

# Drought Monitoring and Forecasting

Launch of the African Drought Monitor and Advisory



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# Drought

## Characteristics

- Slow onset, “creeping” phenomenon
- Affects all compartments of the hydrological cycle (rainfall, soil moisture, groundwater, reservoirs, river flows)
- Impacts are non-structural, spread over large areas and long time periods (direct and indirect), affect many people, and depend on the exposure and the societal, ecological and environmental vulnerability
- Crop economic losses in 2022 in Billion US\$, 13 Brazil, 6.2 Europe, 4.7 China, 0.3 Morocco \*

\* SwisseRe

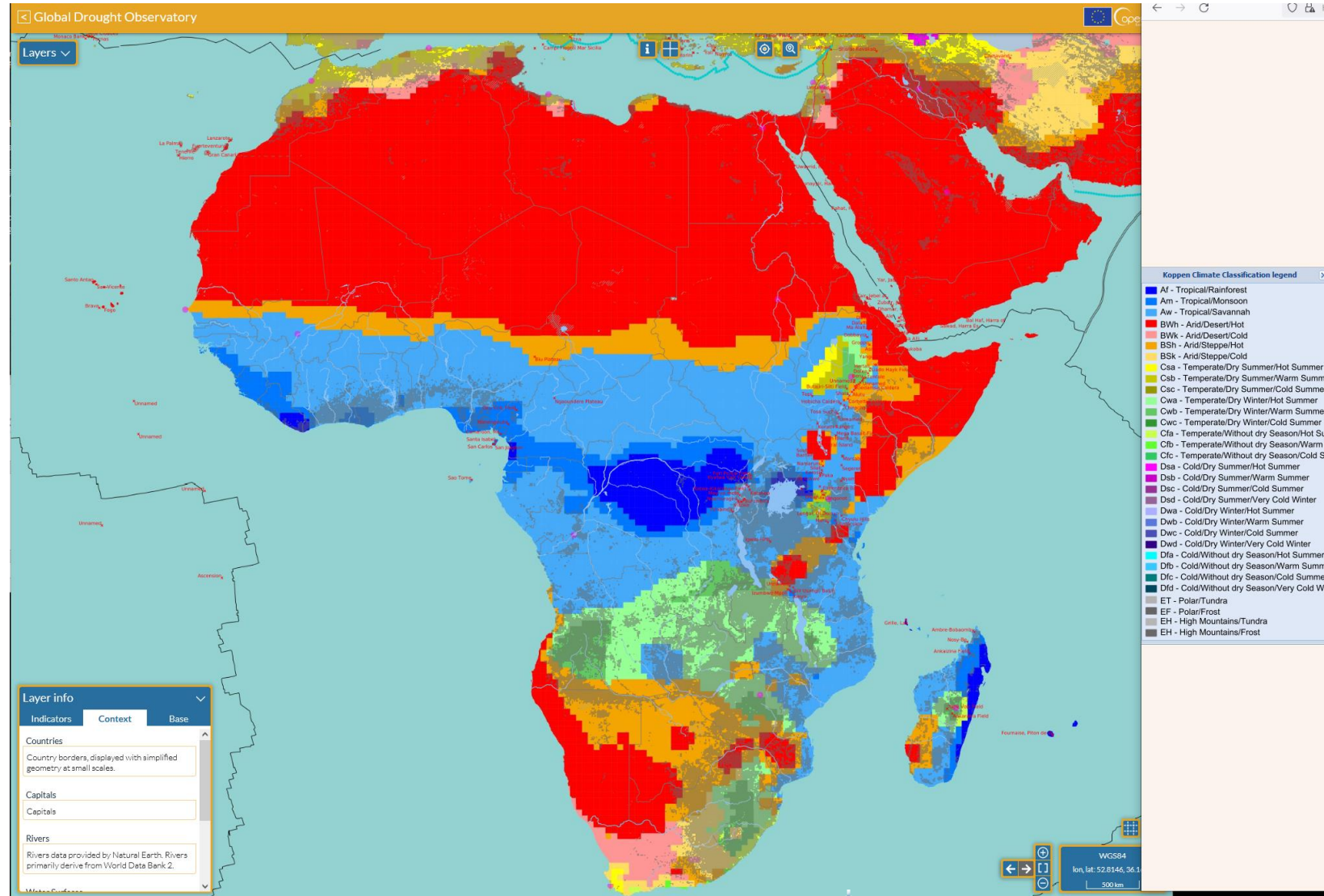
# Drought Monitoring

- Measuring
  - Rainfall
  - Temperature / Humidity
- Satellite Monitoring
  - Gravitation anomalies
  - Vegetation light absorption
- Modelling
  - Soilmoisture

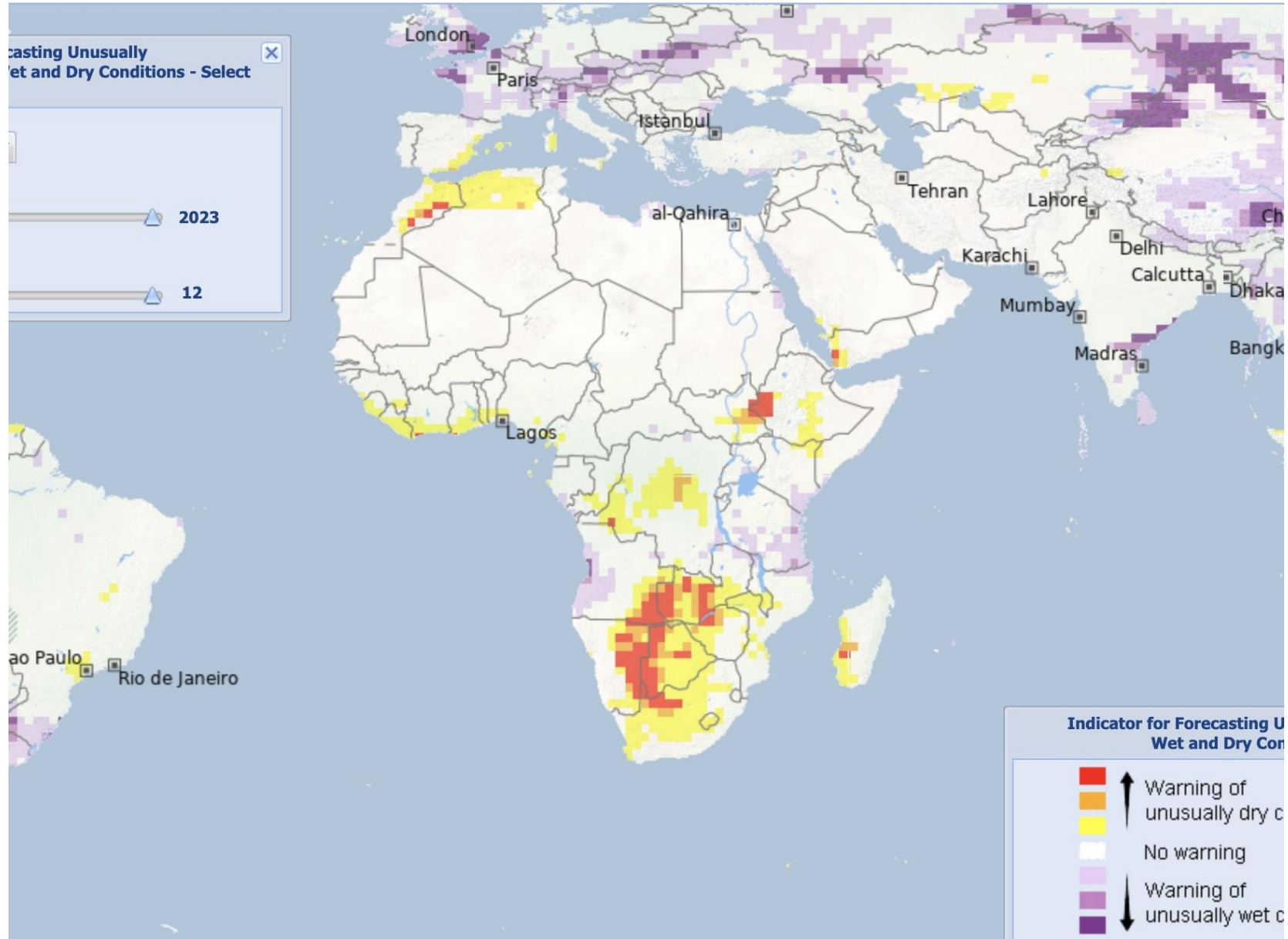


# Forecasting

- Sea surface temperature
- Teleconnections
- Forest map / Landuse map
- Climate Zones
- Season start / end
- Long term climatology / trends



# Forecast as SPI for 1 month



Valid for December 2023

# Rainfall

## Daily rainfall

- Summarize to monthly rainfall
- Standard Precipitation Index (SPI)
  - Accumulation (1,3,6,9,12,24,48) in months
- Deficit



# Summarized Monthly Rainfall

European Commission
Emergency Management Service

EC > Copernicus > Emergencies > Droughts > GDO > Global Drought > MapViewer

GLOBAL DROUGHT
DROUGHT REPORTS
DATABASE OF DROUGHT EVENTS

**WARNING !** - Due to an issue in the provision of MODIS source data, since October 2022 fAPAR and fAPAR Anomaly are computed with Ensemble Soil Moisture Anomaly (SMA) misses the MODIS Land Surface Temperature component and is computed with two components since October 2022 and with 2M-ensemble SMA since the third 10-day period of November 2022. We apologize for any inconvenience.

Layer Tree

1 : 27700000

| REFERENCE DATE | DROUGHT IMPACT | ID | NAME  | UN REGION      | AREA                    | POPULATION 2010 | CAPITAL | UN HUM DEVELO           |
|----------------|----------------|----|-------|----------------|-------------------------|-----------------|---------|-------------------------|
| 2023-08-2nd    | Open Report    | NE | Niger | Western Africa | 1267000 km <sup>2</sup> | 15511953 inhab. | Niamey  | <a href="#">Open re</a> |

! Warning: the date selected in the Layer Tree on the left is visualized by default for every layer. Click in the indicator's row to change it.

**Administrative Reporting Units (1)**

Found **1** result for this layer at the clicked point

| DATE        | DROUGHT IMPACT | ID   | NAME   |
|-------------|----------------|------|--------|
| 2023-08-2nd | Open Report    | 2202 | Agadez |

! Warning: the date selected in the Layer Tree on the left is visualized by default for every layer. Click in the indicator's row to change it.

**Koppen Climate Classification (1)**

Found **1** result for this layer at the clicked point

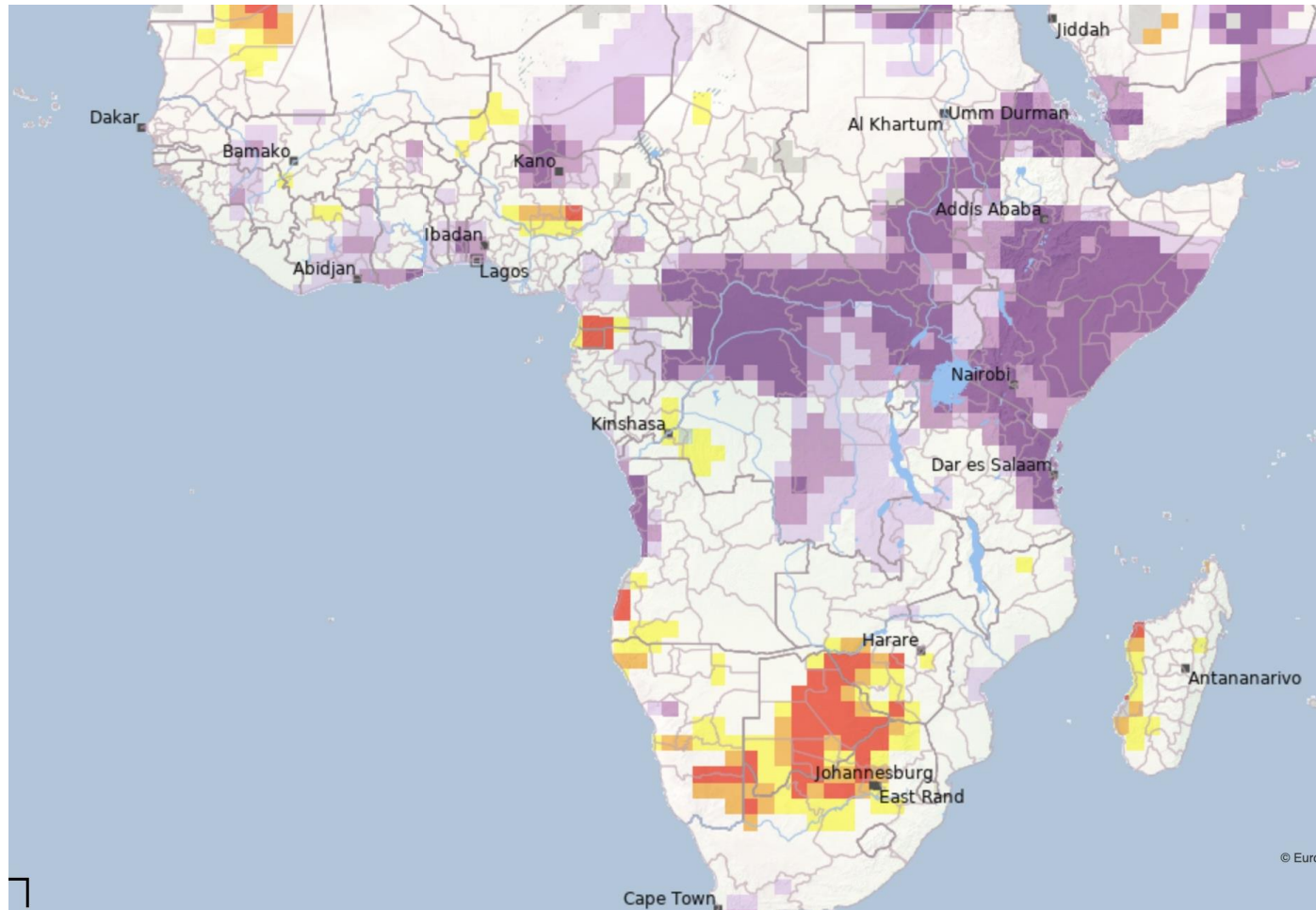
| CODE | DESCRIPTION     | CENTROID LAT,LON | KML |
|------|-----------------|------------------|-----|
| BWh  | Arid/Desert/Hot | 15.79,8.21       |     |

**All Drought Indicators (10)**

Found **10** results for this layer at the clicked point

| INDICATOR                     | VALUES   | PERIOD                 |
|-------------------------------|--|------------------------|
| Monthly Rainfall              | <input type="checkbox"/> Grid 1 dd: <b>92.4 mm</b>   | 2023-07                |
| Precipitation Deficit/Surplus | <input type="checkbox"/> Grid 1 dd: <b>20.276 mm</b> | 2023-07                |
| SPI 1dd                       | <input type="checkbox"/> Grid 1 dd: <b>1.735</b>     | 2023-07, timescale: 03 |
| fAPAR (VIIRS)                 | <input type="checkbox"/> Grid 1/12 dd: -             | 2023-08-11             |
| fAPAR Anomaly (VIIRS)         | <input type="checkbox"/> Grid 1/12 dd: -             | 2023-08-11             |
| fAPAR (MODIS)                 | <input type="checkbox"/> Grid 1/12 dd: -             | 2022-09-21             |

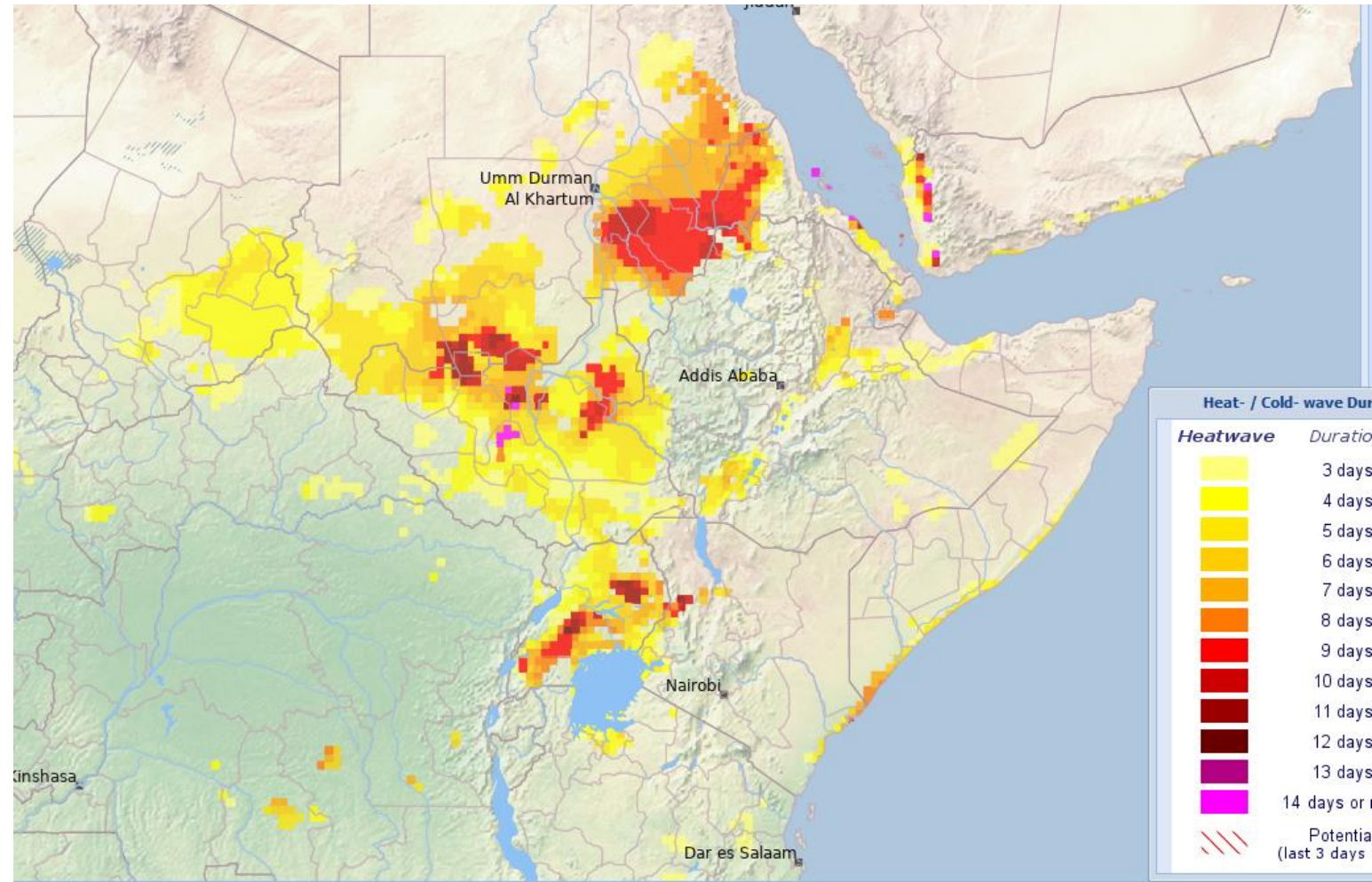
# Rainfall SPI Index (3 months)





# Temperature

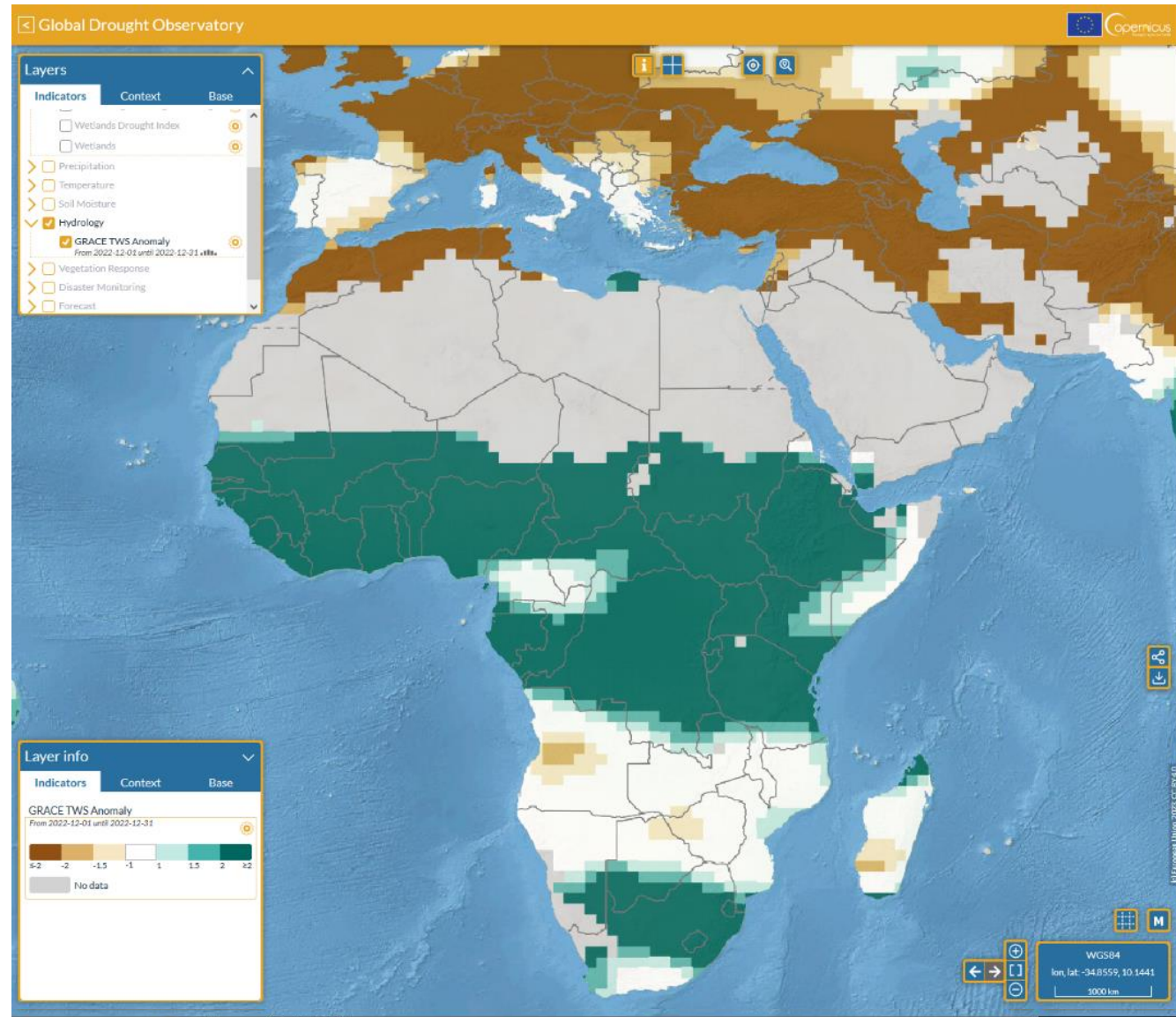
- Maximum and Minimum Temperature
- Long term thresholds
- Heat- cold waves
- Anomalies



# Satellite

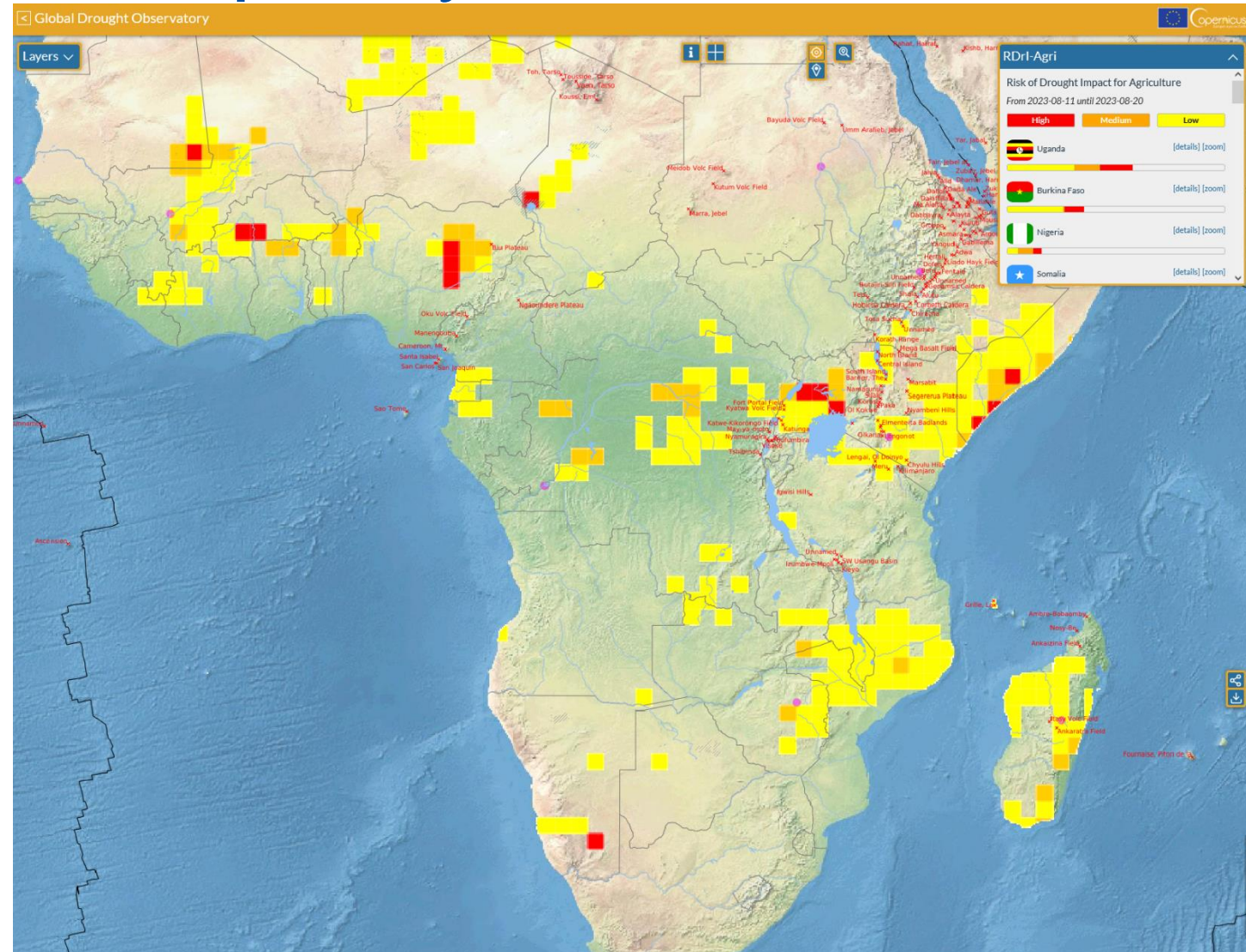
Vegetation light absorption

Gravity anomalies

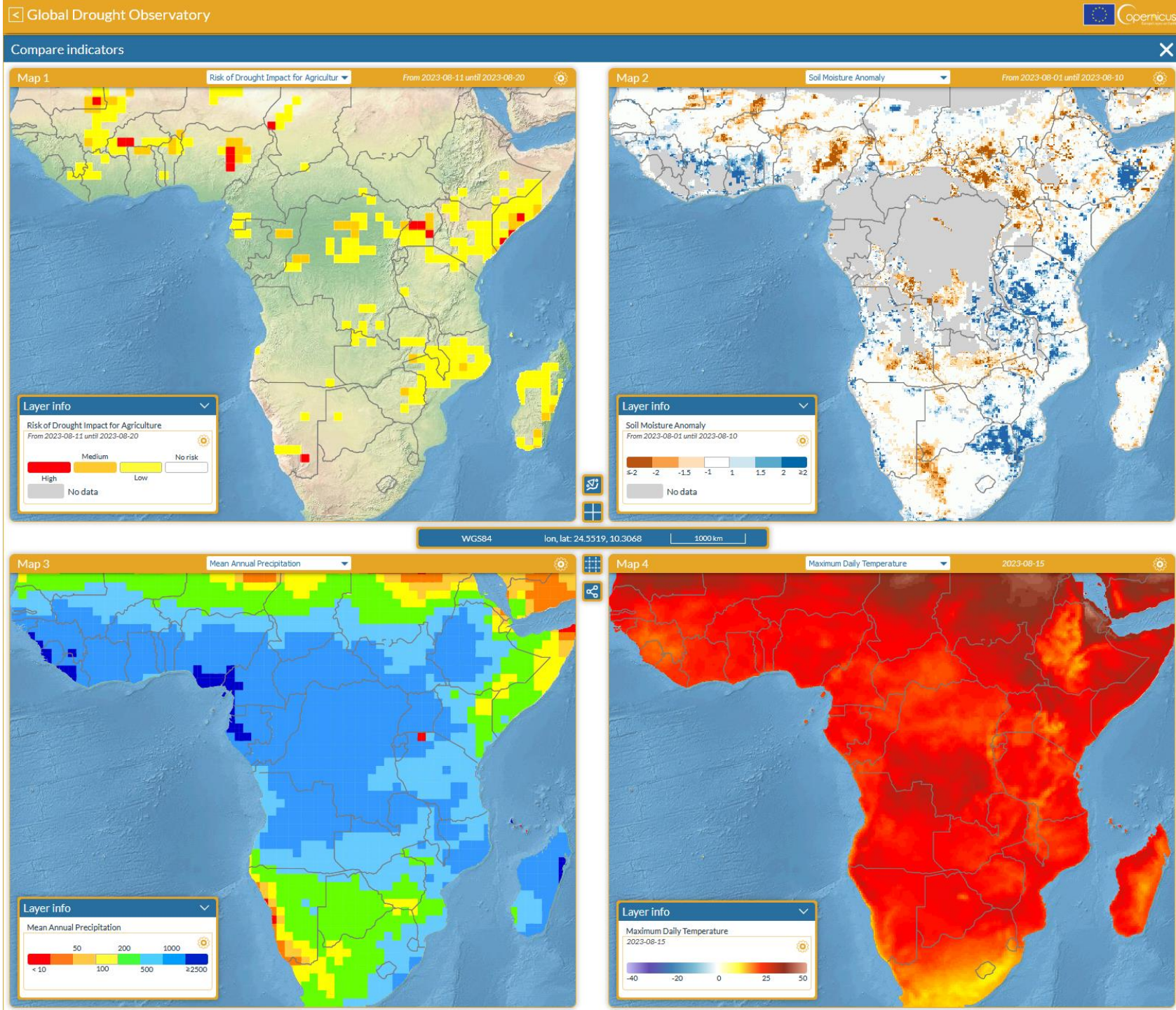


# How to communicate complexity?

- Interactive Mapping
- Combining Parameters
- Time series
- Alert indicators
- Website
- Open data
- Social Media
- Atlases

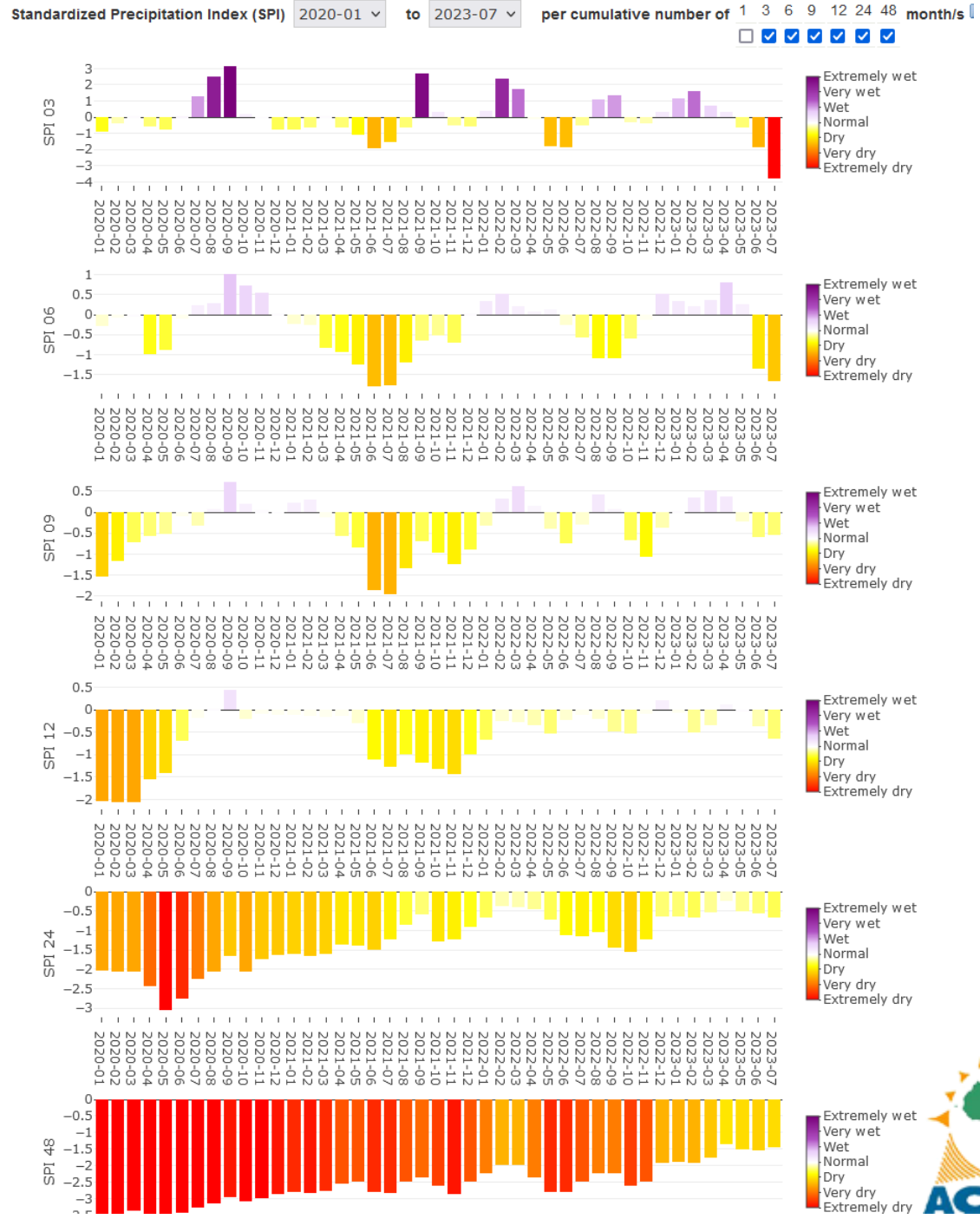


# Comparing Parameters using WMS Technology



# Time series

## Shabelle Hoose (Somalia)



# Drought: what to do?

## In time

- Keep water in the landscape
- Preserve Groundwater
- Base agriculture on deep rooting plants/trees
- Short-term maturing crops
- Conserve organic matter content in the soil
- Avoid evapotranspiration
- Make a shadowed landscape/city

## Too late

- Bring in water (trucks/cisterns)
- Bring in fodder (warehouses)
- Bring in food
- Check for diseases
- Disrupt industrial water usage
- Prepare for fire
- Destocking of livestock



# Keep in touch

## EU Science Hub

joint-research-centre.ec.europa.eu



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EU Science, Research and Innovation



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# Thank you



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