

# The SEED-FD Project's Objectives



SEED-FD

Vanessa Pedinotti, Magellium



# HORIZON-CL4-2023-SPACE-01-32: Copernicus for Emergency Management

Published:

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Budget:

3 M€

Kick-Off:

01/01/2024

Duration:

3 years

[Jan 2024 – Dec 2026]

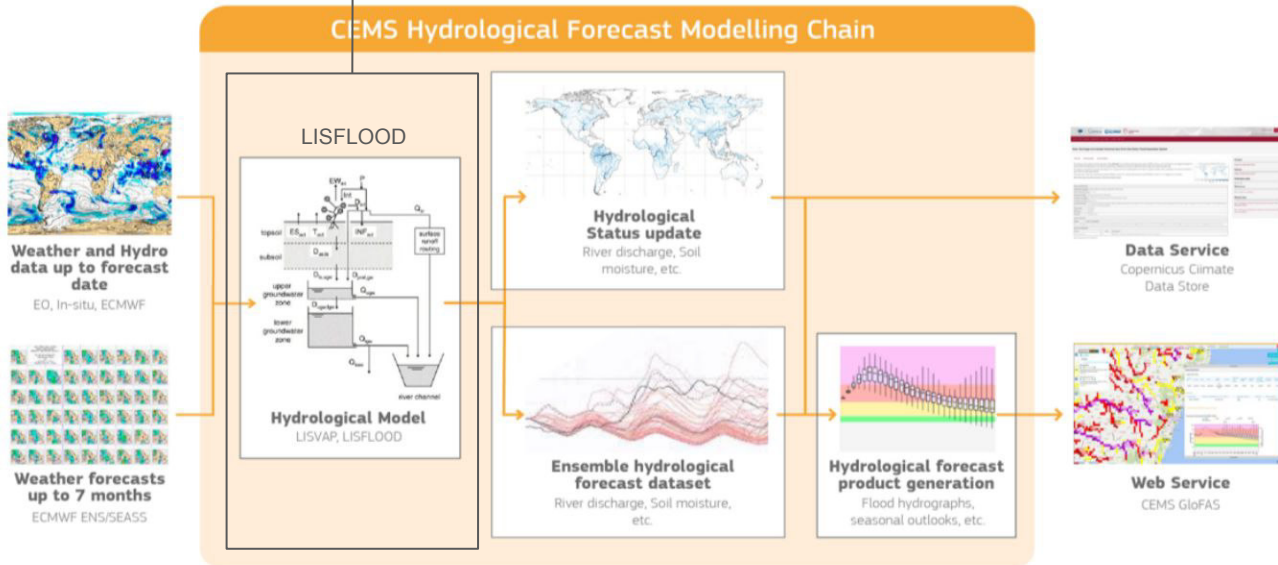
Consortium:

- Magellium (France, prime), ECMWF (science leader)
- CNR-IRPI (Italy)
- ICPAC (Kenya, Intergovernmental Authority on Development (IGAD) Climate Prediction and Application Center)
- IIASA (Austria, International Institute for Applied Systems Analysis)
- VORTEX.IO (France)
- POLIMI (Italy, POLITECNICO DI MILANO)
- DesignData (Germany)
- JRC (EU)



# CEMS-HFMC 1st gap : model representation of complex processes

- originally developed for European applications
- does not yet resolve many complex
  - processes and challenges associated with data scarce regions such as wetlands, reservoirs operation rules, groundwater flows, evaporation and specific routing.



# CEMS-HFMC 2nd gap: no use of EO data despite their extensive deployment

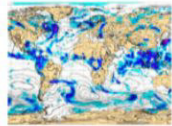


## Earth observation (Copernicus)

Water Level/ Discharge  
(S-3, S-6, SWOT, etc.)

Water extent  
(S-1, S-2)

- Not used in CEMS-EWS F&D :
  - model improvement (processes and calibration)
  - real time correction (data assimilation, post-processing)



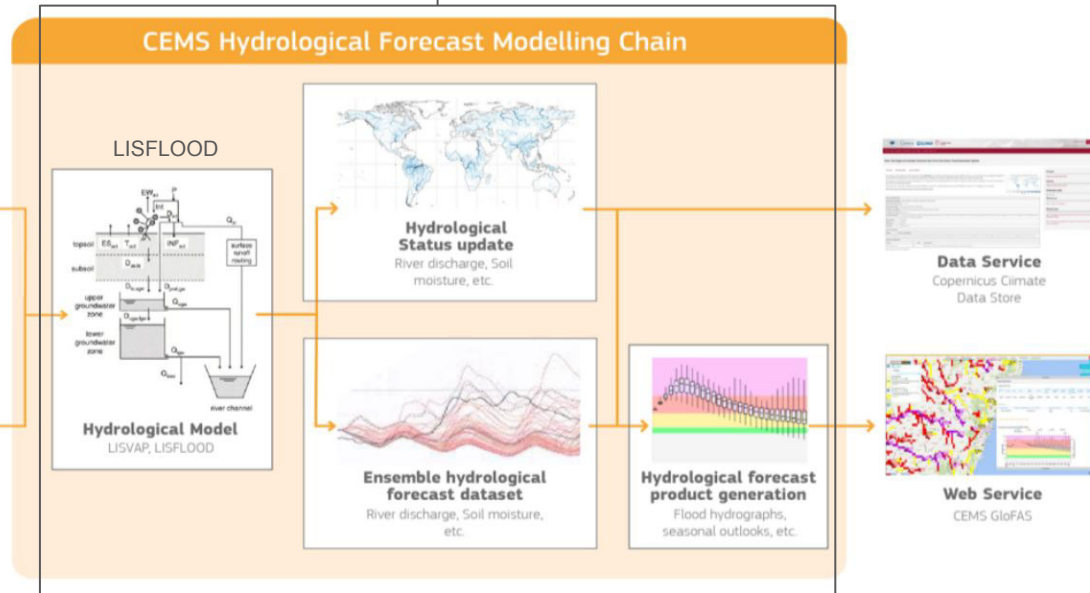
**Weather and Hydro data up to forecast date**

EO, In-situ, ECMWF



**Weather forecasts up to 7 months**

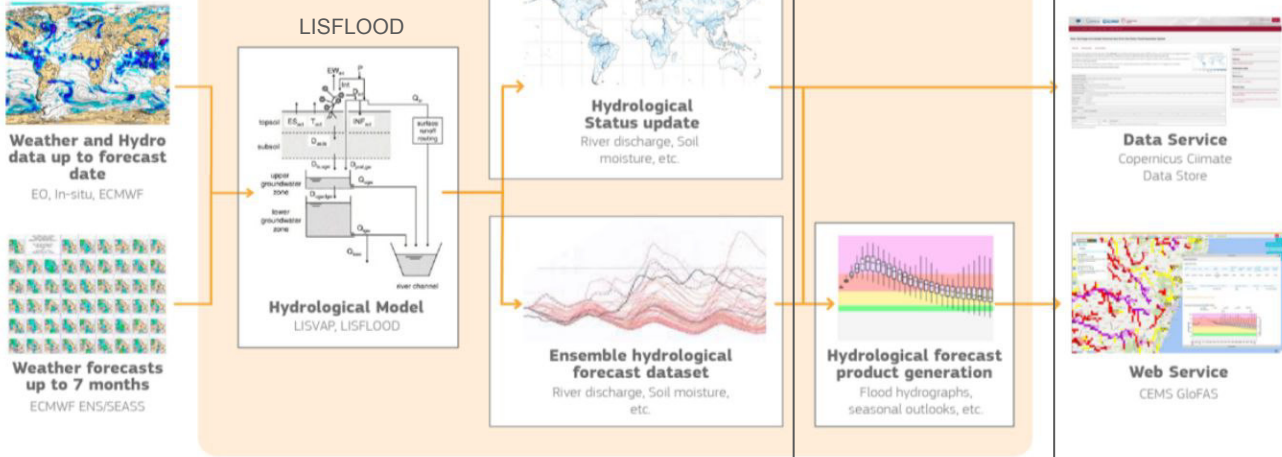
ECMWF ENS/SEA5



# CEMS-HFMC 3rd gap : some types of real extreme events are not detected



Important real-life extreme events are not in CEMS-EWS portfolio

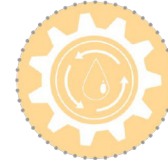


## Specific Objectives (SO)



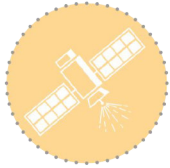
### Global Objective: Enhance the quality and portfolio of the CEMS EWS for floods and droughts

Enhance the CEMS hydrological model for better representing the range of hydro-climatic processes worldwide



SO1

SO2



Demonstrate the added-value of using information from satellite data and innovative in-situ micro-sensors for higher quality CEMS hydrological simulations and forecasts globally

Expand the CEMS EWS forecast product portfolio for floods and droughts by developing/ prototyping new extreme hydrometeorological event detection algorithms applicable worldwide

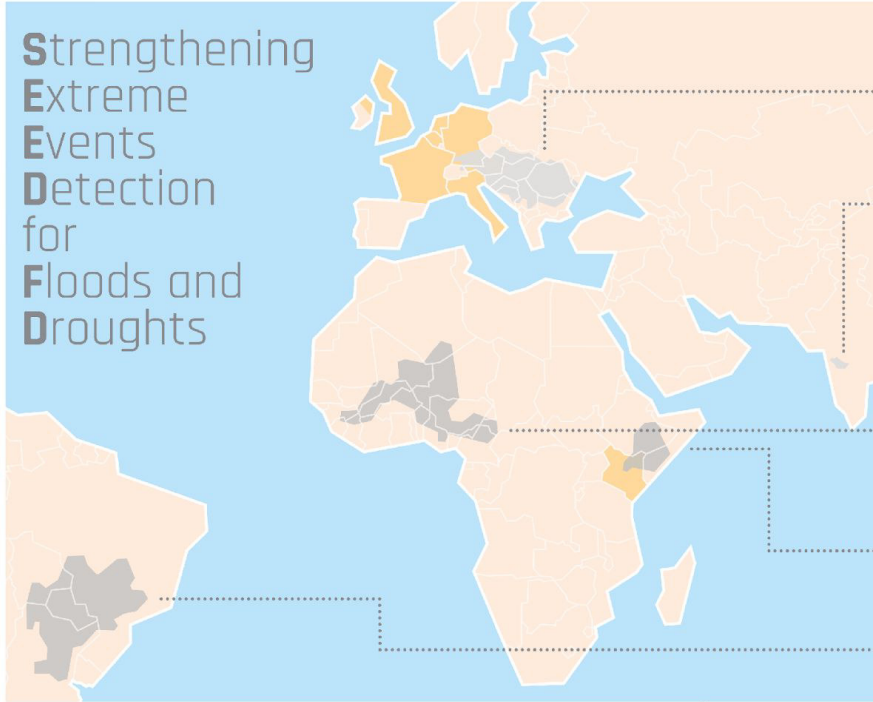


SO3



# Study and validation basins

## Strengthening Extreme Events Detection for Floods and Droughts



Partners ●  
2 development basins ●  
3 validation basins ●

### DEVELOPMENT

#### DANUBE

Major transboundary heavily regulated basin  
- temperate climate

#### BHIMA

Heavily managed surface and groundwater system - tropical climate

### VALIDATION

#### NIGER

Data scarce semi-arid area with monsoon season and large wetlands

#### JUBA - SHEBELLE

Data scarce semi-arid area, global hot spot for droughts

#### PARANÁ

Tropical transnational basin, axis for waterway movement

#### WORLD

Extreme hydrological events across the globe

### FLOODS

Flood caused by heavy rainfall, melting snow, or a combination of both

Monsoon flooding, high inter- and intrannual variability

### FLOODS

Multiple flash floods in urban areas each year

Occasional floods due to heavy rains in the headwaters

High population density, vulnerable to flash floods

Flash flood events that devastate populated areas and infrastructure

### DROUGHTS

Intensification of droughts with climate change

Multi-years droughts due to limited interannual storage

### DROUGHTS

Consecutive failed rainy seasons and decades of increasing desertification of the Sahel

Currently facing worst drought in history

Multi-year droughts, lowest water levels in 80 years

Long-term impact on population, food and energy security worldwide

# The SEED-FD project on a map



Multiple sources of data (Eo and non-EO)

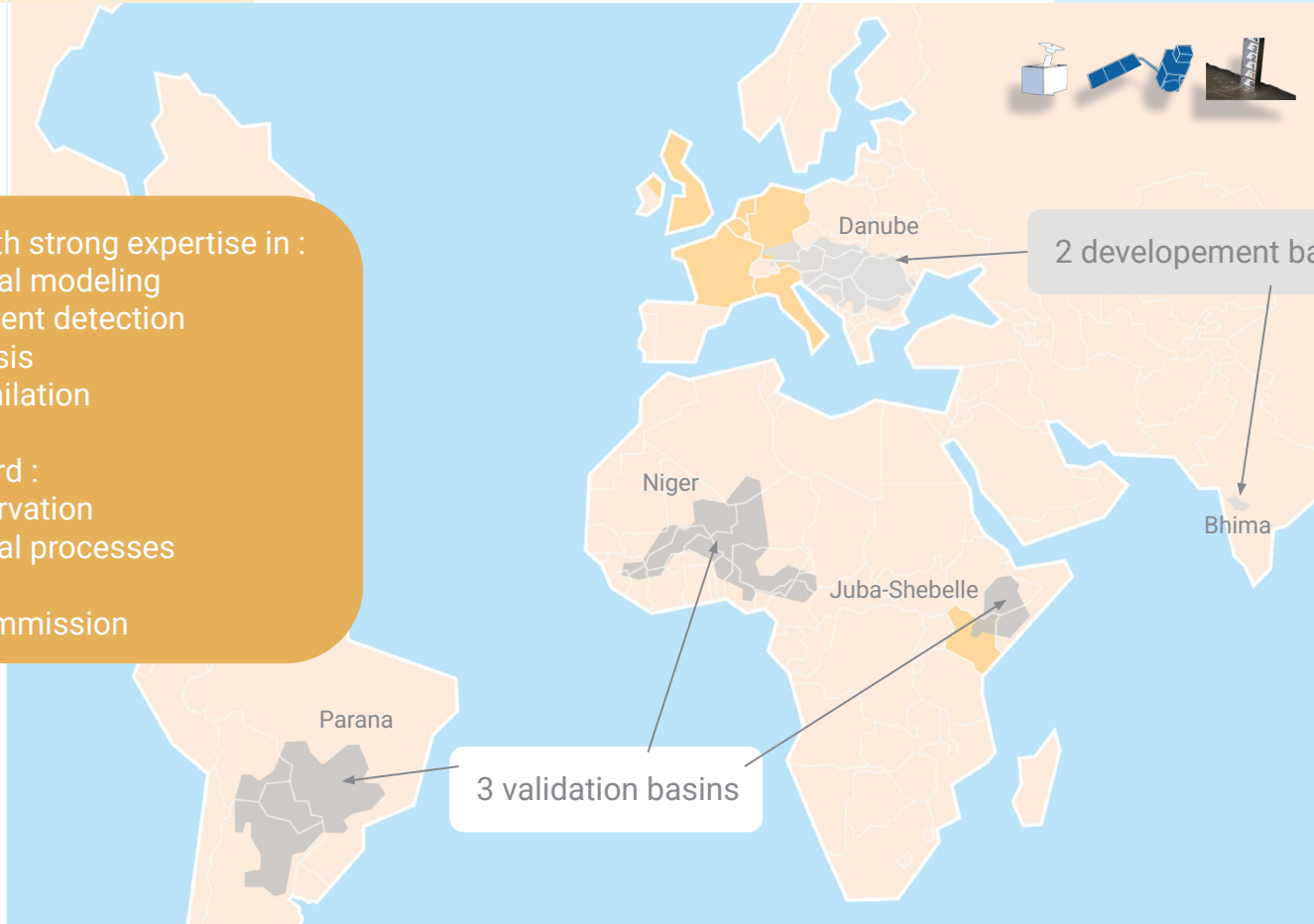
9 partners with strong expertise in :

- Hydrological modeling
- Extreme event detection
- Data analysis
- Data assimilation

Advisory Board :

- Earth observation
- Hydrological processes

European Commission



2 development basins

3 validation basins

Danube

Niger

Juba-Shebelle

Parana

Bhima

# Project communication



**SEED-FD** Learning Resources

## Advancing the prediction of extreme hydrological events

Strengthening Extreme Events Detection for Floods and Droughts

[in](#) [X](#)

**SEED-FD** Learning Resources

The SEED-FD learning resources offer insights into the project's scientific hydrological modelling and forecasting methods. New resources and information will be added regularly to ensure this page is stay updated.

### GLDAS

The Global Flood Awareness System (GLDAS), part of the Copernicus Emergency Management Service (CEMS), provides valuable flood forecasts for global river basins. The SEED-FD project aims to enhance GLDAS by integrating additional hydrological data, including satellite soil moisture data, to strengthen global disaster preparedness.

### LISFLOOD

LISFLOOD is a hydrological model, which simulates floods and droughts. It serves the CEMS Early Warning System for Droughts, providing real-time forecasts globally. SEED-FD further enhances LISFLOOD by integrating data and innovative modelling techniques, reducing false warnings and improving disaster management, risk assessment and hydrological scientists are invited to contribute.

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Advancing the prediction of extreme hydrological events

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@seed\_fd Follows you

SEED-FD is a #HorizonEurope project aiming to enhance global predictions of extreme hydrological events like #floods and #droughts

Science & Technology [seed-fd.eu](#) Joined July 2024

22 Following 33 Followers

Followed by ECMWF

**Posts** Replies Media

**SEED-FD** @seed\_fd · Sep 6  
🌱 How can we ensure global protection from extreme weather?

SEED-FD supports the UN's mission by enhancing Europe's Copernicus EWS for floods & droughts with advanced satellite tech & hydrological models.

Join us and learn more: [seed-fd.eu](#) #Hydrology #seedfd

# Floods & Droughts

How can we predict them?

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3 Tage · 🌱

How can we ensure everyone worldwide is protected by early warning systems? The UN's goal is within reach - by leveraging the latest in satellite technology and advanced hydrological simulations, Europe is leading the ... mehr

Übersetzung anzeigen

# Floods & Droughts

How can we predict them?

8 2 direkt geteilte Beiträge

Gefällt mir Kommentar Teilen Senden

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1 Woche · 🌱

Can we improve the prediction of extreme hydrological events? Yes, with SEED-FD ... mehr

Übersetzung anzeigen

# Strengthening Extreme Events Detection for Floods & Droughts

8 1 Kommentar · 6 direkt geteilte Beiträge

Gefällt mir Kommentar Teilen Senden



## 'Everyone, everywhere in the world protected by an EWS'



Local authorities, water security and humanitarian agencies will benefit from real-time and quantitative global forecasts of floods, droughts and new extreme events.

Scientists will have access to new or improved tools for hydrological modeling, data assimilation, data processing and forecasting of floods and droughts.



Better synergy between Copernicus services - integrating Copernicus satellite data into the CEMS EWS and adding new and innovative in-situ observations.

Use real case studies to raise awareness of flood and drought prevention with a wider audience.

