Impact-based flood forecasting
in the Greater Horn of Africa
Lorenzo Alfieri, CIMA Foundation
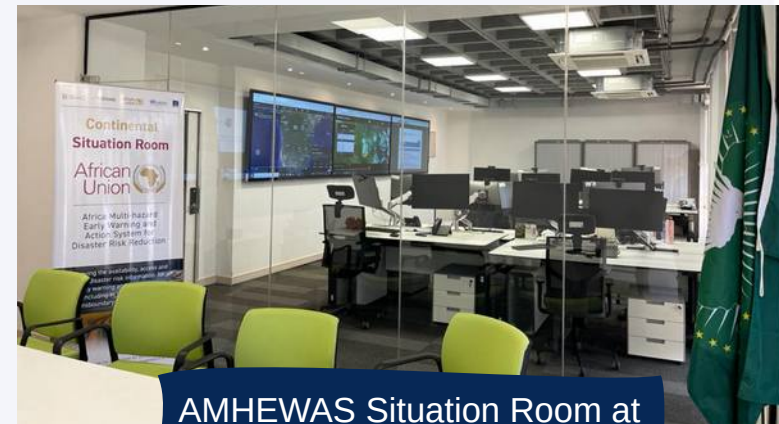
Introduction

Goal

An African Multi-Hazard Early Warning and Action System (AMHEWAS) for Disaster Risk Reduction

Key activities

- Design of legal and institutional framework
- Set up of situation rooms with 24/7 operation and Standard Operating Procedures
- Operational tools for monitoring and forecasting extreme hydro-meteorological events
- Issuing of regular bulletins for hazard monitoring and forecasting
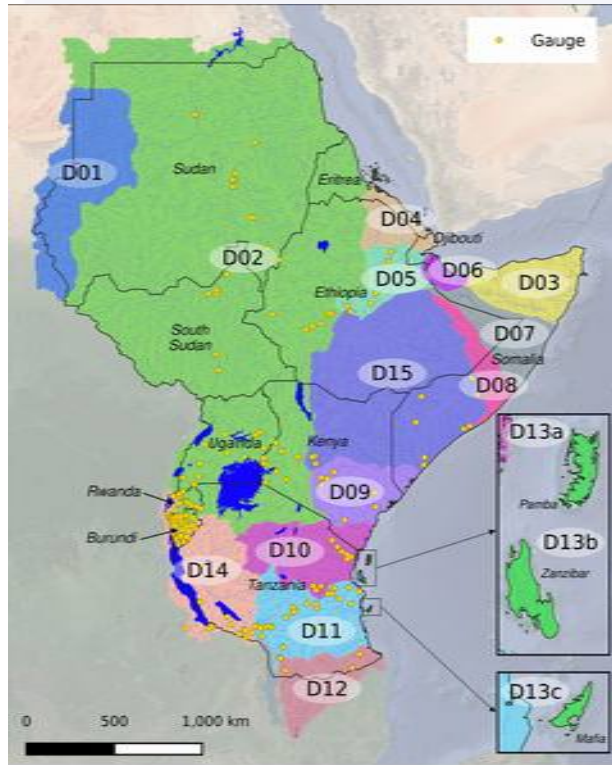- Capacity building for staff and experts from Member States and RECs

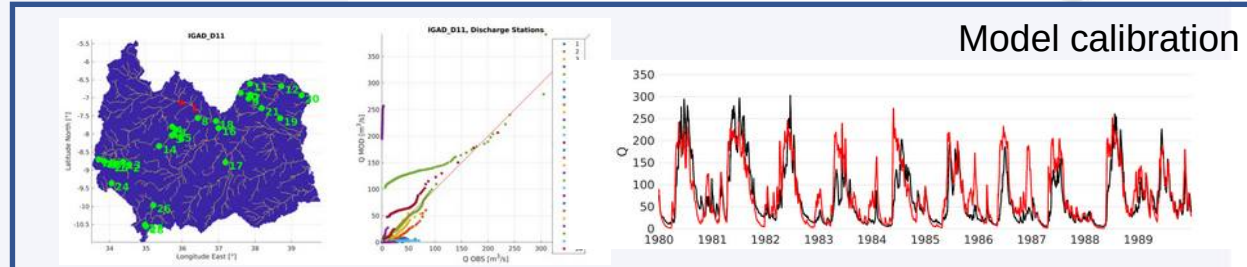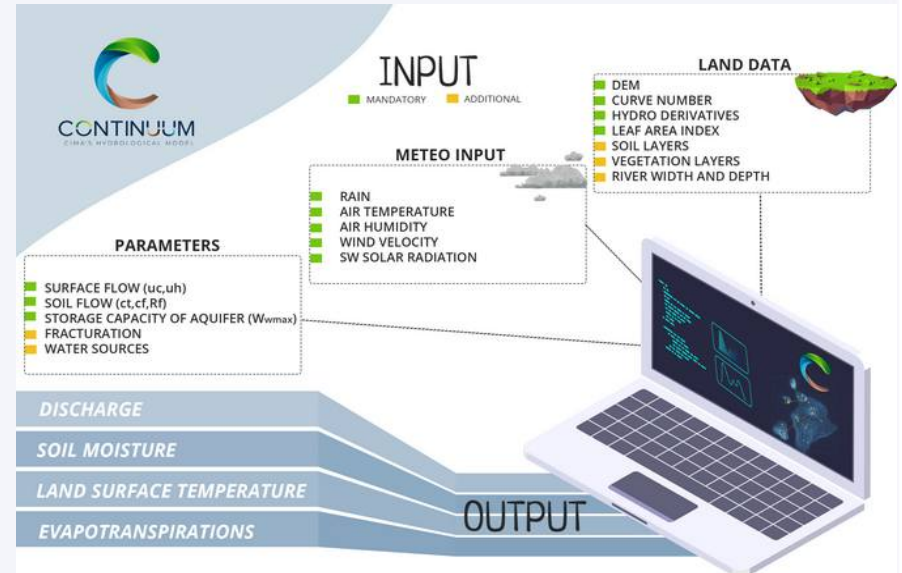AMHEWAS Conference Nairobi, October 2021

AMHEWAS Situation Room at AUC Addis Ababa, Ethiopia

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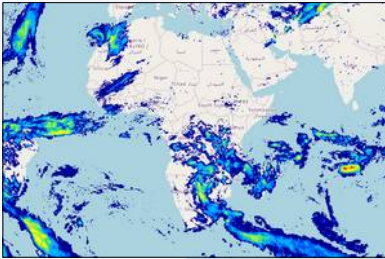THE WORLD BANK
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Flood-PROOFS East Africa

- 11 countries
- 17 domains
- 6.8 million km^2
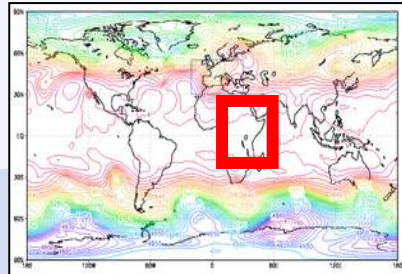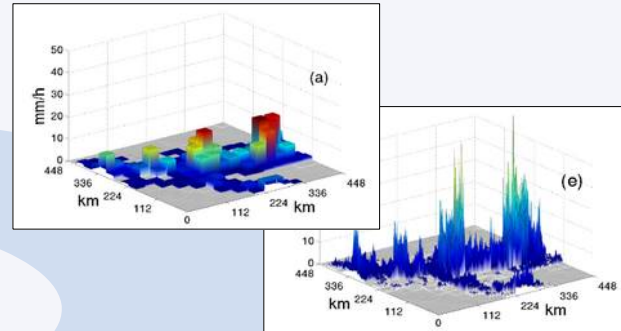- 250m to 3km grid resolution
- 5-day forecasts

Model calibration

Hazard forecasting

Latest observations
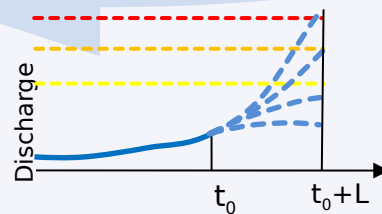
Global or Local meteorological model

Pre-processing

Hydrological model

Hydraulic model
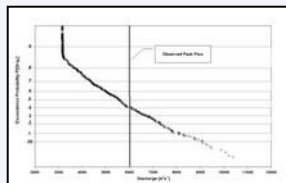
Early Warning

Probability of peak discharge

Discharge forecasts up to 120h

Discharge

t_0 t_0+L
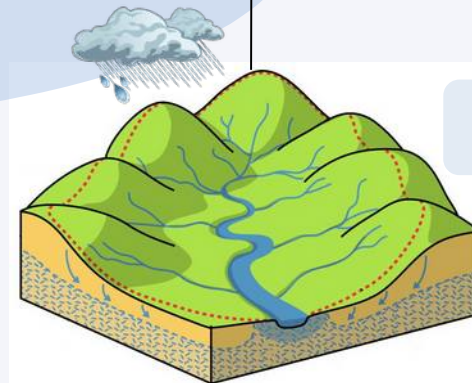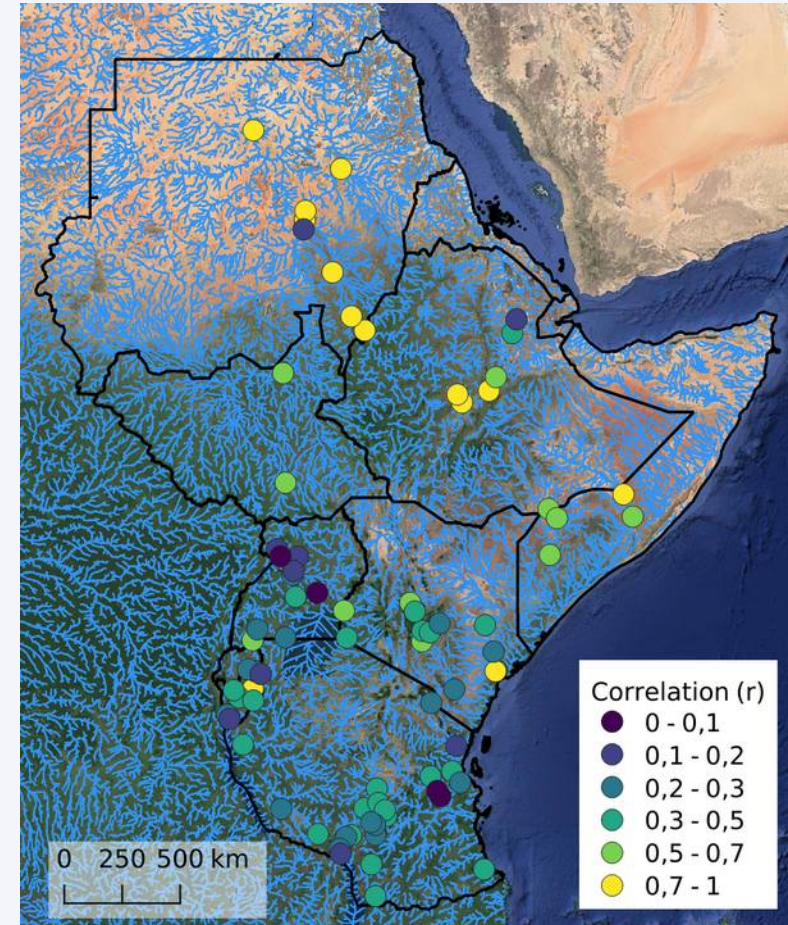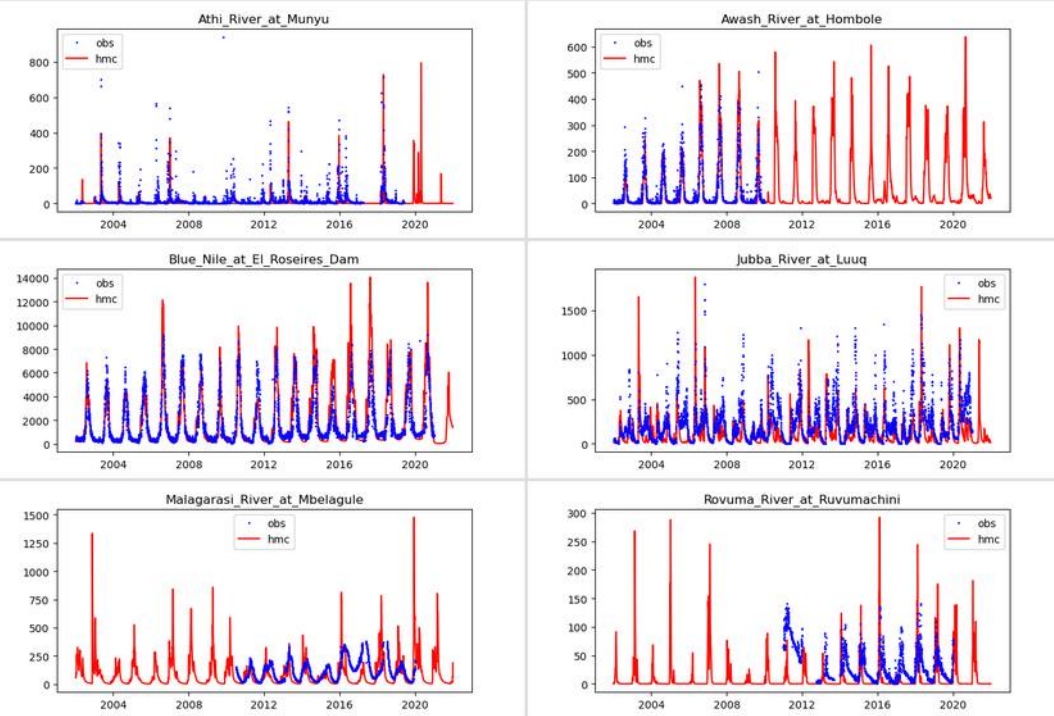
Calibration results

Model calibrated at 56 river gauges using 3 years of data; validated at 78 river gauges using up to 20 years of data

More details in Alfieri et al. (NHESS, 2023)
https://doi.org/10.5194/egusphere-2023-804

Impact forecasts

5-day **impact-based forecasts** for the following categories:

1) Population affected [-]
2) Population displaced [-]
3) Crop land affected [ha]
4) Grazing land affected [ha]
5) Livestock affected [-]
6) Roads affected [km]
7) Loss of GDP [USD]

Based on deterministic peak flow forecasts from *FloodPROOFS East Africa* and inundation maps.
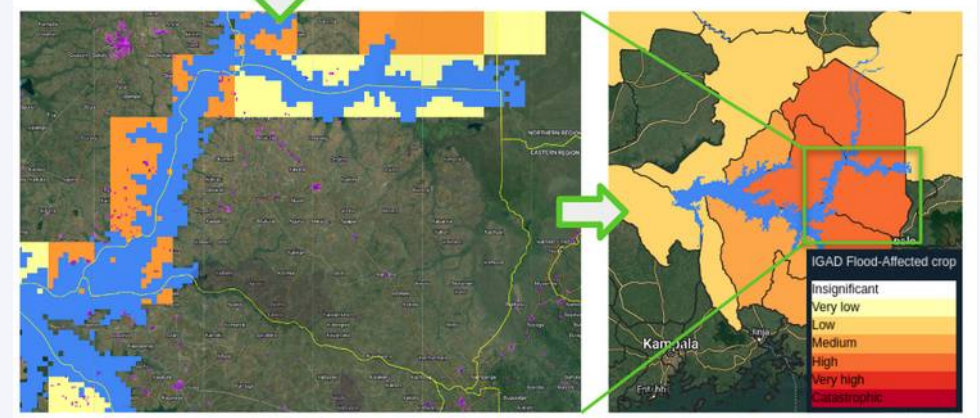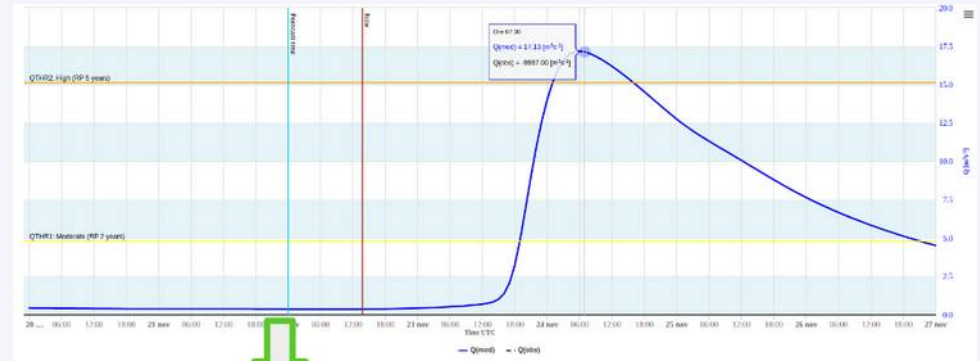
$$\text{Impacts}_{ADMIN} = \Sigma(H \times Exp_{Hc}) \times V \times Lcc$$

Hazard   Exposure   Vulnerability   Lack of coping capacity

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myDewetra web interface

MyDewetra is a geospatial visualization platform. It provides a single point of access to environmental information for hazard monitoring, early warning, supporting forecasters and decision-makers in disaster risk management as well as during emergencies
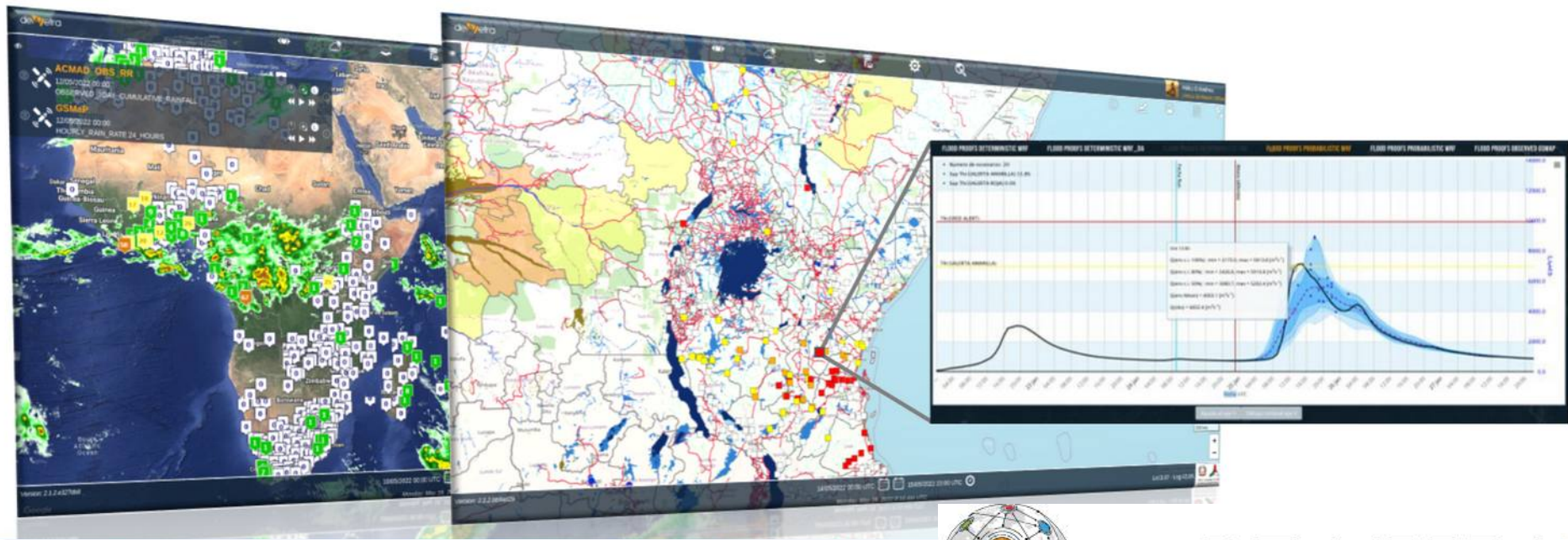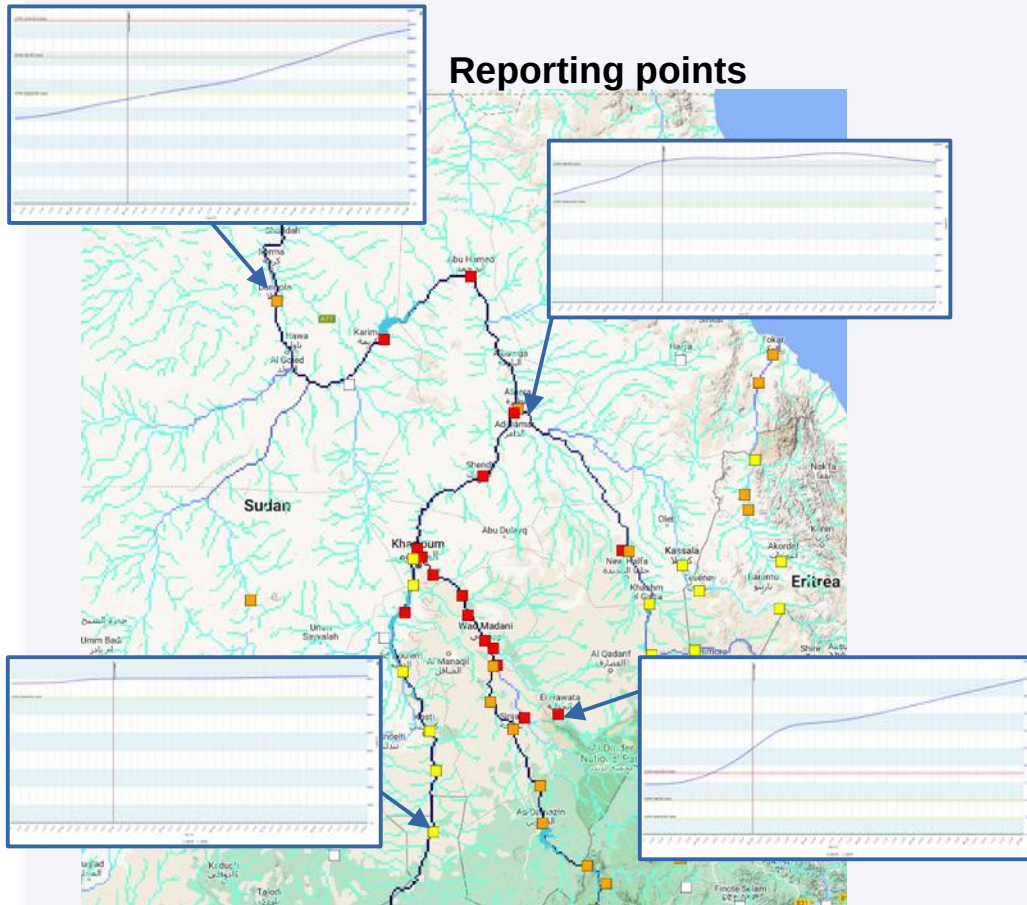
2020 floods in the Nile
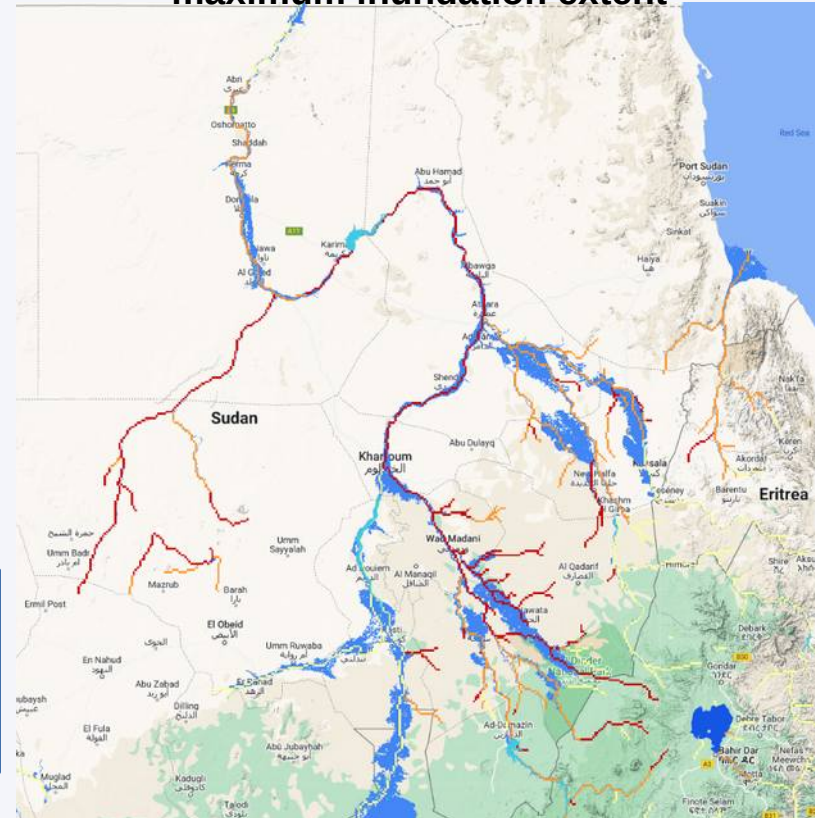
Reporting points

5-day flood hazard levels and maximum inundation extent

Forecast run: 2 September 2020

Forecast run: 2 September 2020

Impact forecasts

Affected cropland [hectares]
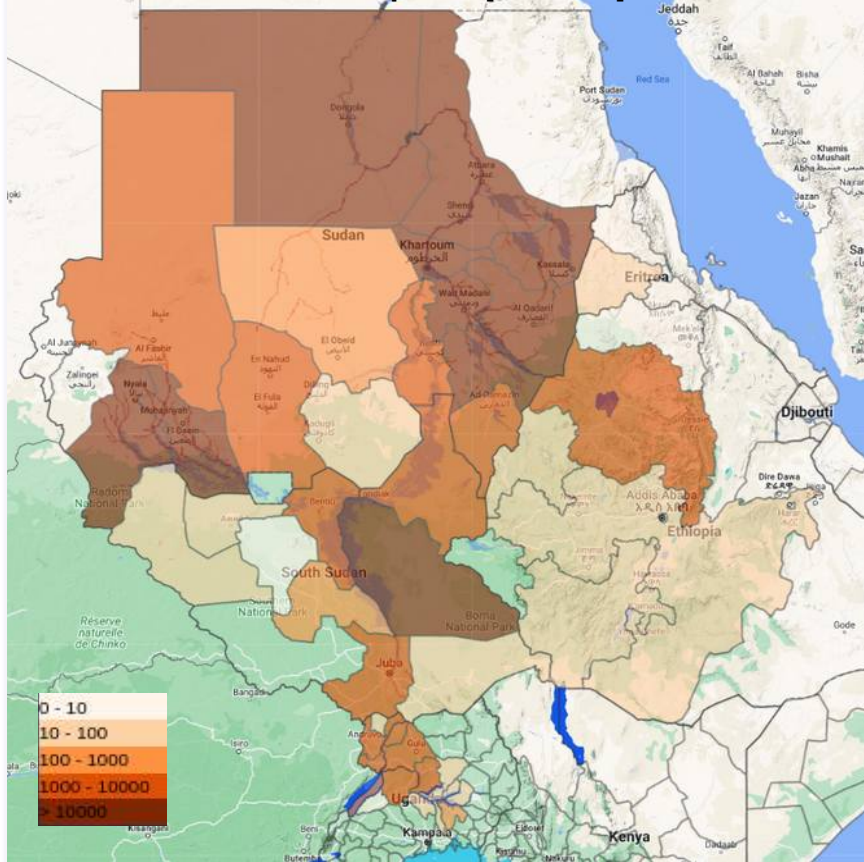
Affected cropland [% of admin region]

Forecast run: 2 September 2020
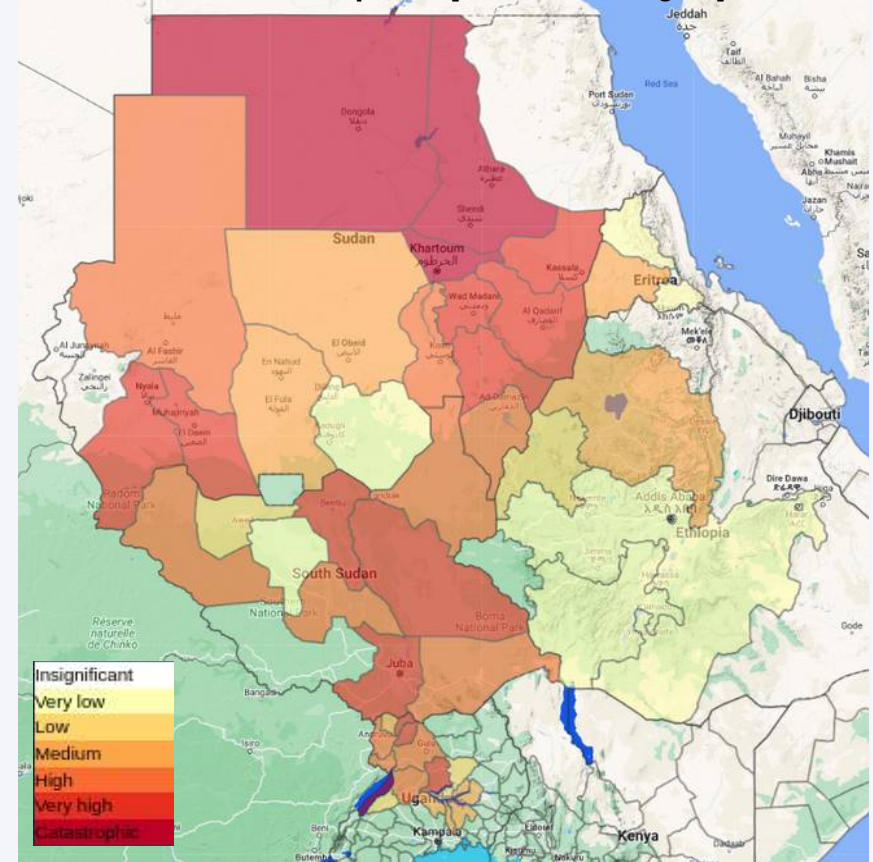
Forecast run: 2 September 2020

Population affected

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INITIATIVE DU BASSIN DU NIL

5-day forecasts
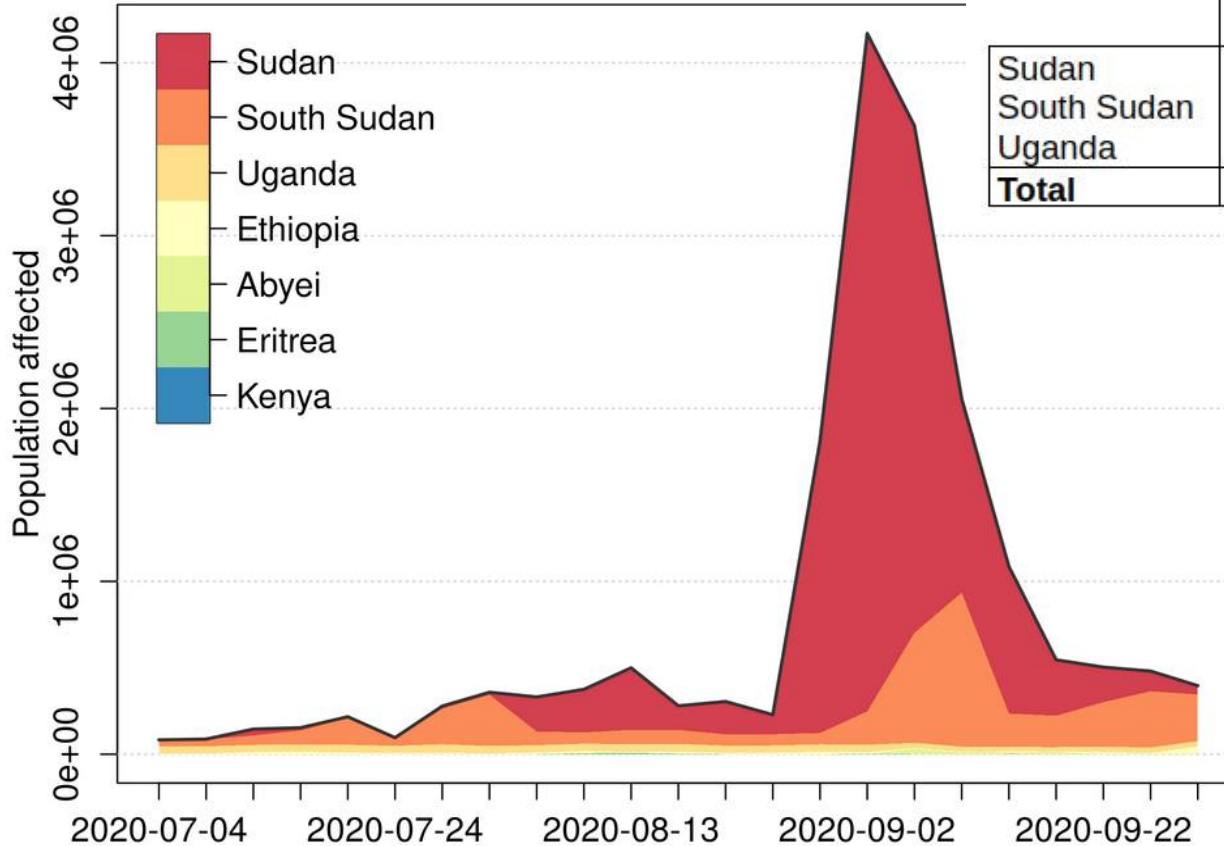
	Population Affected [1,000]		
	EMDAT	FPEA	GloFAS
Sudan	875	3920	39.7
South Sudan	1042	891	184
Uganda	8.7	49	0
Total	**1925.7**	**4860**	**223.7**

Large uncertainty in observed impacts

UN FAO reported as affected nearly one third of cultivated land and about 3 million people from agricultural households in Sudan

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Impact forecasts for Sudan states
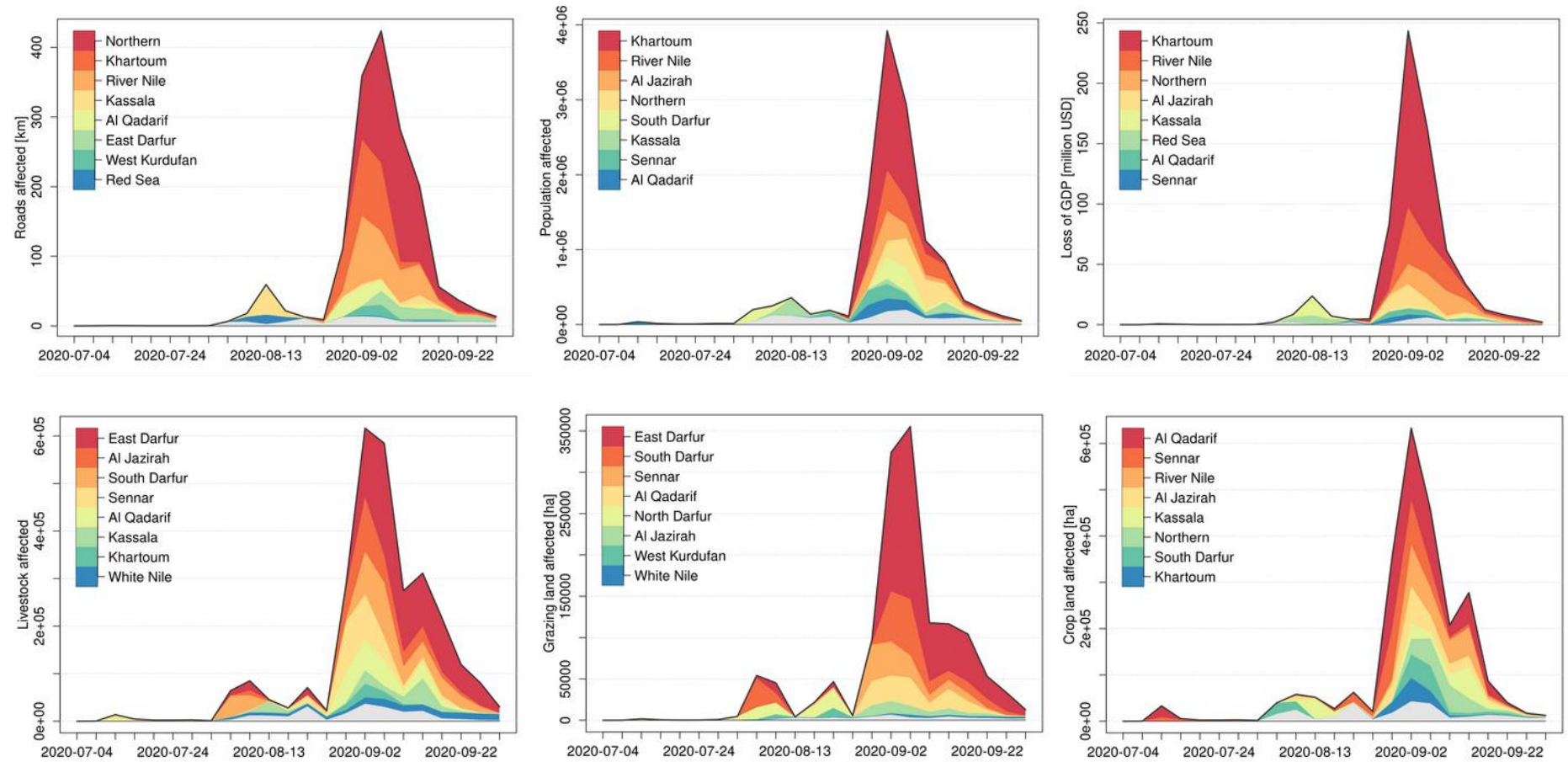
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INITIATIVE DU BASSIN DU NIL

THANK YOU!

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