



Satellite images of Valencia before and after the floods

In the actual context of climate change, with the Mediterranean sea being 2 degrees warmer than the average temperature measured from 1980 to 2000, the risk of extreme weather events such as the latest floods in Valencia will only get higher.

DESBORDAMENT

Rambla de Poio

17.10

100 m³/s

17.30

1000 m³/s

18.30

2000 m³/s

Font: Confederació Hidrogràfica del Xúquer

POLÒNIA
Avui, 22:05

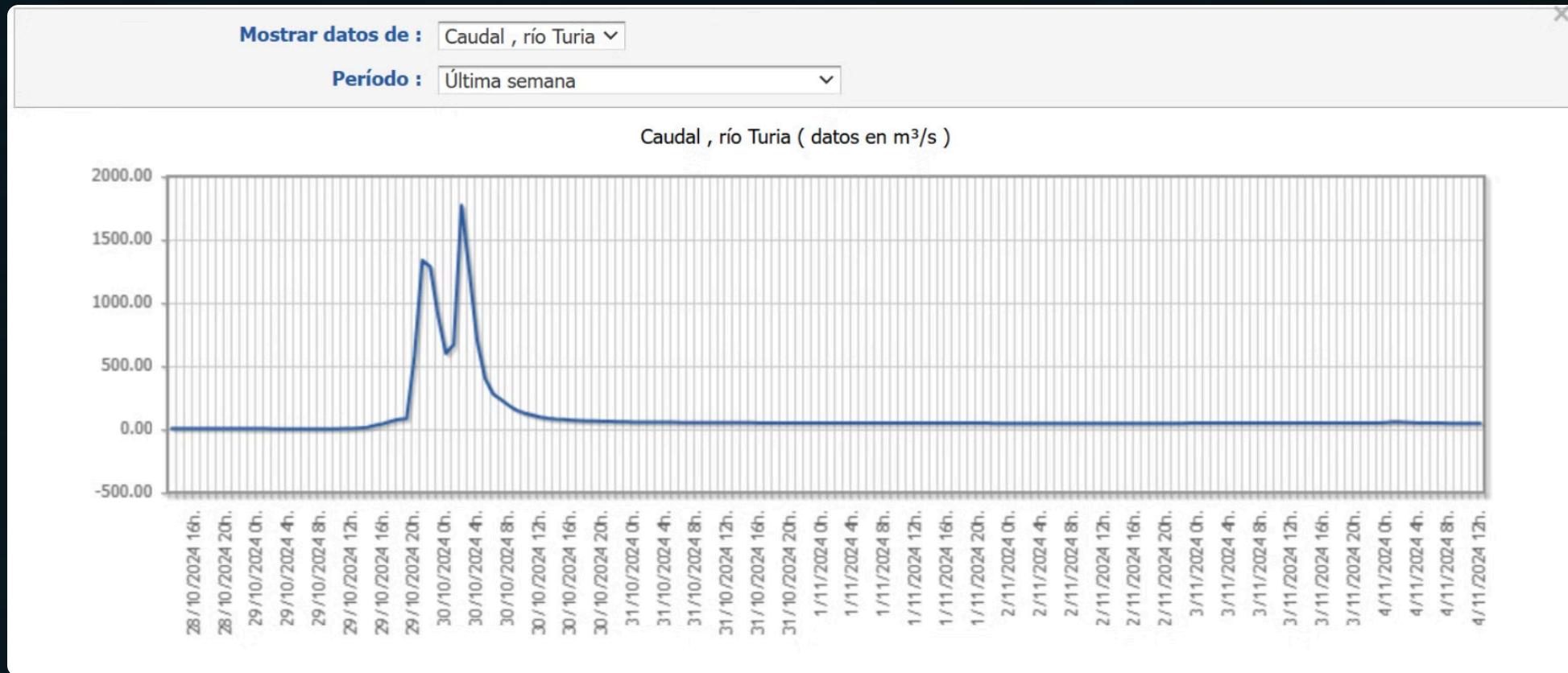
3

#TotEsMou3Cat

10:38

673 370 122

Local tv program showing data of the rise in water flow rates. Presented by a famous Catalan weather forecaster, Francesc Mauri.



Water flow rate graph of river Turia after the heavy rains (source: hidrographic confederation of Júcar)

Alarming Hydrographic Data

Records of 500-800 liters/m² in a short period of time > Extreme flow rate increase from 0 to 2000 m³/s in just 1.5 hours. This is 5-6 times the flow rate of the Ebro River in a small dry riverbed.

The Need for an Early Warning System



Lack of anticipation and fatal consequences

Authorities failed to warn the at-risk population in time. The floods caused more than 200 deaths.



Nota de prensa

Sucesión de hechos de la mañana del 29 de noviembre

Datos disponibles proporcionados por la Confederación Hidrográfica del Júcar durante la DANA

- El organismo de gestión de la cuenca hidrográfica del Júcar no tiene entre sus competencias la emisión de alertas públicas por riesgo de crecidas y avenidas
- Las competencias de alertas a la población corresponden a los servicios de emergencias coordinados por las comunidades autónomas

04 de noviembre de 2024. Las confederaciones hidrográficas tienen entre sus competencias medir y proporcionar datos actualizados en dos instancias: datos de pluviometría y el nivel de los cauces, técnicamente calificado como "aforo". Entre sus competencias no está la de emitir las alertas públicas en materia hidrológica. Son las autoridades competentes en materia de protección civil las responsables de evaluar las posibles afecciones de ese riesgo físico en la población y en el entorno, y, por tanto, de emitir los avisos que corresponda y adoptar las medidas de protección que consideren más adecuadas en cada caso.

Las confederaciones hidrográficas tienen una red automática de información hidrológica (SAIH) que permite monitorizar caudales permanentemente para que las autoridades de emergencias valoren la afección concreta sobre el territorio y determinen actuaciones para prevenir daños. Para realizar este trabajo

Official press release from the Hydrographic Center

State of
current
systems

Hydrographic Center

Only publishes
measurements
without its own alert
system.

European Flood
Awareness System
(EFAS)

Either it was not
implemented in Spain
during this event or it
was not effective
enough to alert
citizens at risk.



Automated system
to alert the
population at risk of
flash floods caused
by intense rainfall



Proposal



Data Collection

Real-time monitoring of water levels.



Automatic Alerts

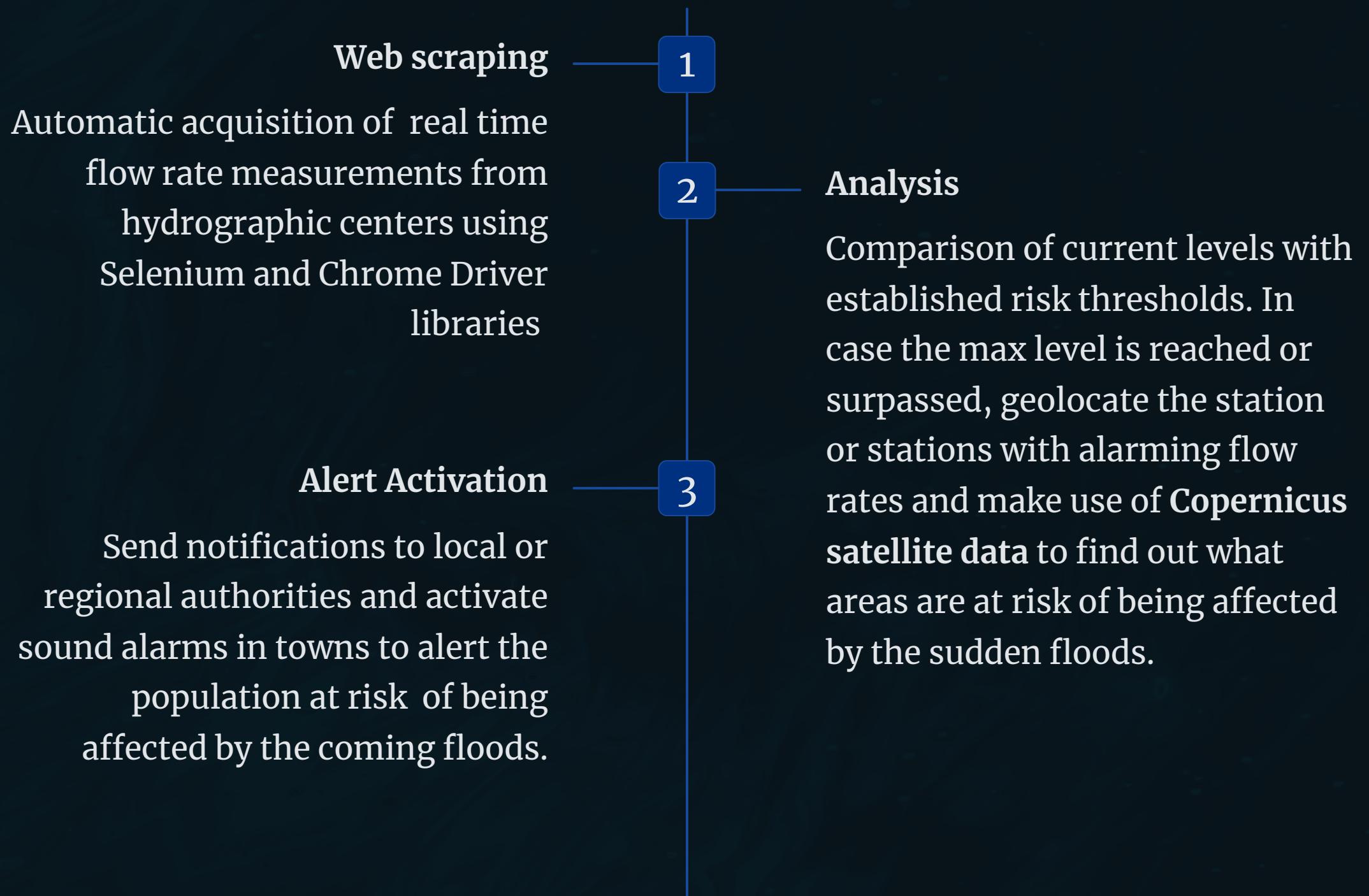
Notifications based on predefined risk thresholds.



Geolocation

Identification of flood-prone areas.

System Operation and technical implementation using Python



ads > Noah.ipynb > Noah FWS (Flood Warning Systems) > Main Objectives: > from selenium import webdriver

Run All Restart Clear All Outputs Variables Outline ...

```
um.webdriver.chrome.service import Service
um.webdriver.common.by import By
um.webdriver.support.ui import WebDriverWait
um.webdriver.support import expected_conditions as EC
um.webdriver.chrome.options import Options
ver_manager.chrome import ChromeDriverManager
port BeautifulSoup
as as pd

lib
mime.text import MIMEText
mime.multipart import MIME Multipart

evel threshold in m³/s and name of the station or statioins to be monitored.
1000
Rambla del Poyo"

to scrape data and check against max_level
atest_flow_rate():
    ChromeDriver with options
    options = Options()
    options.add_argument("--headless")
```

Re: - 20 November 2024 00:29



Further insights:

The code does not need to be constantly running 24 hours a day, 365 days a year. Only when red alerts are notified by national or European weather agencies for forecasting heavy rainfalls. Once the alert is notified, the code can be in execution monitoring water flow rates that are being registered every 5 minutes at the Hidrographic Center website.



Next Steps

Integration with EFAS

Collaboration with the European system to improve coverage.

Geographic Expansion

Implementation in more flood-prone regions.

Continuous Improvement

Refining the system based on feedback and new data.



Made with Gamma

Thank you for your attention