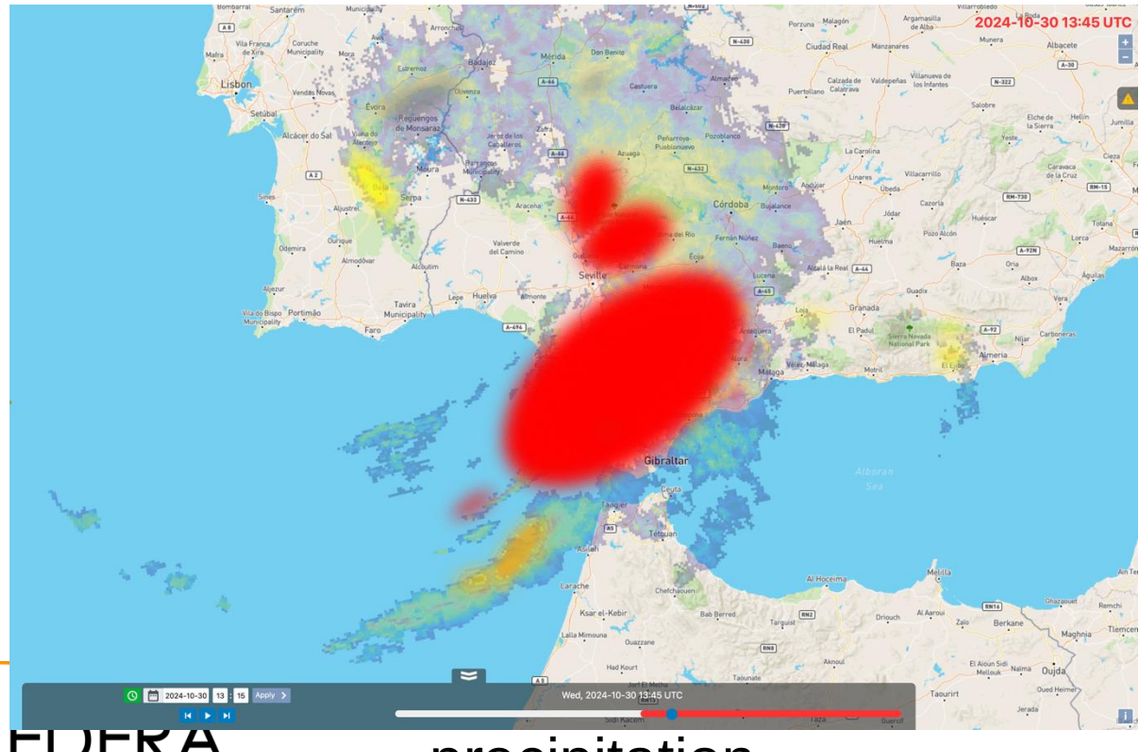
Examples of different hazard types



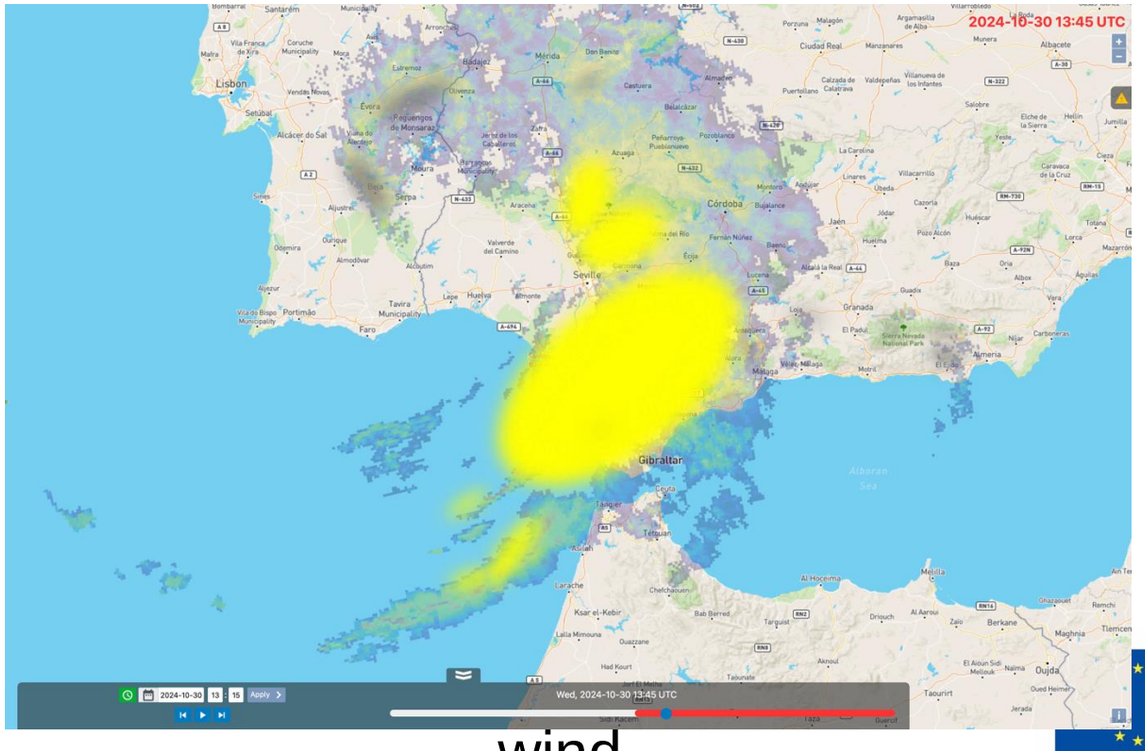
hail



lightning



precipitation



wind

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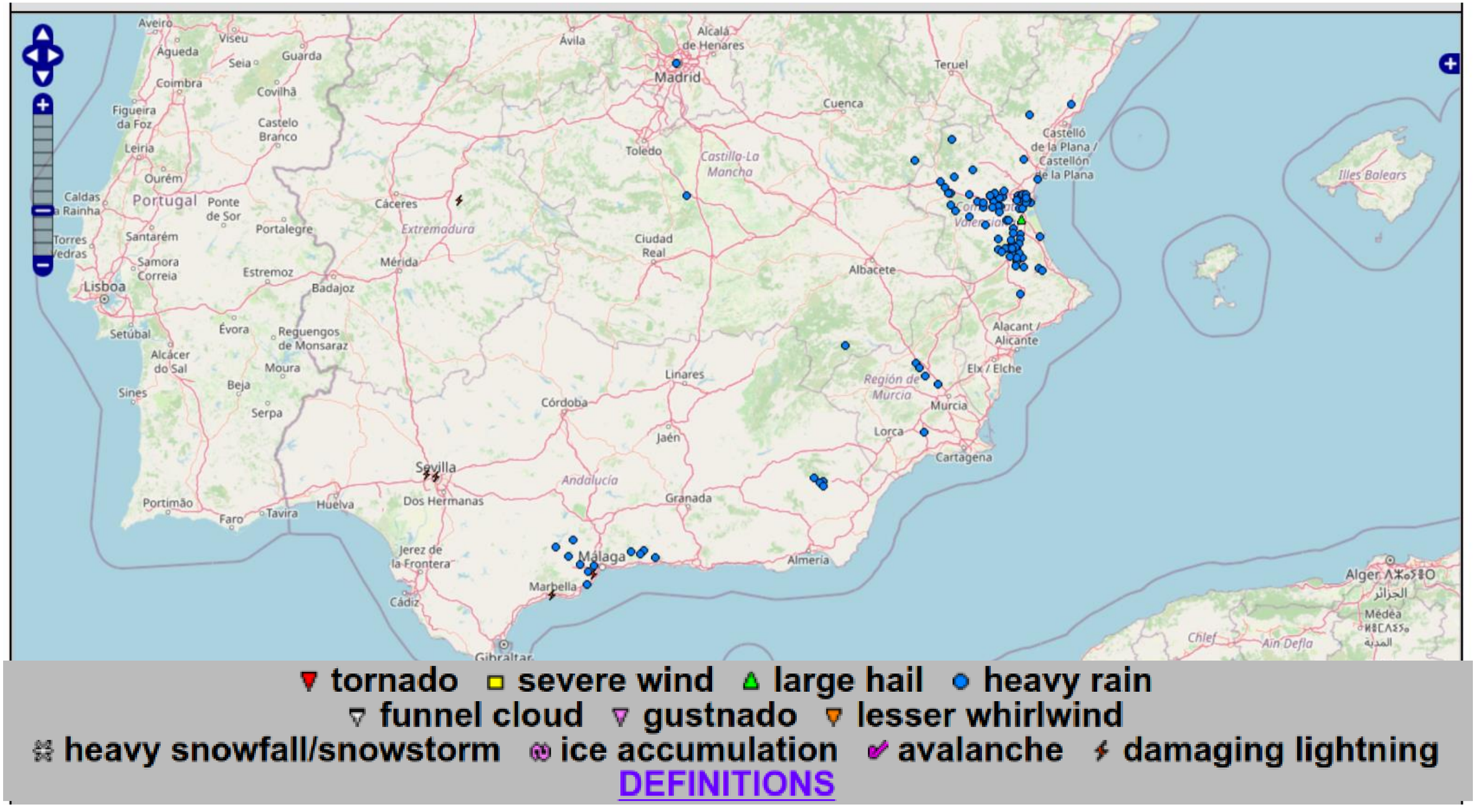
Block 2: Storm hazard nowcasts



Machine learning models are trained by using severe weather reports from ESWD (https://eswd.eu)

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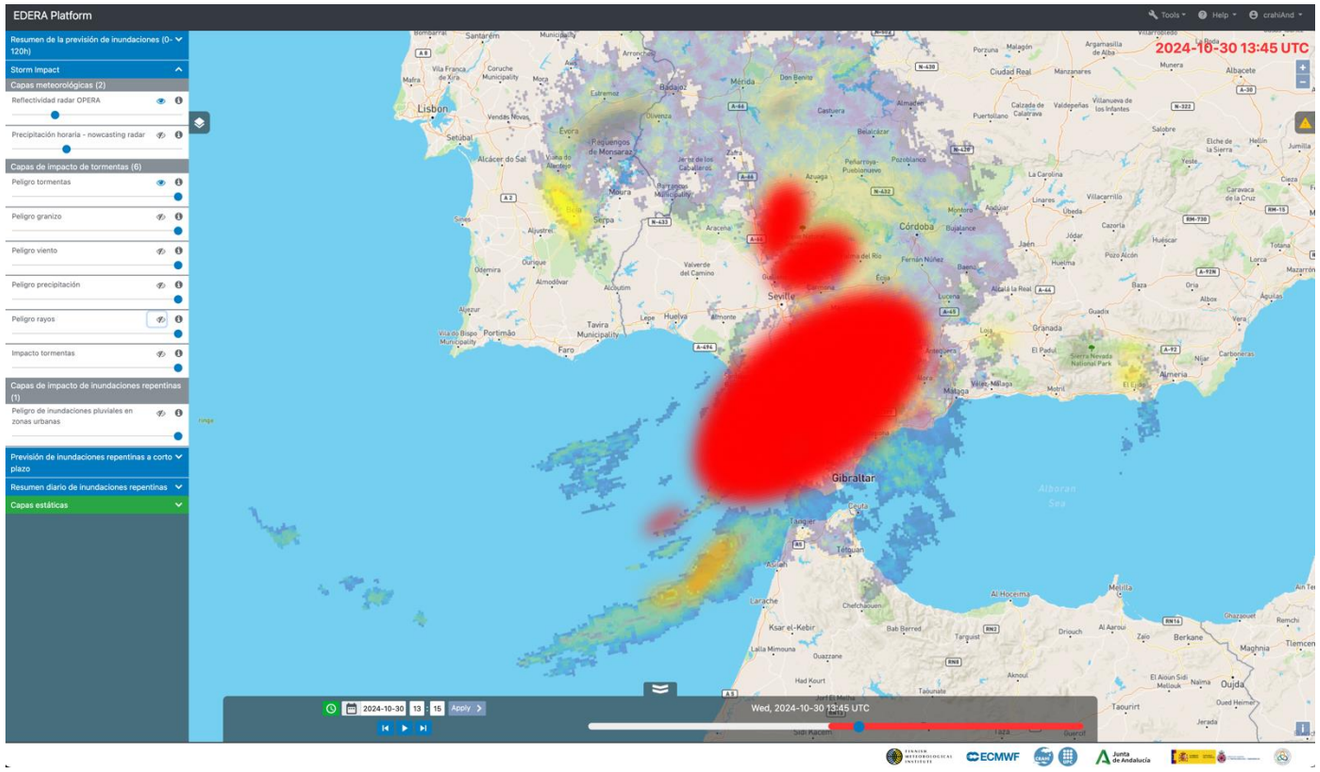
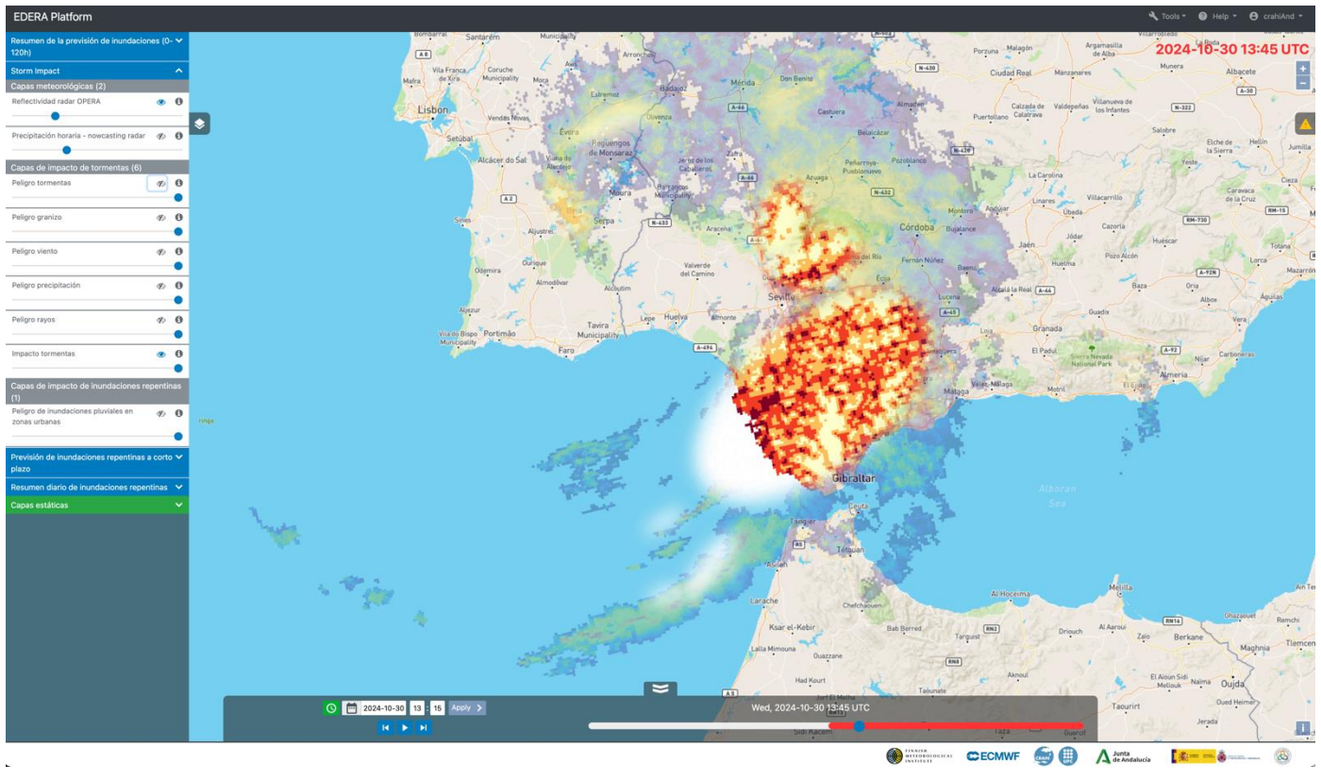
Block 2: Storm impact nowcasts

- Impact nowcasts are produced by multiplying storm hazard level by exposure level
- Exposure raster provided by ECMWF
- Exposure combined from publicly available information: population, health, education, transport and energy from HARCU-EU and JRC datasets



30-minute hazard and impact nowcasts



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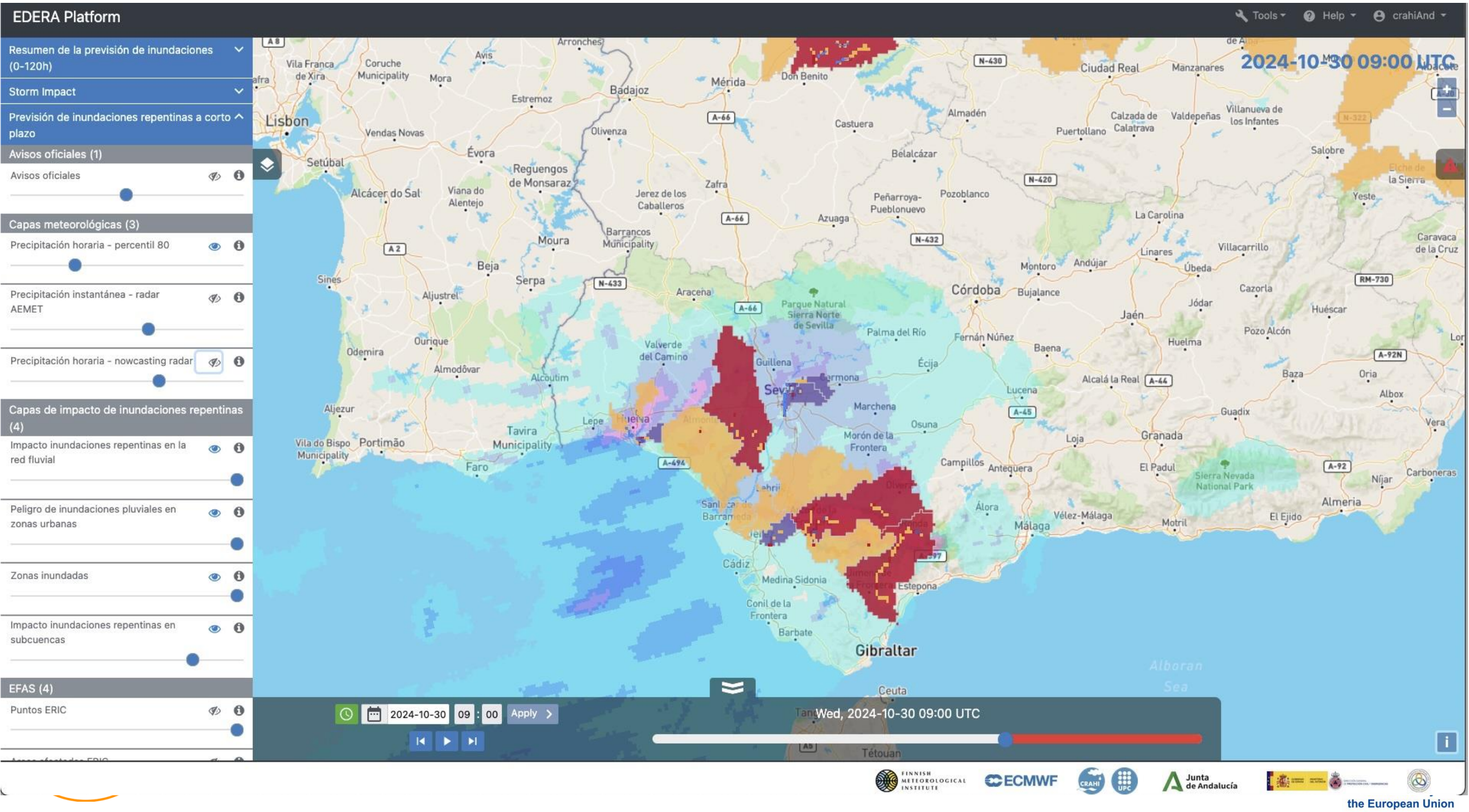
Block 3: Animated FF nowcasting

Combination of products for monitoring the FF situation.

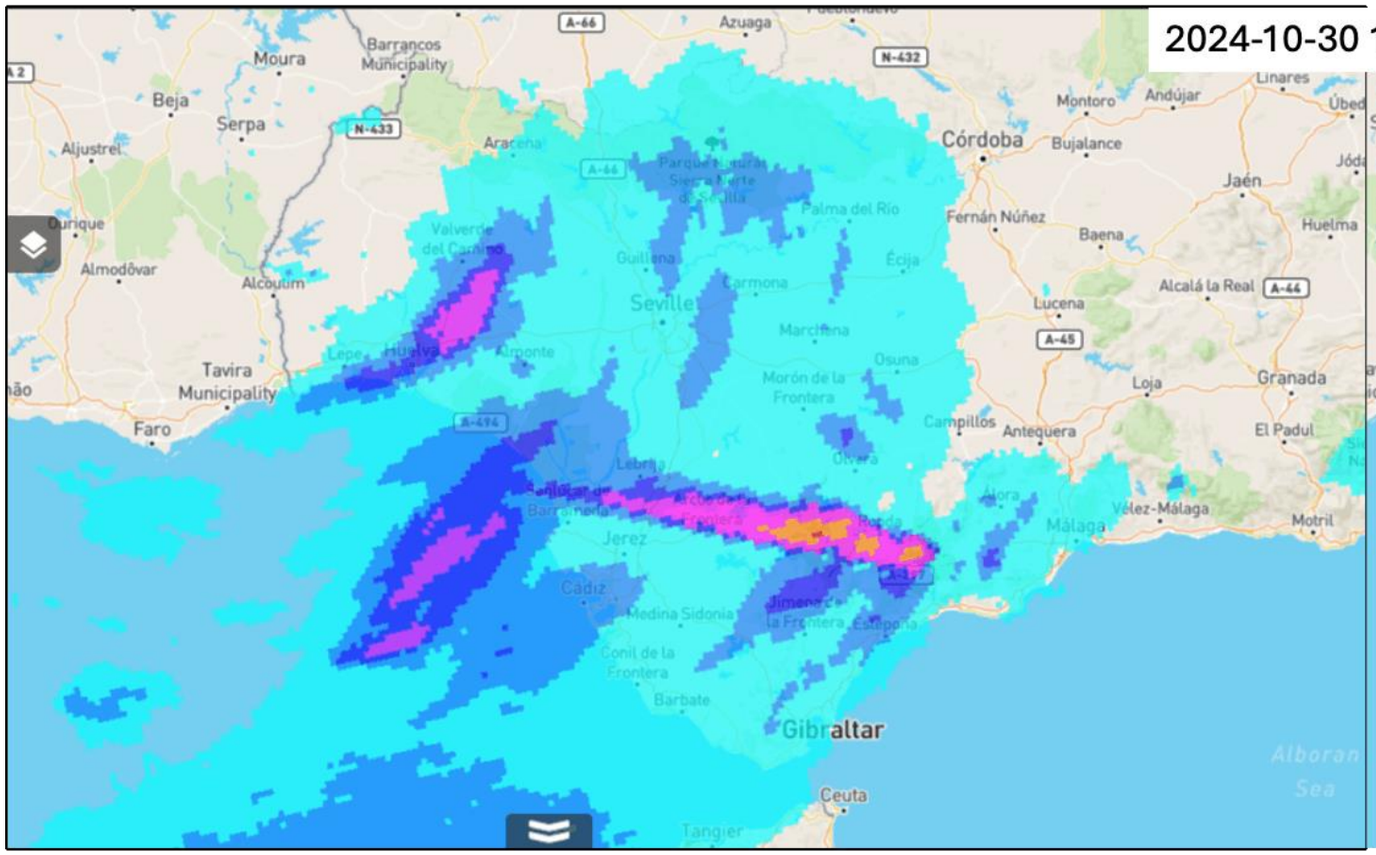
18h past observations + 6h nowcasts with 1-h resolution



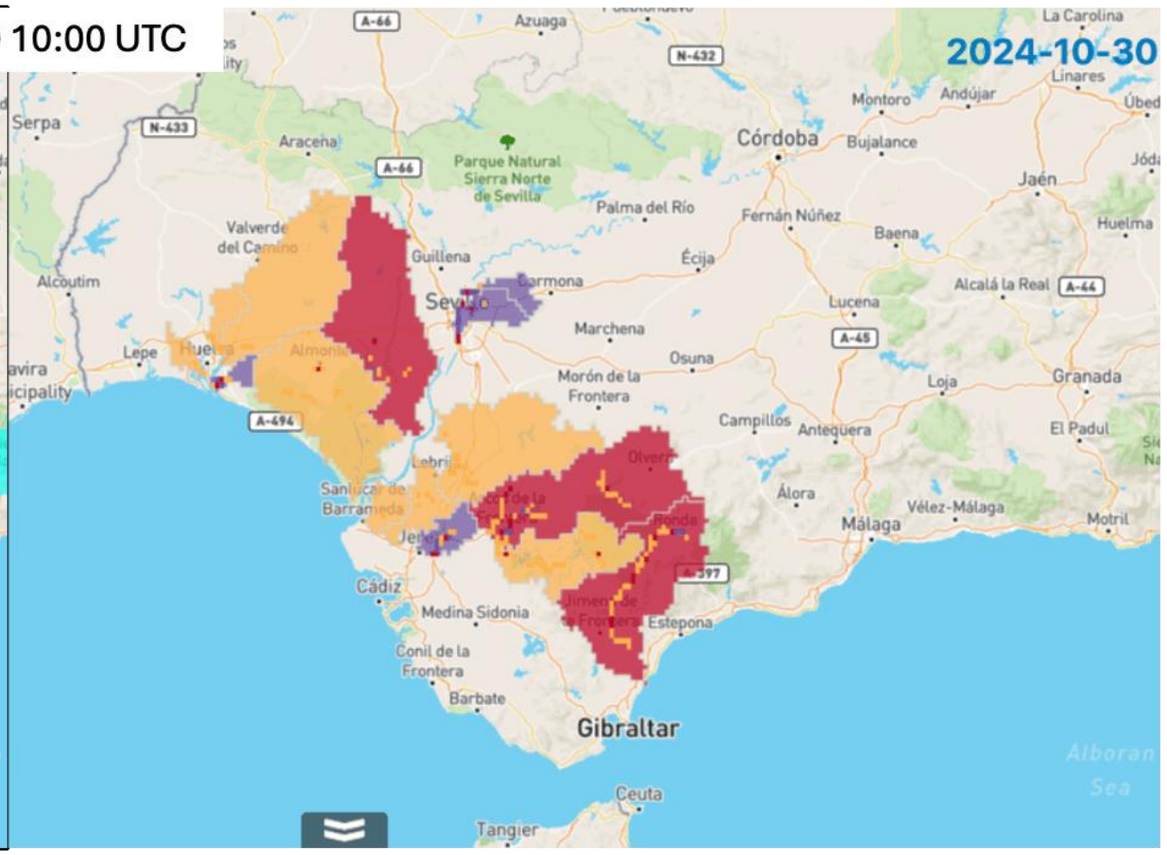
Block 3: Animated FF nowcasting
Flash Flood Impact Layers

- Example forecast at 10:00 UTC on the 30th October
- Heavy rain moved north increasing flood risk in SW of Spain
- Highlighted catchments in east of region due to earlier rain

Blended Radar & NWP Precipitation



Flash Flood Layers



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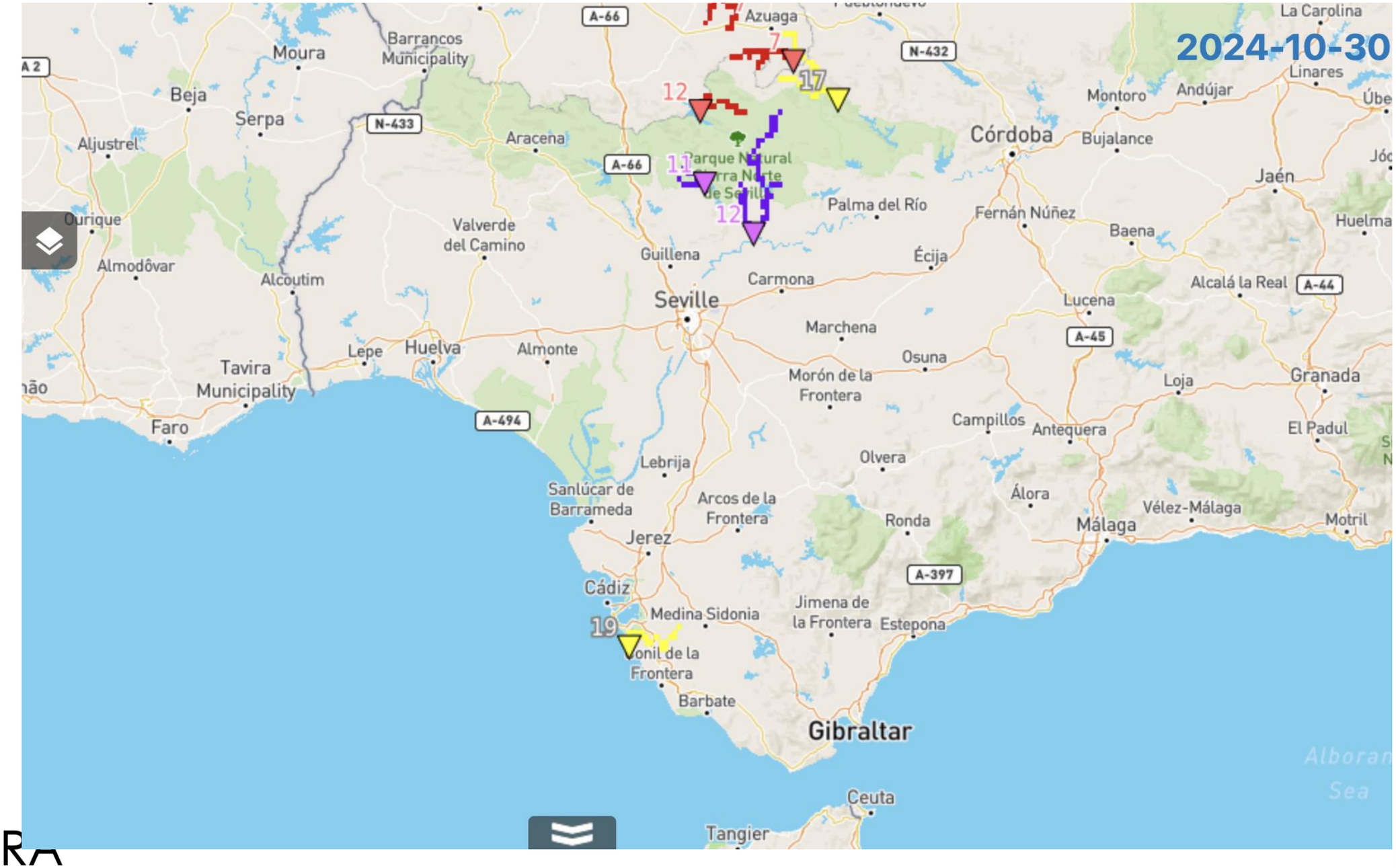
Block 3: Animated FF nowcasting
EFAS Layers: ERIC

- EFAS flash flood forecast at start of event on 30th Oct 00:00 UTC did not highlight area as being at risk
- Therefore, EDERA layers highlighted additional risk



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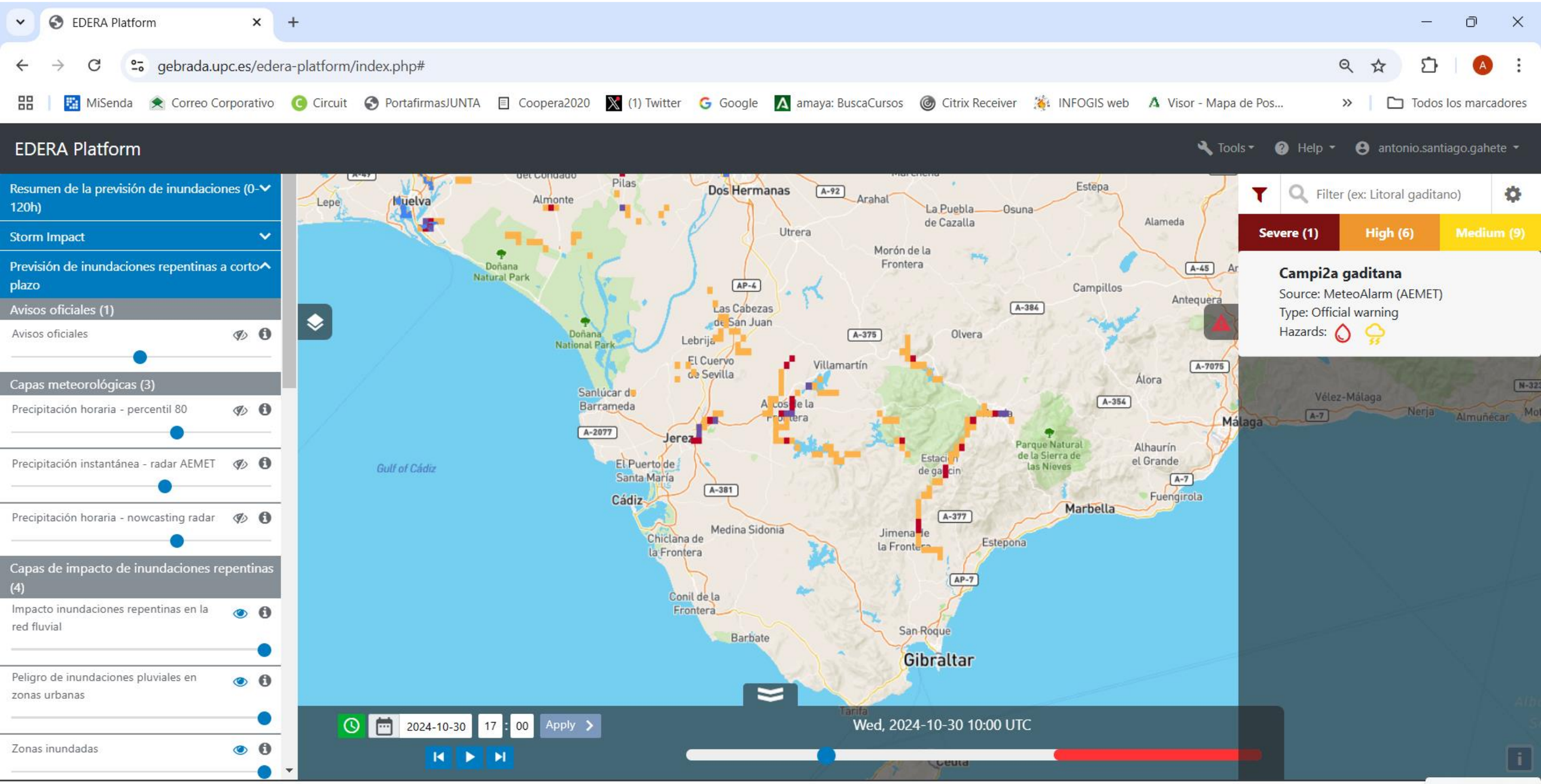
Block 3: Animated FF nowcasting

Evolution of the event as it was on-going – peak – end (AS)



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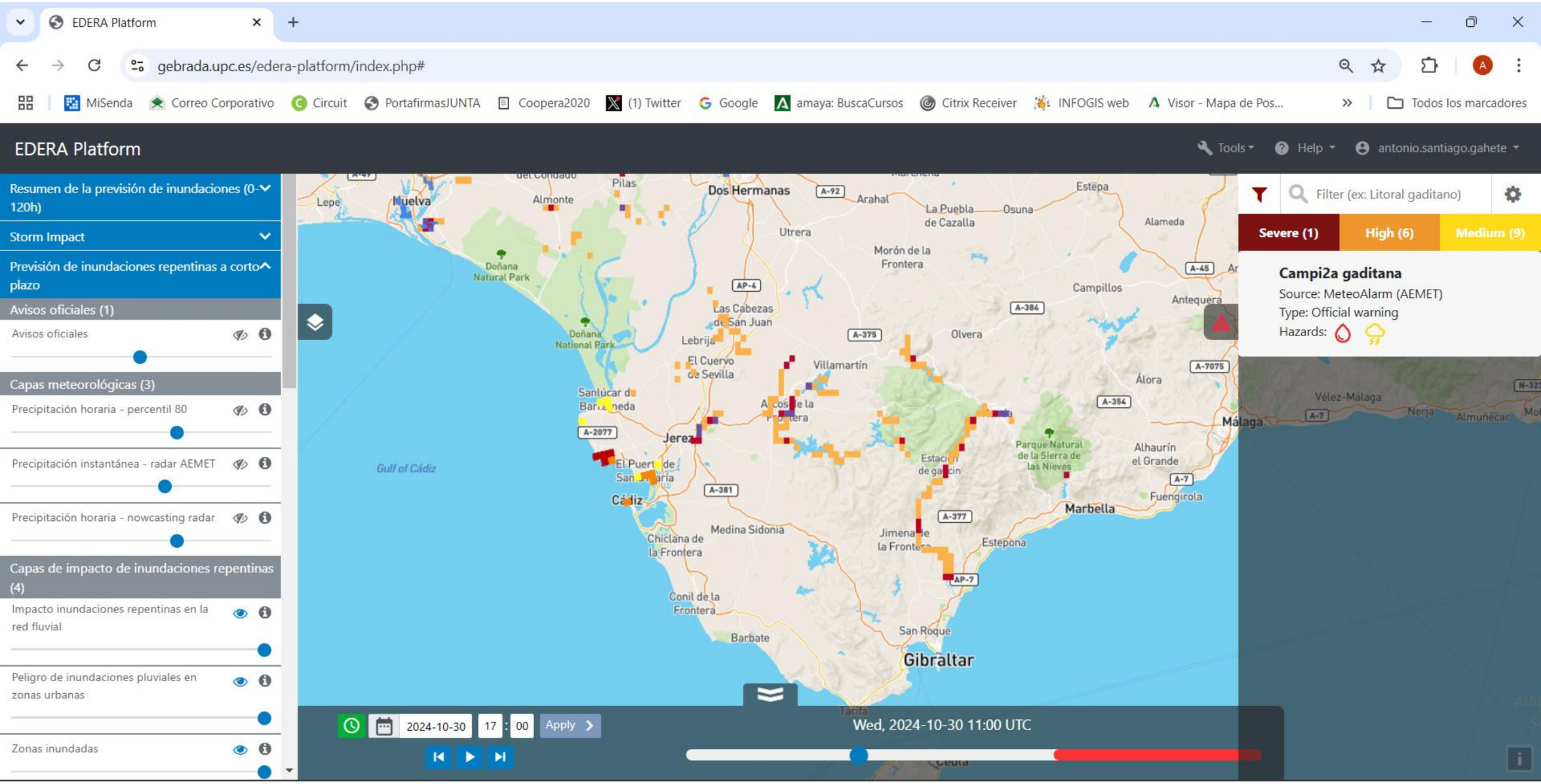
Block 3: Animated FF nowcasting

Evolution of the event as it was on-going – peak – end (AS)



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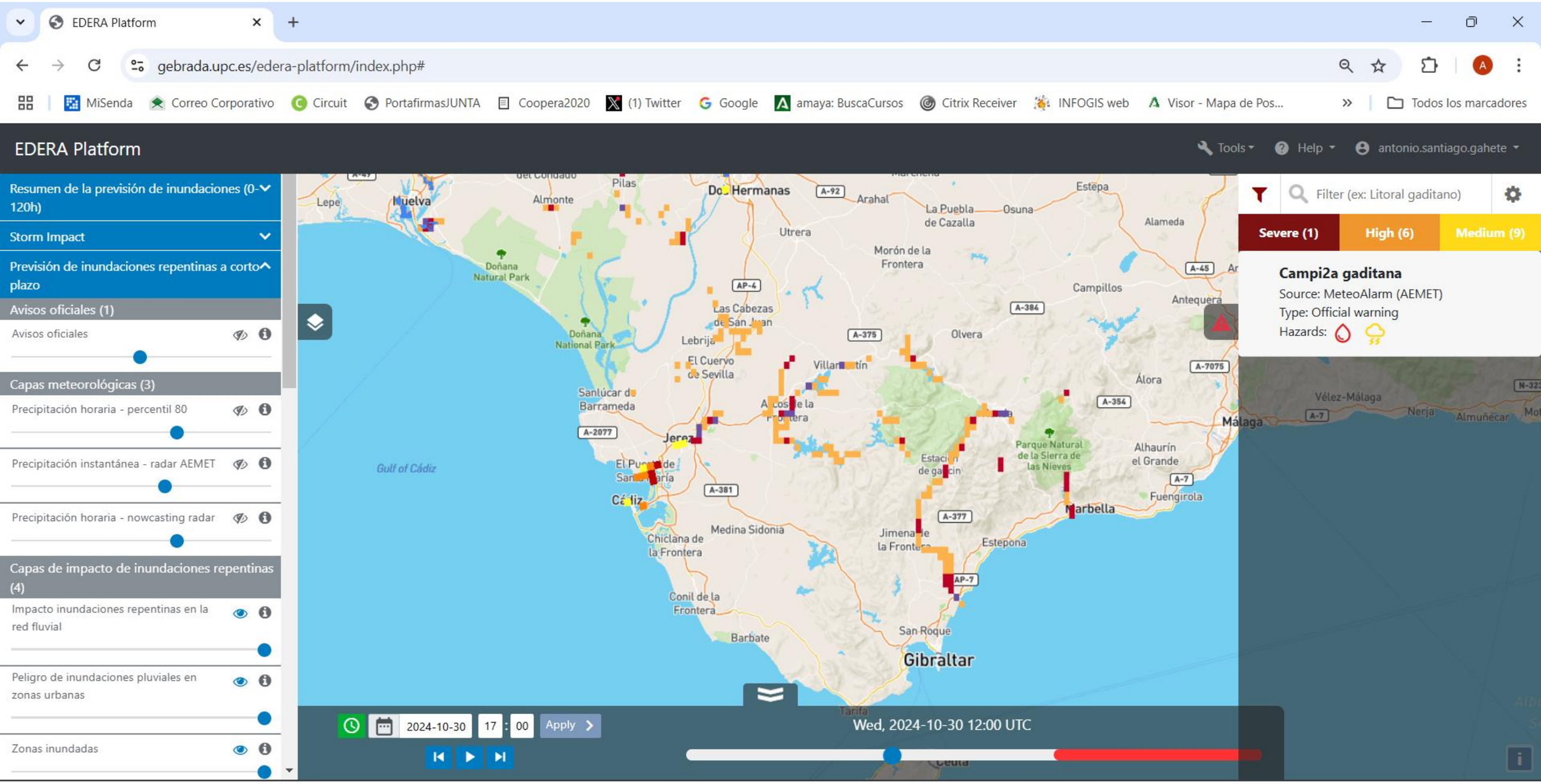
Block 3: Animated FF nowcasting

Evolution of the event as it was on-going – peak – end (AS)



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Block 3: Animated FF nowcasting

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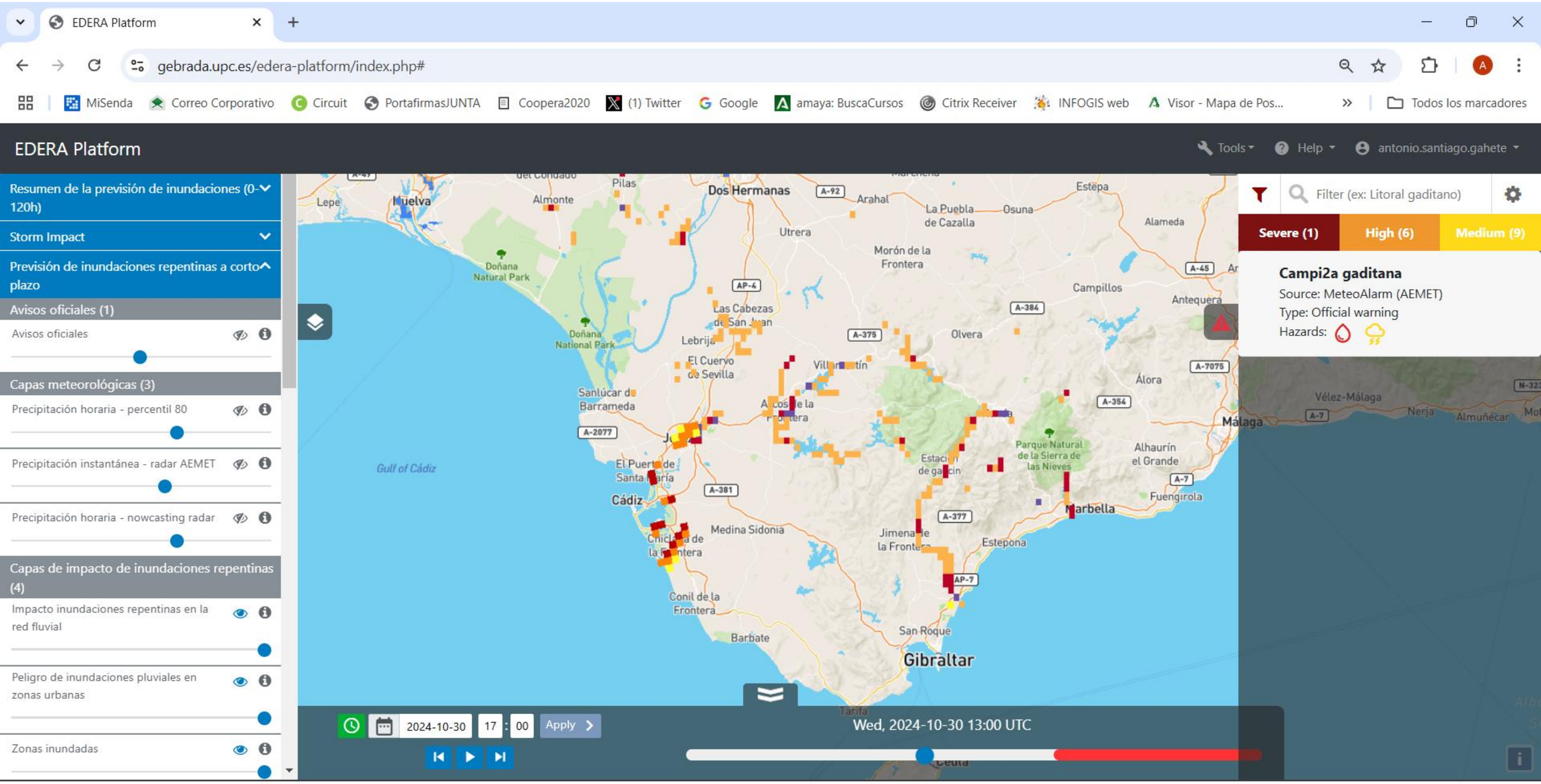

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Block 3: Animated FF nowcasting

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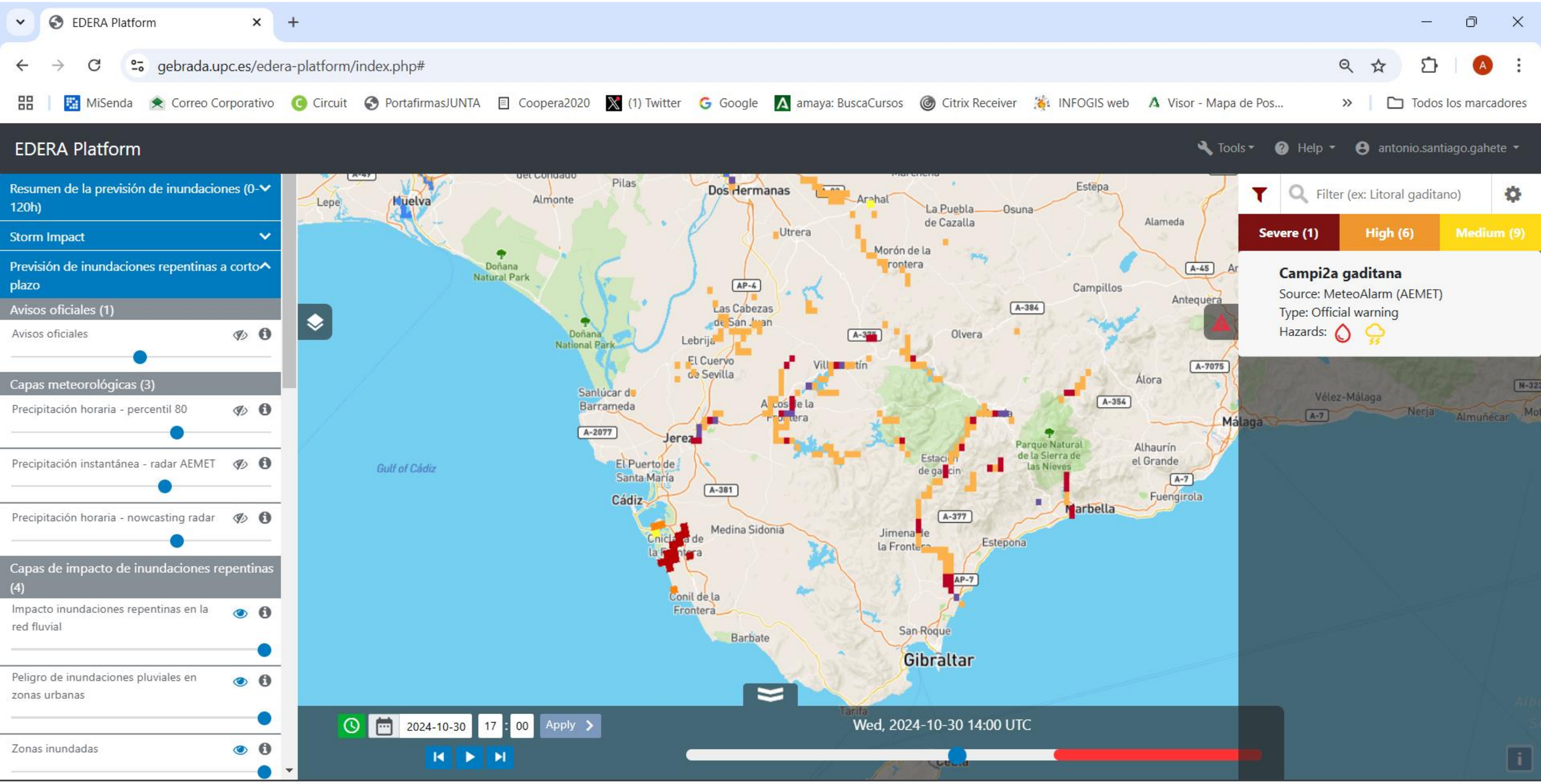

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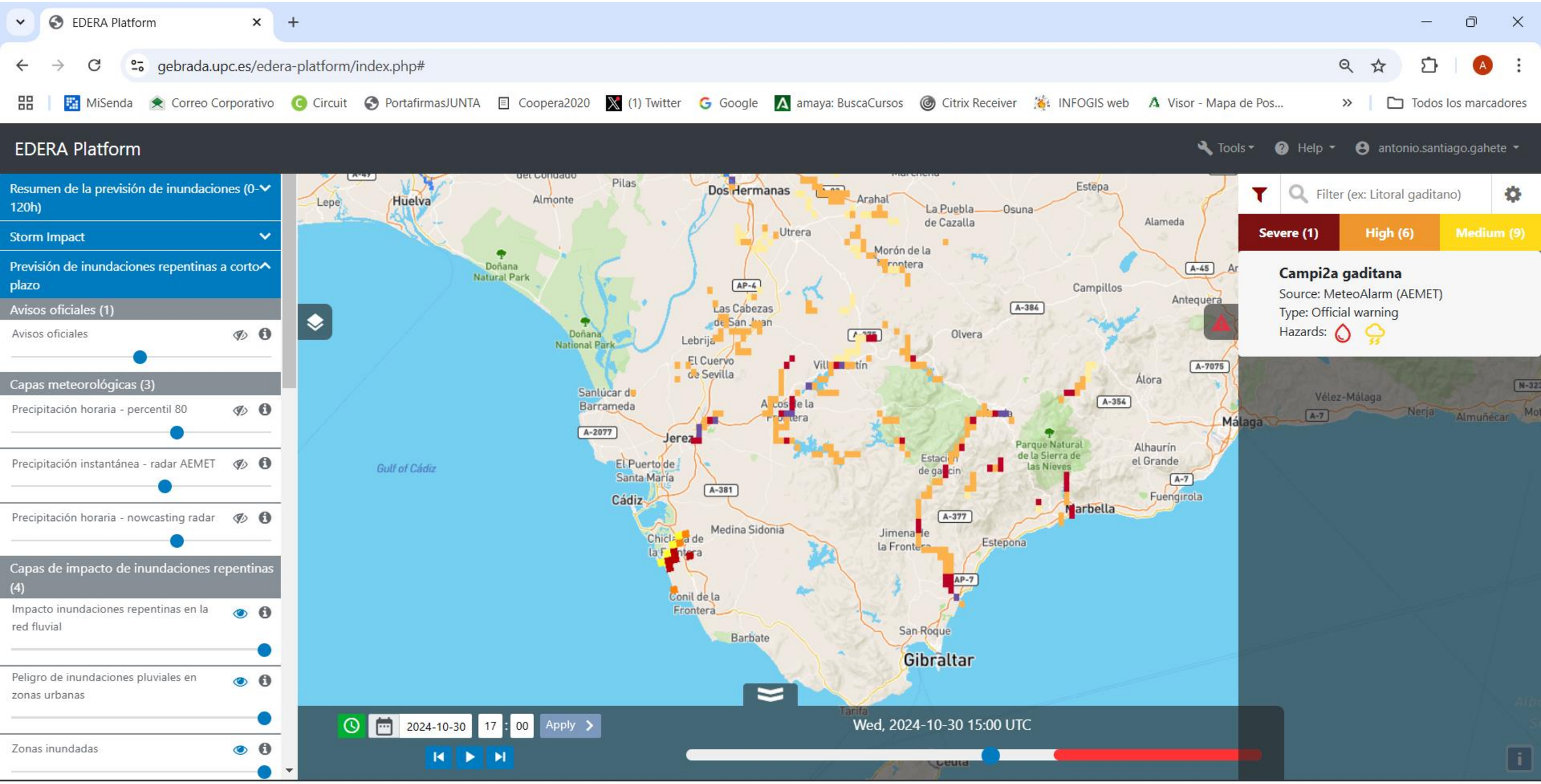
Block 3: Animated FF nowcasting

Evolution of the event as it was on-going – peak – end (AS)



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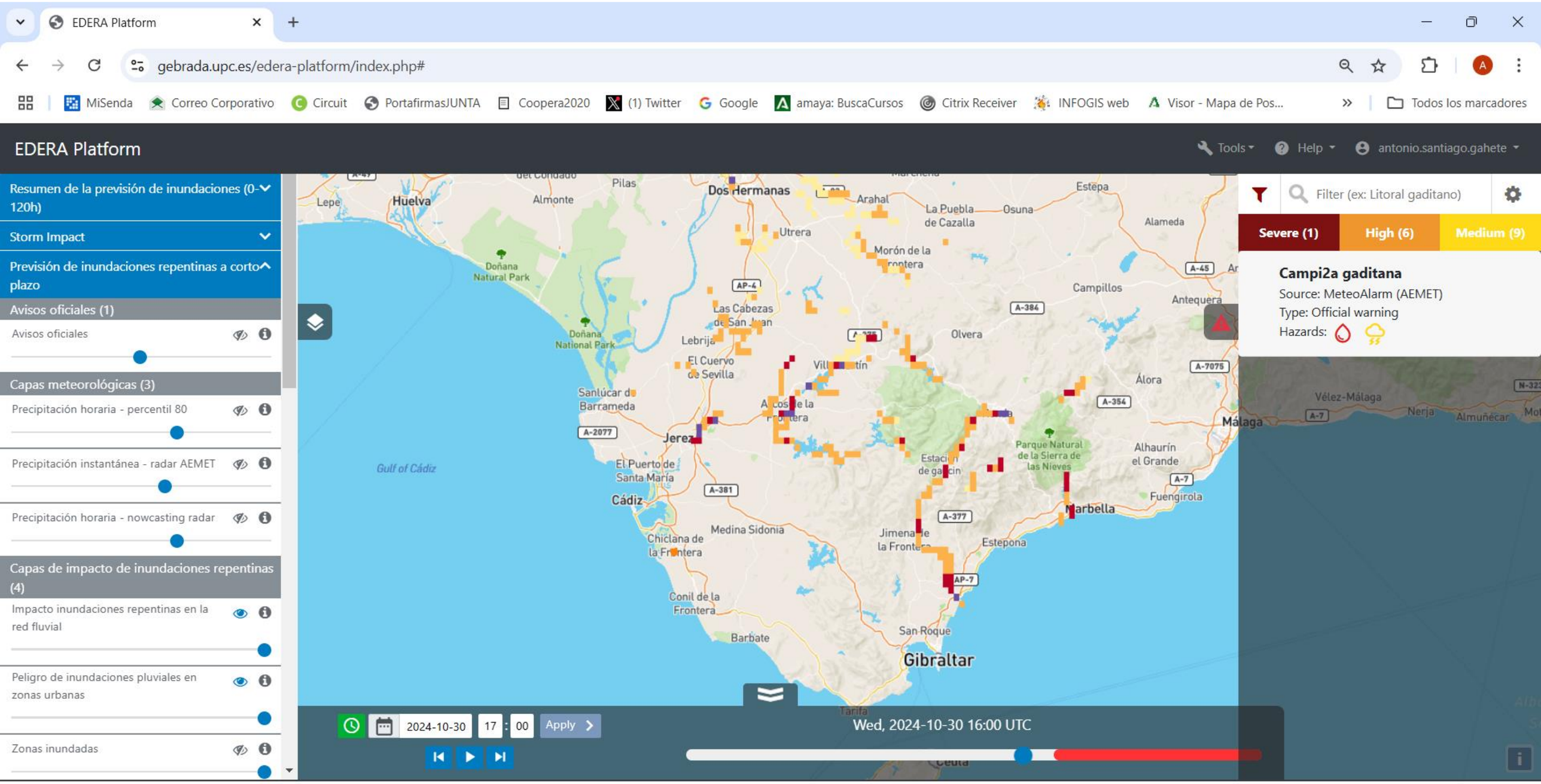
Block 3: Animated FF nowcasting

Evolution of the event as it was on-going – peak – end (AS)



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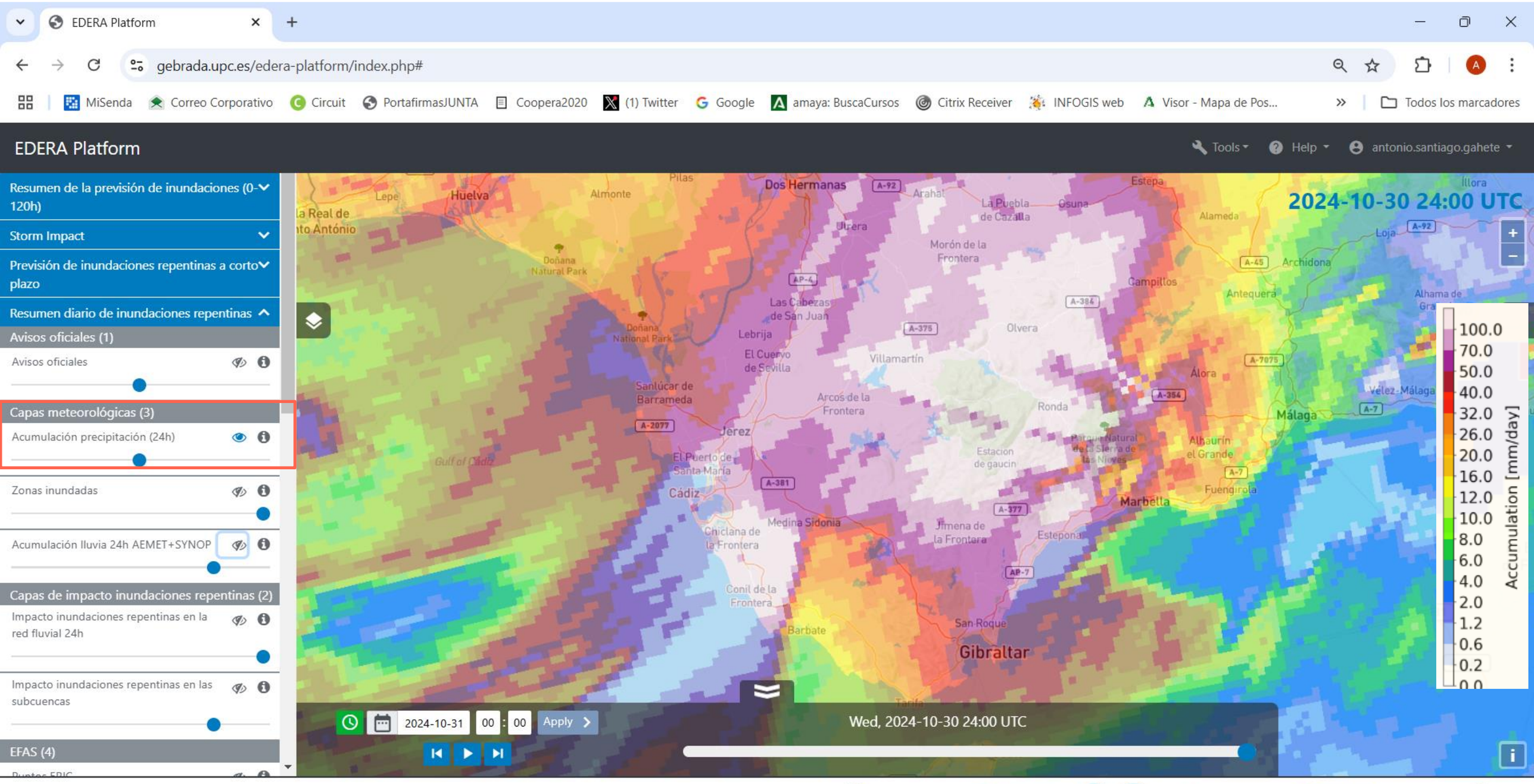
Block 4: Flash flood past 24h summary

Acumulated precipitation



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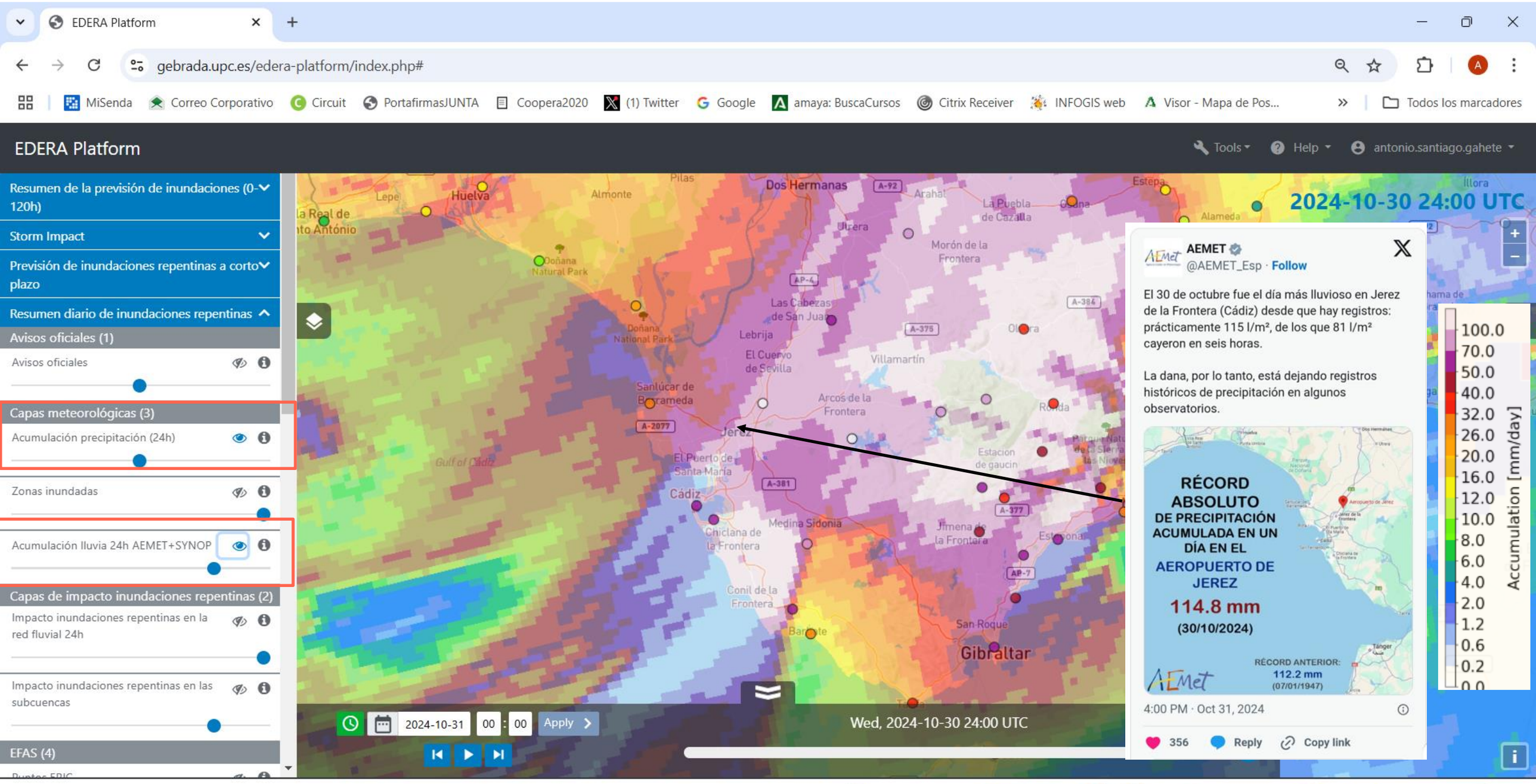
Block 4: Flash flood past 24h summary

Acumulated precipitation & Raingauges



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Block 4: Flash flood past 24h summary

Impacts

Flooding in:
JEREZ
El Puerto de Santa María
Sanlúcar de Barrameda

Transportation network affected:
CA-9101 Olvera
CA-3113 Puerto Real
CA-5101 Arcos de la Fra.
CA-9101 & N349 Jerez
A-372 El Bosque

EDERA Platform

gebrada.upc.es/edera-platform/index.php#

MiSenda | Correo Corporativo | Circuit | PortafirmasJUNTA | Coopera2020 | (1) Twitter | Google | amaya: BuscaCursos | INFOGIS web | Visor - Mapa de Pos... | Todos los marcadores

EDERA Platform — Tools — Help — antonio.santiago.gahete

Resumen de la previsión de inundaciones (0-120h)
Storm Impact
Previsión de inundaciones repentinas a corto plazo
Resumen diario de inundaciones repentinas
Avisos oficiales (1)
Avisos oficiales
Capas meteorológicas (3)
Acumulación precipitación (24h)
Zonas inundadas
Acumulación lluvia 24h AEM
Capas de impacto inunda
Impacto inundaciones repen red fluvial 24h
Impacto inundaciones repen subcuencas
EFAS (4)

2024-10-30 24:00 UTC

Huelva, Lepe, Almonte, Pilas, Dos Hermanas, Doñana Natural Park, Sanlúcar de Barrameda, Jerez, El Puerto de, Arcos de la Frontera, Olvera, Villamartín, Ronda, Estepa, Osuna, Alameda, Loja, Archidona, Antequera, Campillos, Álora, Málaga, Vélez-Málaga, Nerja, Alhaurín el Grande

Junta de Andalucía

Estudiar | Trabajar | Tu salud | Más temas | Transparencia | La Junta

incidencias la mayoría en Málaga, Granada y Almería

con 51 incidencias, Córdoba con 28 y Huelva (7) completan la nómina de incidentes en el 112 desde el inicio del temporal.

Durante las últimas horas se están gestionando incidencias principalmente en municipios de las provincias de Cádiz, fundamentalmente, en **Jerez de la Frontera, el Puerto de Santa María y Sanlúcar de Barrameda**, donde se ha atendido más de **medio centenar de casos en una hora** (entre las 12.00 y las 13.00 horas), entre los que se cuenta la anegación de t**res colegios en el Puerto de Santa María**, y el desprendimiento de parte del **muro de contención de las vías del tren**, detrás de la zona de **Guadalcacín**. En Jerez se ha solicitado rescate para tres menores en la calle Honda, todos han podido salir y han sido asistidos.

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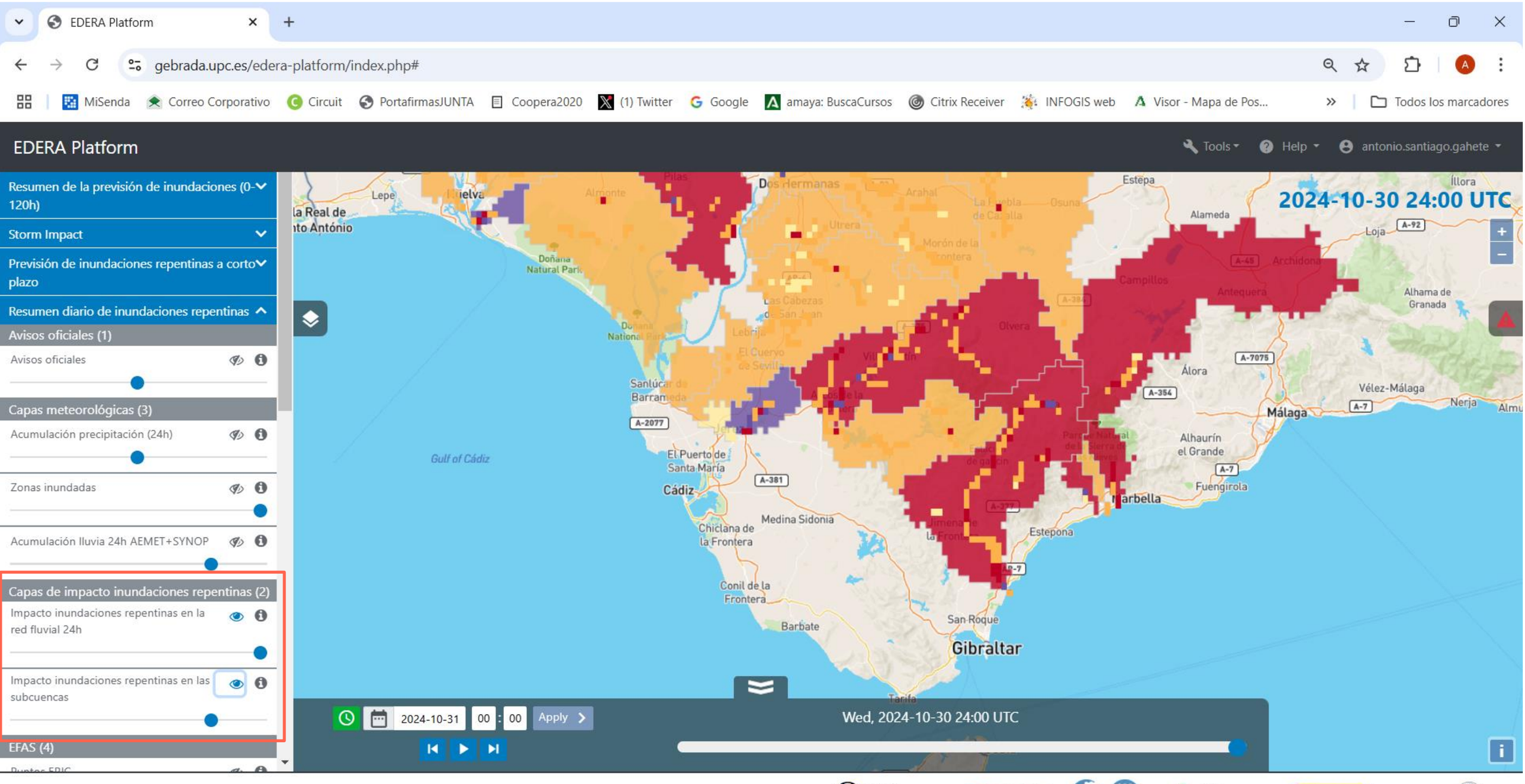
Block 4: Flash flood past 24h summary

Flash flood impact in the sub-catchments



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Block 4: Flash flood past 24h summary

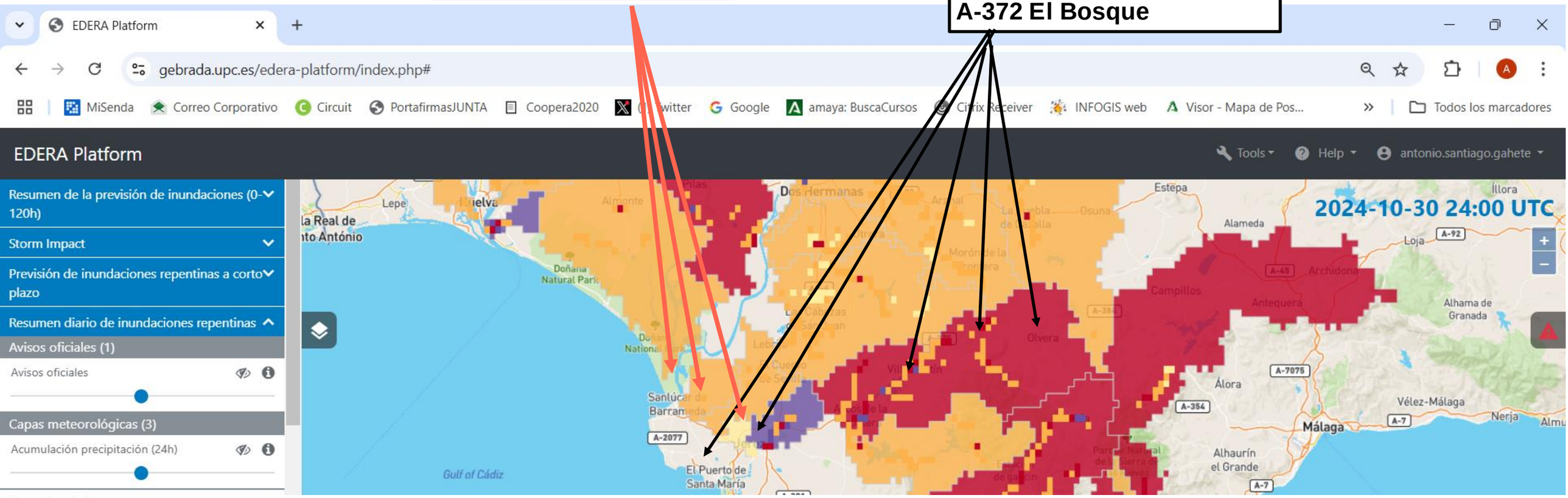
Impacts

Urban floods

JEREZ
El Puerto de Santa María
Sanlúcar de Barrameda

Road cuts

CA-9101 Olvera
CA-3113 Puerto Real
CA-5101 Arcos de la Fra.
CA-9101 & N349 Jerez
A-372 El Bosque



Junta de Andalucía

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En **Cádiz** el desbordamiento del río Guadalporcún ha afectado a un puente a la altura del kilómetro 6 de la CA-9101, así como a la CA-3113, también en el hito 6 en Puerto Real y la CA-5101, en Arcos de la Frontera. Asimismo, permanecen los cortes en la CA-9101 en el kilómetro 6, a los que se añade la N-349 entre los kilómetros 0 y 1.500 en ambos sentidos en Jerez; mientras que ya ha quedado limpia la A-372, kilómetro 31, en El Bosque.

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How to analyse an EDERA forecast?

Received notification emails (official warnings + EDERA notifications).

- Log in to the platform
- Analyse the summary of the forecasted situation (0-6h, 6-24h, 24-48h, 48-120h).

As the situation approaches,

- Monitoring the evolution of the storm impact (0-3h).
- Monitoring the evolution of flash flood impact forecasts (0-6h).

After the event:

Recap through the 24-h summary

More information?

EDERA training materials online
(don't miss Karen's presentation)

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

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EDERA products and tools: Demonstration on an event in Andalusia

Antonio Santiago
Calum Baugh, Shinju Park, Seppo Pulkkinen

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ECMWF
ILMATIETEEN LAITOS METEOROLOGISKA INSTITUTET FINNISH METEOROLOGICAL INSTITUTE
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GOBIERNO DE ESPAÑA MINISTERIO DEL INTERIOR DIRECCIÓN GENERAL DE PROTECCIÓN CIVIL Y EMERGENCIAS
EMERGÊNCIA E PROTEÇÃO CIVIL AUTORIDADE NACIONAL