



# GloFAS and GFM data usage in the context of the Horizon Europe project CENTAUR

**CEMS Global Flood Forecasting and Monitoring Meeting**

9<sup>th</sup> February 2023

Luisa Bettili, PhD, e-GEOS



This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No. 101082720 - CENTAUR

# 1 CENTAUR excellence: introduction and objectives

CENTAUR responds to societal challenges due to Climate Change threats, developing new service components for the Copernicus Emergency Management Service (CEMS) and Copernicus Service in Support to EU External Action (SEA).

**Objectives:** i) **Improving situational awareness and preparedness around climate change** and its impact on complex emergencies and multi-dimensional (security) crises; ii) **anticipating the occurrence and possible knock-on effects of crisis events**, in particular those triggered by climatic extremes, thus contributing to resilience and effective adaptation.



From raised alerts, CENTAUR moves to an event driven setting, where indexes shall be updated, benefiting from actual measurements of key parameters and newly acquired data at higher resolutions.



Analytics - multi criteria indexes

Large-scale information over wide areas, for wide-scale observatories of phenomena capable to switch on red lights corresponding to significant changes in the normal patterns of the indicators.

## CENTAUR DOMAINS OF APPLICATION IN CEMS AND SEA



**FLOOD-RELATED THREATS** to population and assets in **URBAN AREAS**

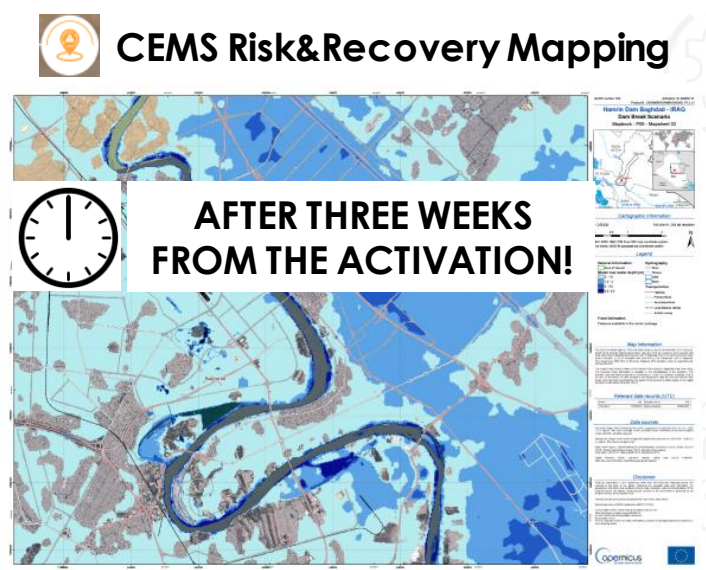
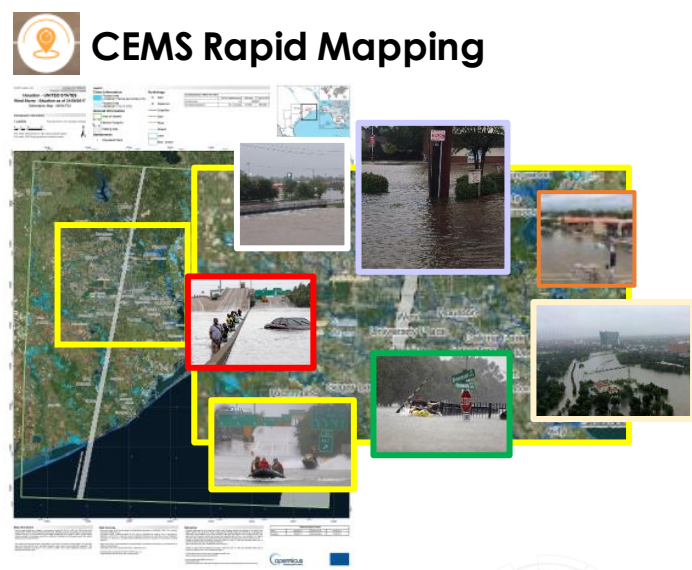


**WATER/FOOD INSECURITY** and model subsequent risks **IN DEVELOPING AND FRAGILE COUNTRIES**

## 2 Limitations: CEMS flood detection in urban areas and pluvial floods prediction

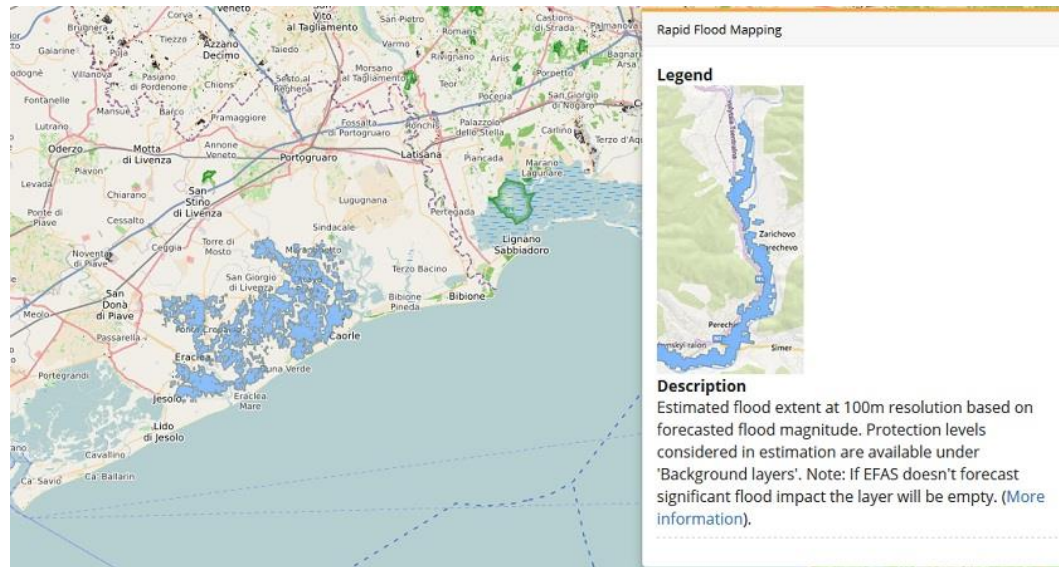


Topic	Limitations
Floods in urban areas reflected in CEMS services	Satellite sensors technology
Prediction of pluvial floods (Rapid accumulation of water in urban areas associated with intense rainfall)	Spatial coverage of terrestrial radar. Limited predictability of intense rainfall by Numerical Weather Prediction models. Availability of HR datasets of urban flood inundation.

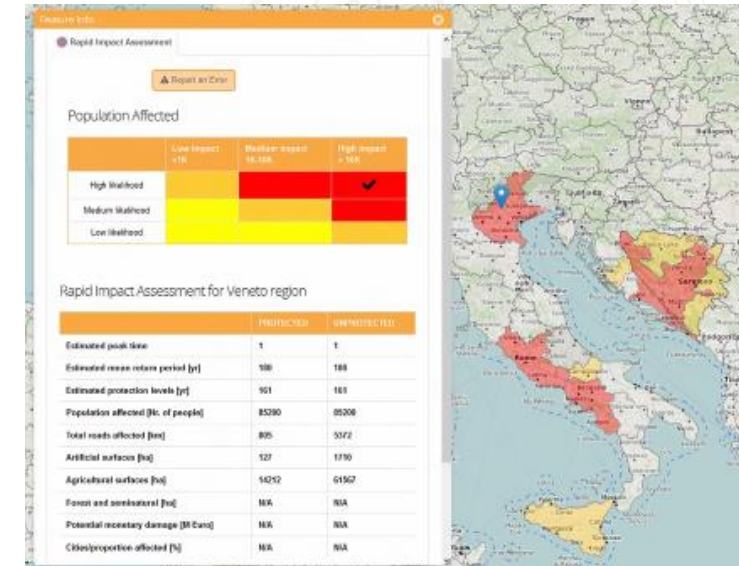


	PREDITION OF PLUVIAL FLOODS	FLOOD DETECTION IN URBAN AREAS	
Data	GFM NRT flood delineations and GLOFAS forecast precipitation	GFM NRT flood delineations and GLOFAS forecast precipitation	GFM NRT flood delineations combined with further EO/non EO data
Approach & innovation	Develop ML methods to improve the timing and localization of intense precipitation forecasting. The accuracy will be verified in urban areas.	Enhance the efficiency of pre-tasking acquisition process	Enhance the efficiency of pre-tasking acquisition process
	Developing <b>inundation probability maps</b> for specific use cases based on available historical urban flood mapping acquisitions. Scalable methodology.	Increasing satellite acquisitions for the hydraulic modeling calibration	More data useful for the flood temporal analysis and assessments
	Creating <b>database of urban events using VHR SAR data</b> processed with std and InSAR techniques, for verification combining mapping acquisition, hydraulic modelling and open data sources.	Increasing hydraulic model accuracy and improving delivery products timeliness	More accurate hydraulic modelling results for all the extreme event days

## EVOLUTION IN INUNDATION FLOOD MAPPING



CURRENT FLOOD EXTENT AT 100M RESOLUTION ACROSS EUROPE



CURRENT RISK MAPPING ON THE EUROPEAN SCALE

Current flood inundation probability maps are events-based: model forced with 2, 5, 20 year return periods of flood peaks. **Evolution in CENTAUR:** urban flood inundation on **10m-scale** using a high-resolution digital terrain map (DTM) for **urban areas across Europe**. Methodology: it will be developed for the participating municipalities, but can be upscaled to all European cities, whether required information are available. Flood inundation and water depth maps will be calculated for a range of return periods of intense precipitation events (e.g. 2, 5, 20, 50 year). The return period maps will also be overlaid with exposure and vulnerability (such as population) to create risk maps on desired resolution. The inundation, depth and risk maps will be triggered by forecasts of intense precipitation and disseminated to forecasters and first responders. A similar approach will be tested on the global scale, but the resolution is yet to be determined.

**Thanks for your kind  
attention.**

