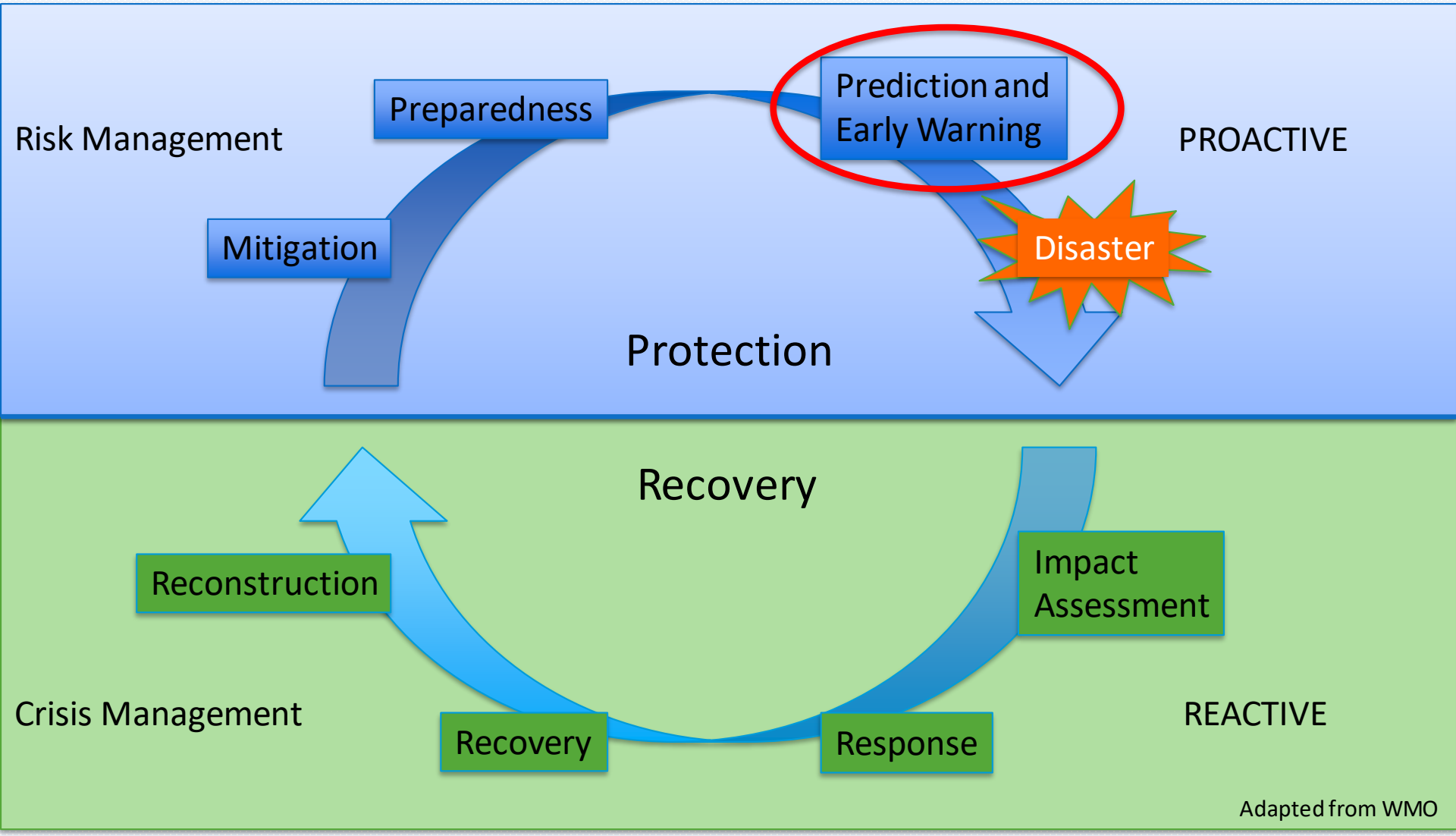
United Nations
Educational, Scientific and
Cultural Organization

# Disaster Risk Management

## *Responding to Cyclone Idai*

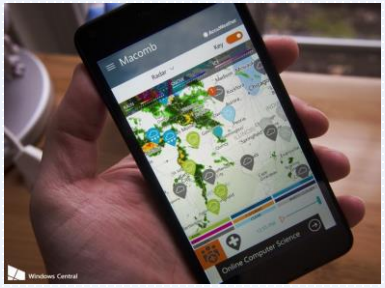
# Towards Proactive Climate Risk Management



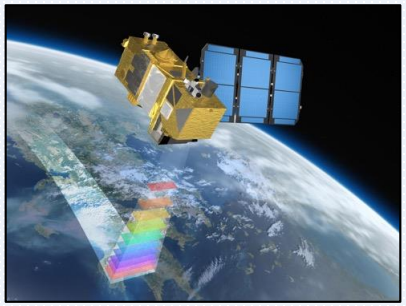

Adapted from WMO

# Connecting all available datasets

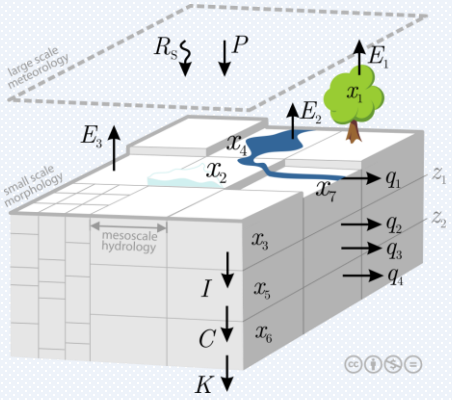
In-situ Data

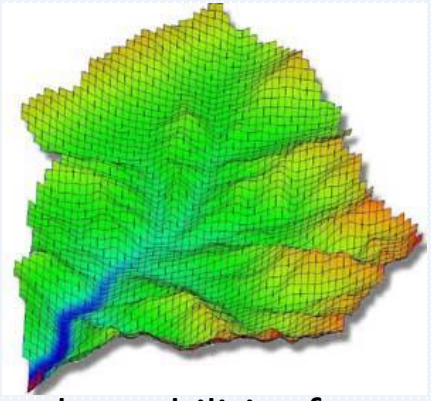



Remote Sensing

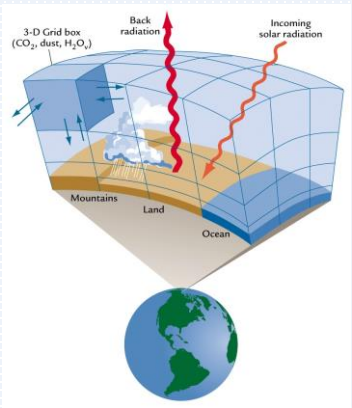


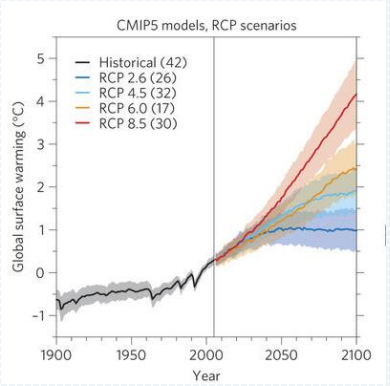
Hydrological Models



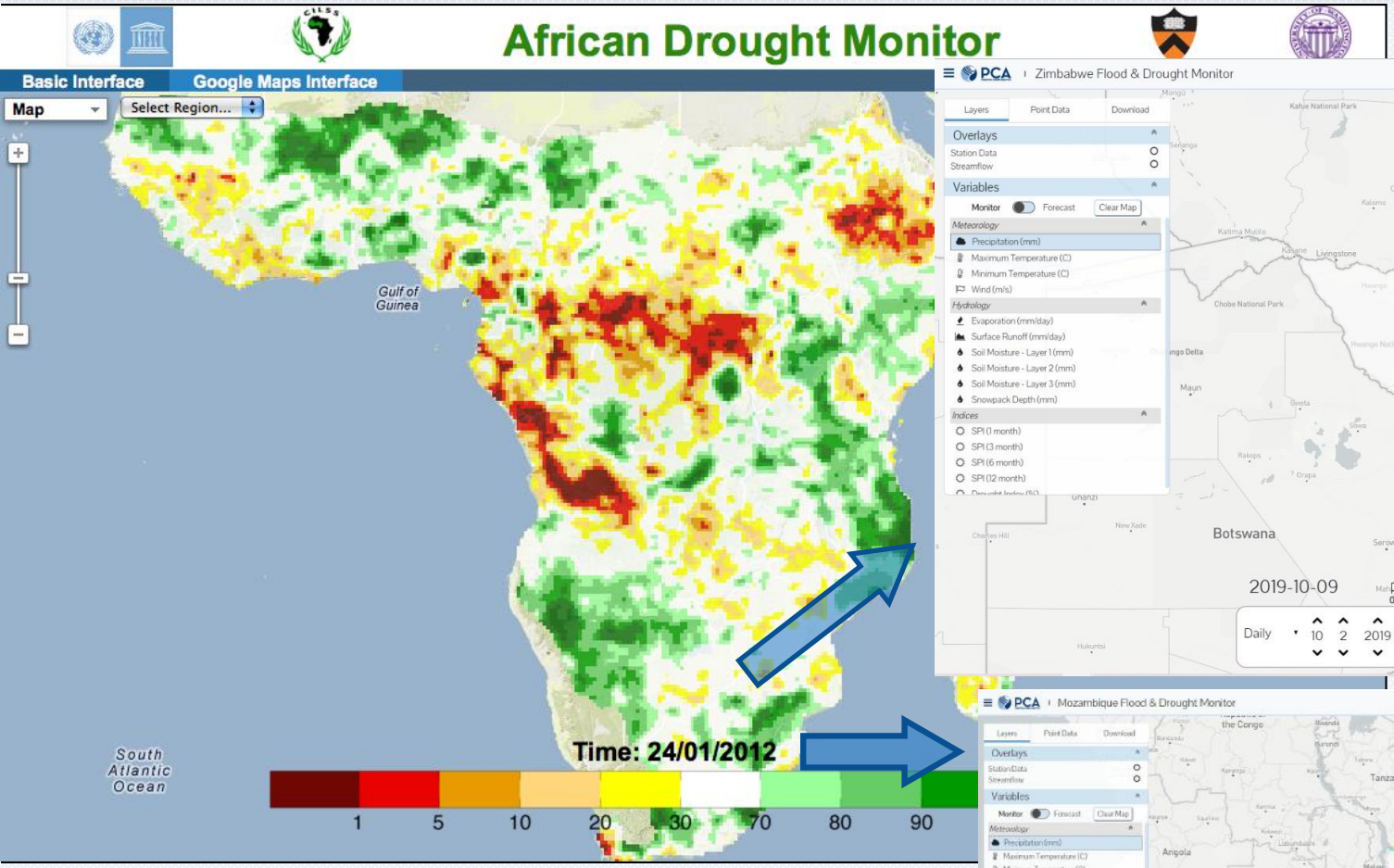
Climate Models



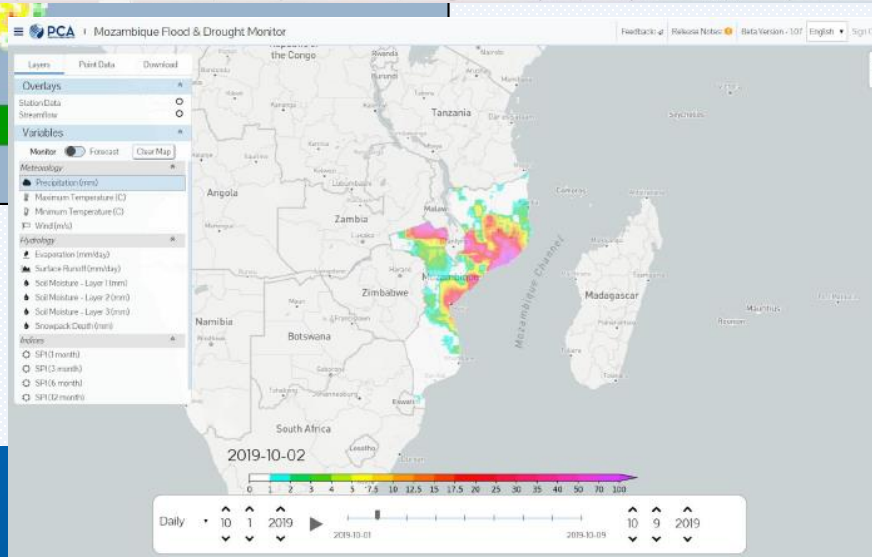

There is a need to enhance national operational capabilities for remote sensing based hydro-meteorological monitoring and prediction for better decision making, disaster resilience, and climate adaptation.

# Towards National Flood/Drought Early Warning



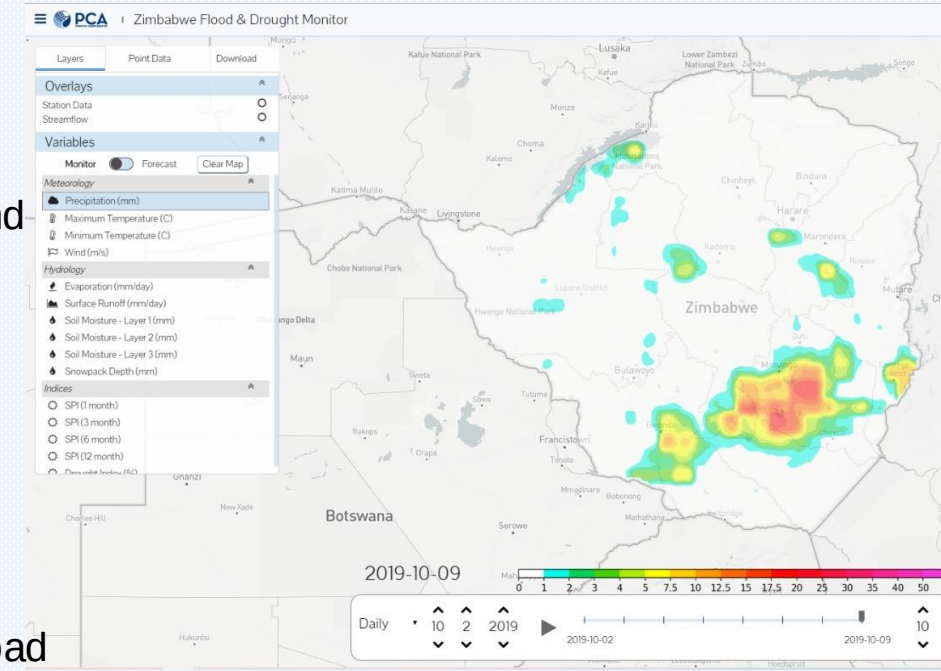




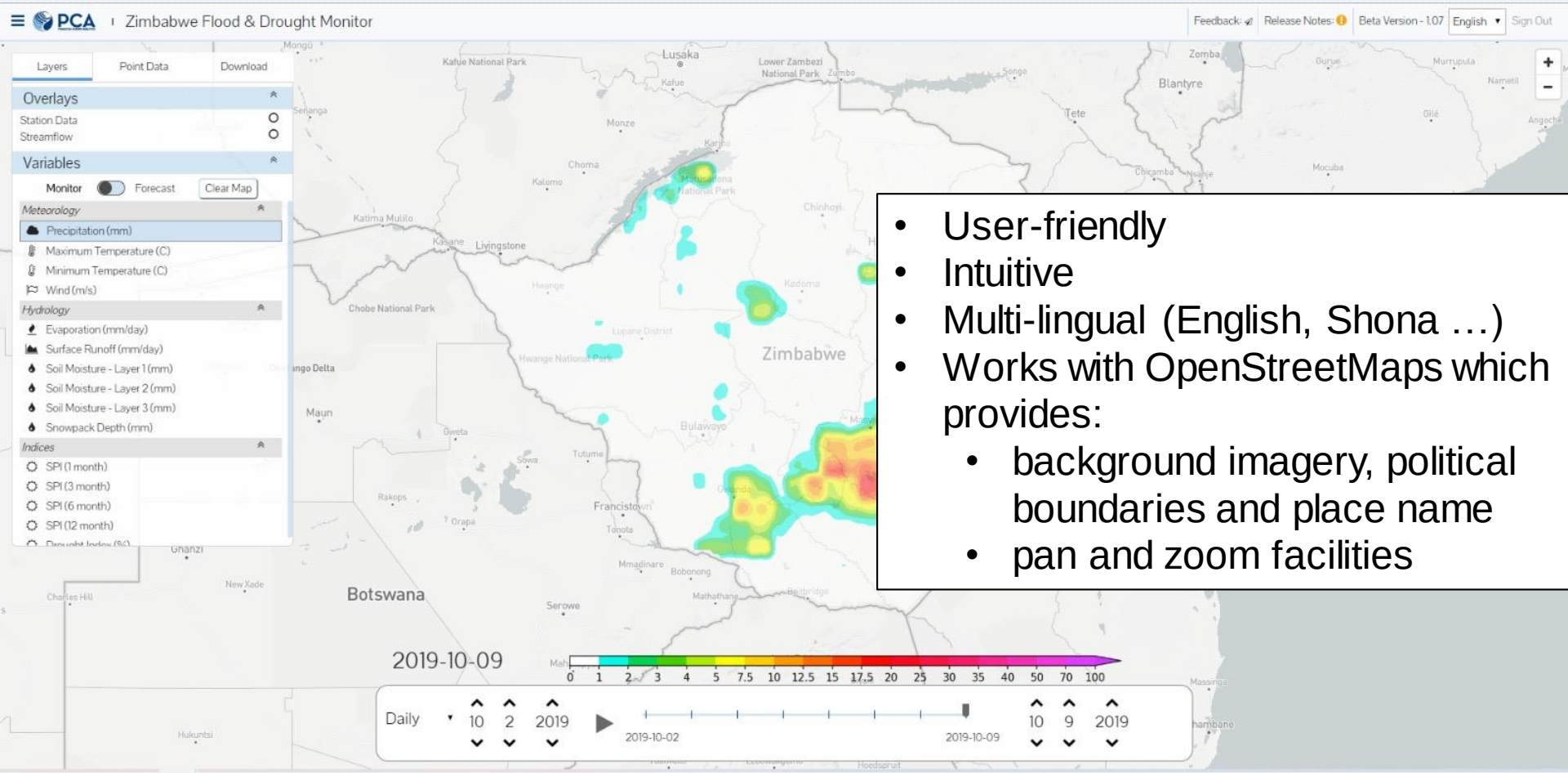


# National Flood/Drought Early Warning Systems


- It produces historic, real-time and forecasts of meteorological and hydrological data, plus drought and flood indices
- Based on observations, modeling and remote sensing
- For all Zim/Moz, at daily, 0.05-degree (~5km) resolution
- The monitoring is about 2 days behind real-time and is updated every day
- The short-term forecasts are updated every day
- The seasonal forecasts are updated once a month
- Includes station observations
- State-of-the-art visualization and easy data download

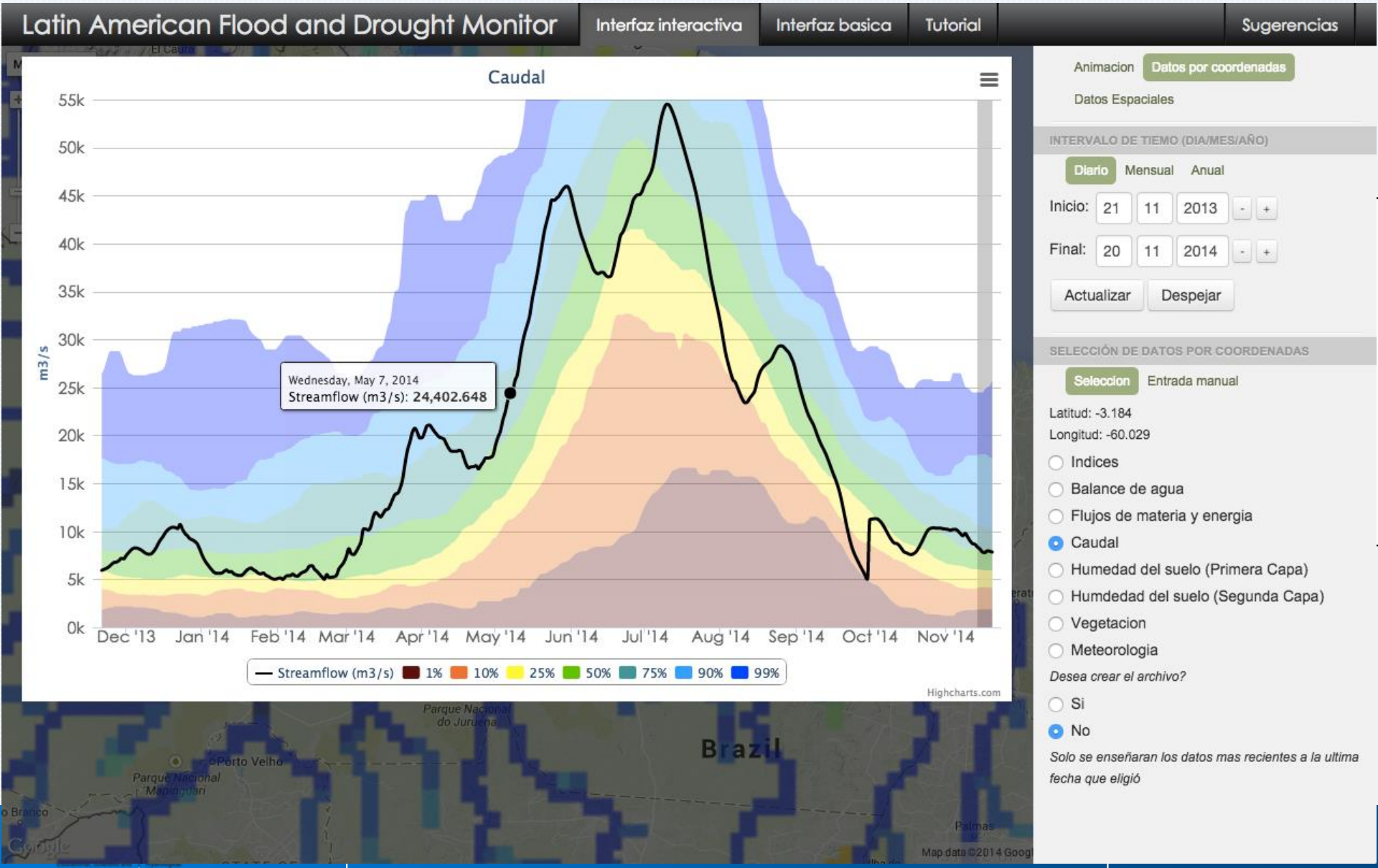


# A look at the online forecast system

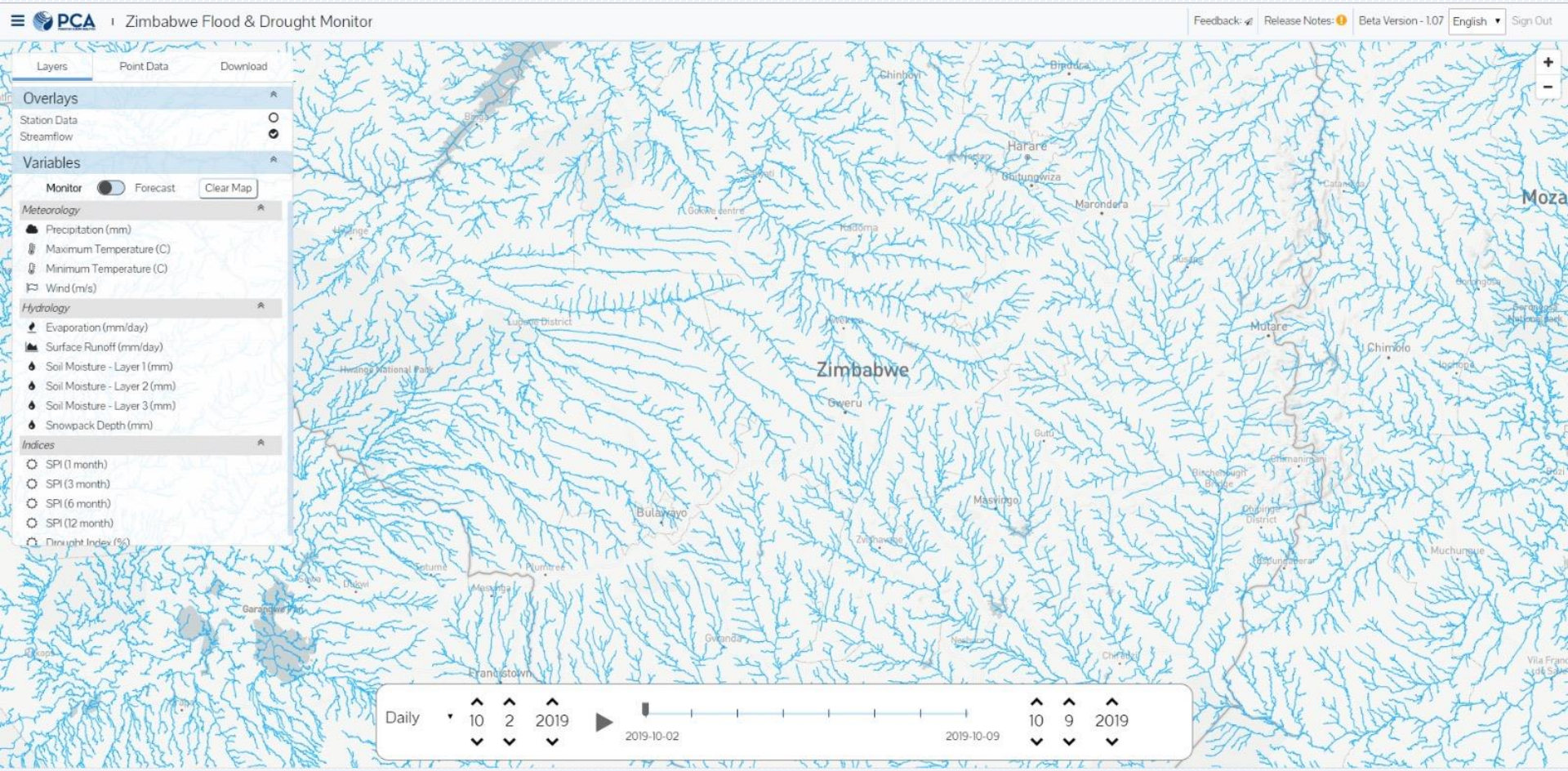



- User-friendly
- Intuitive
- Multi-lingual (English, Shona …)
- Works with OpenStreetMaps which provides:
  - background imagery, political boundaries and place name
  - pan and zoom facilities

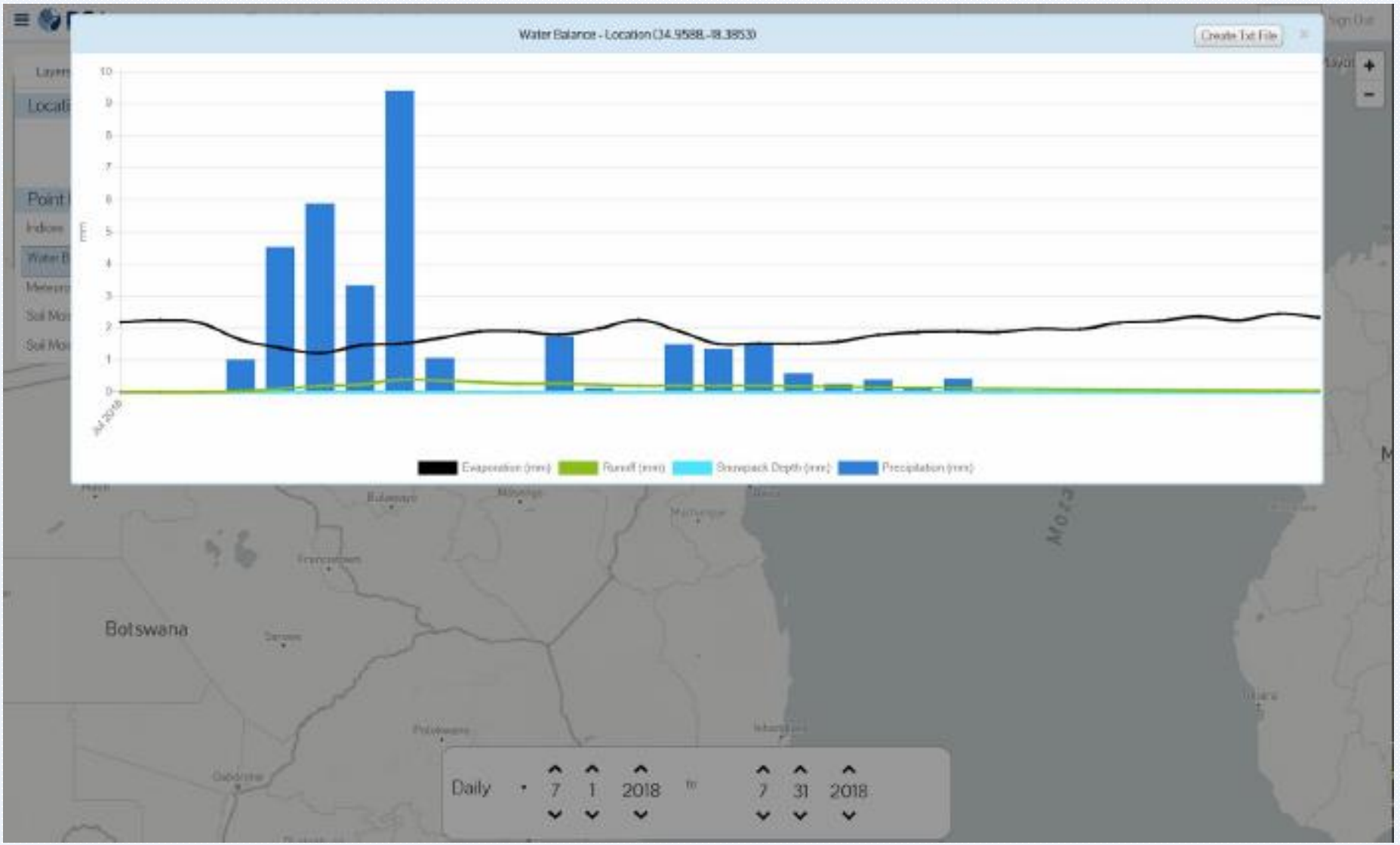
# Putting observations/forecasts into historical context



# High Resolution modelling

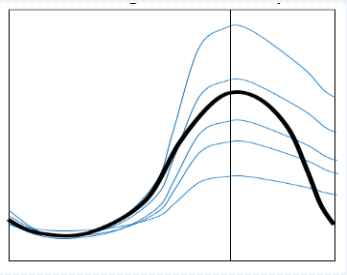


# Detailed local climate observations and forecasts



# Cyclone Idai: flood forecasting potential

- The AFDM includes short-term forecasts (7-15 days), which have the potential to contribute to flood early warning and other extreme events (extreme precipitation, heat and cold waves, frost).
- The forecasts are driven by weather climate model forecasts from the US Global Ensemble Forecast System (GEFS), which provides 20 ensemble forecasts every 6-hours out to 15 days.
- The AFDM bias-corrects and downscales the forecasts of precipitation and temperature and uses these to drive the hydrological model to produce an ensemble of hydrological forecasts.



Short-term weather and water forecasts

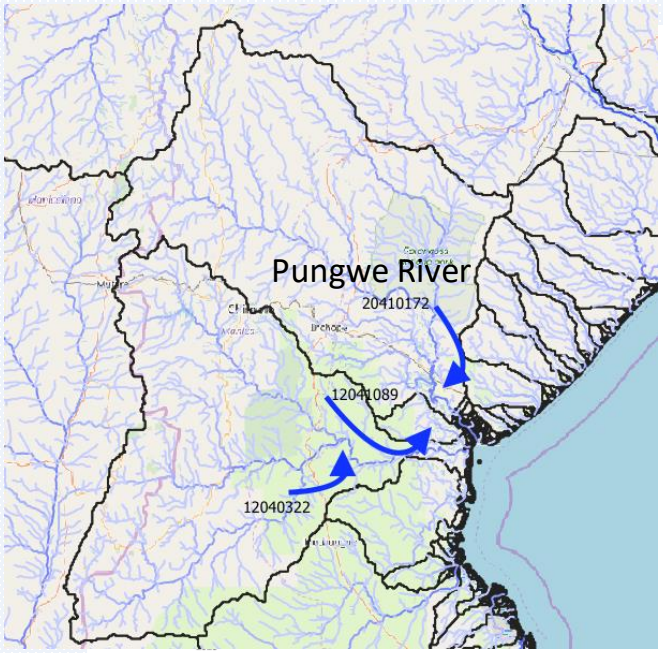
Extreme heat and flash drought

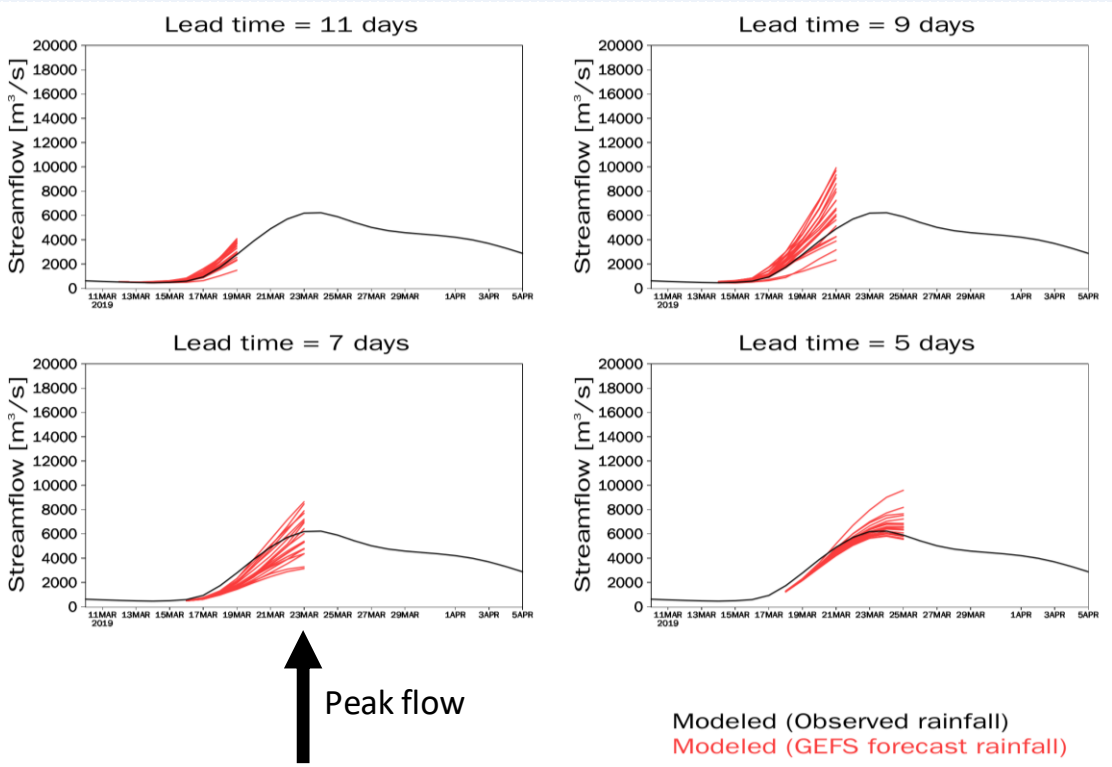
Frost damage

Flooding

# Cyclone Idai: flood forecasting potential

Example of forecast skill and ensemble spread for the peak flooding on the Pungwe River, 11 March – 5 April

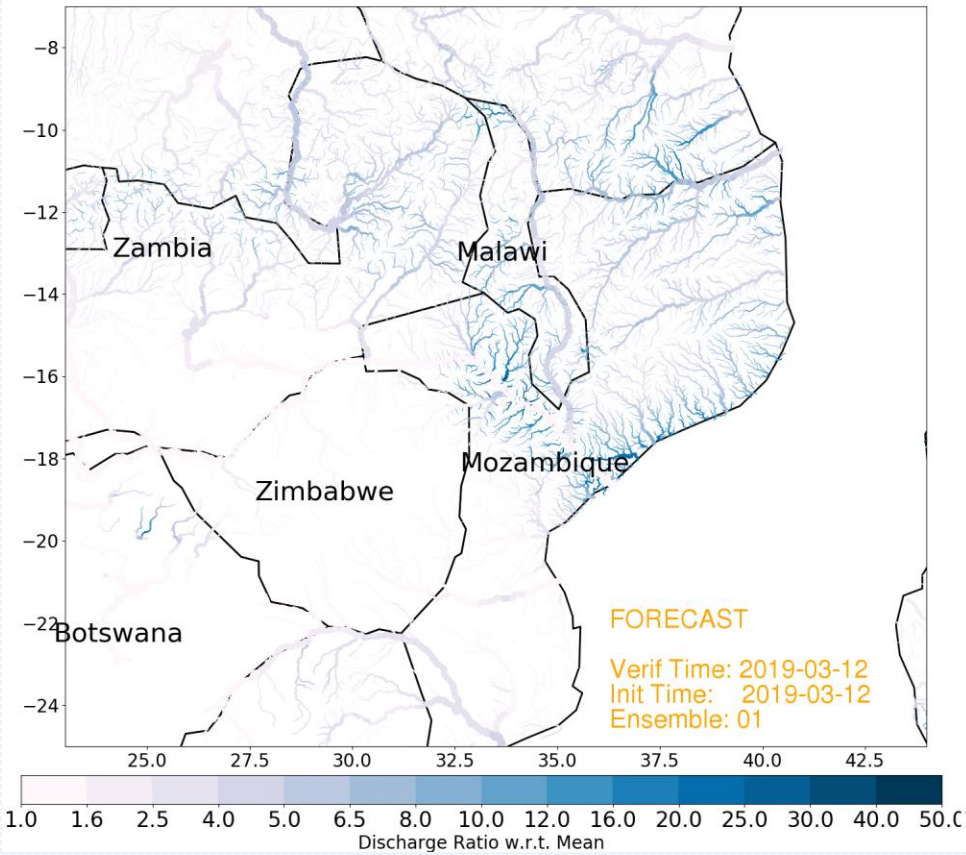


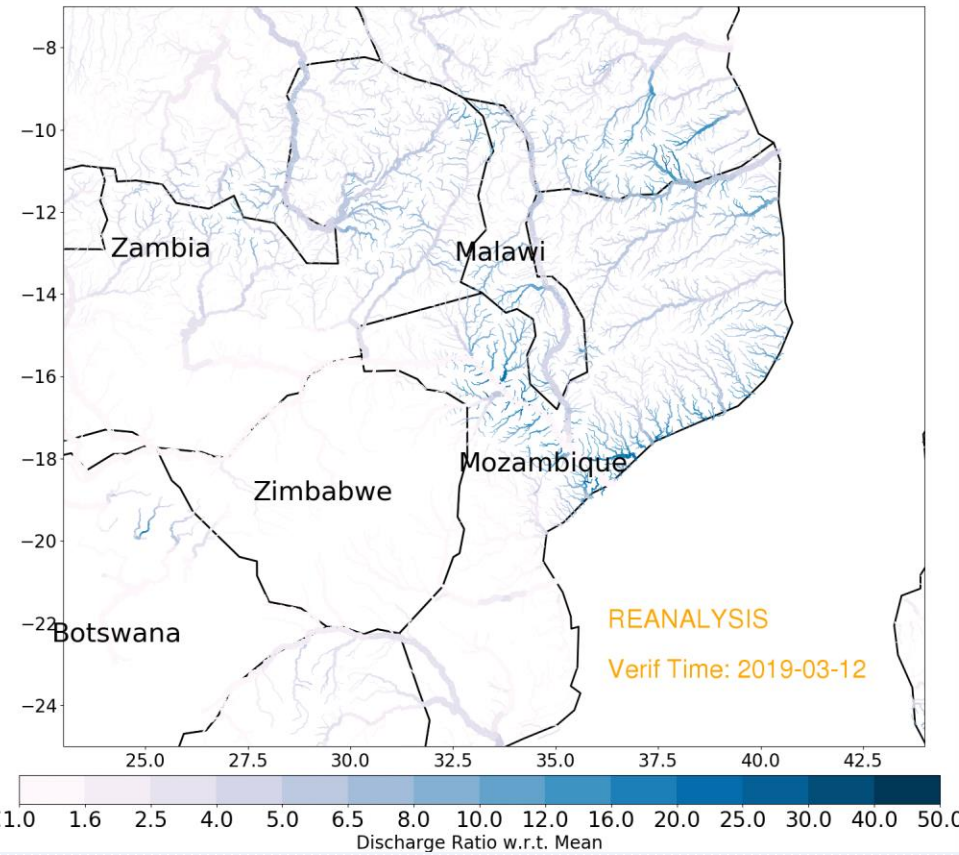
# Cyclone Idai: flood forecasting potential

Peak flooding: 2019-03-12 to 2019-03-19

Forecast: initialized on 2019-03-06

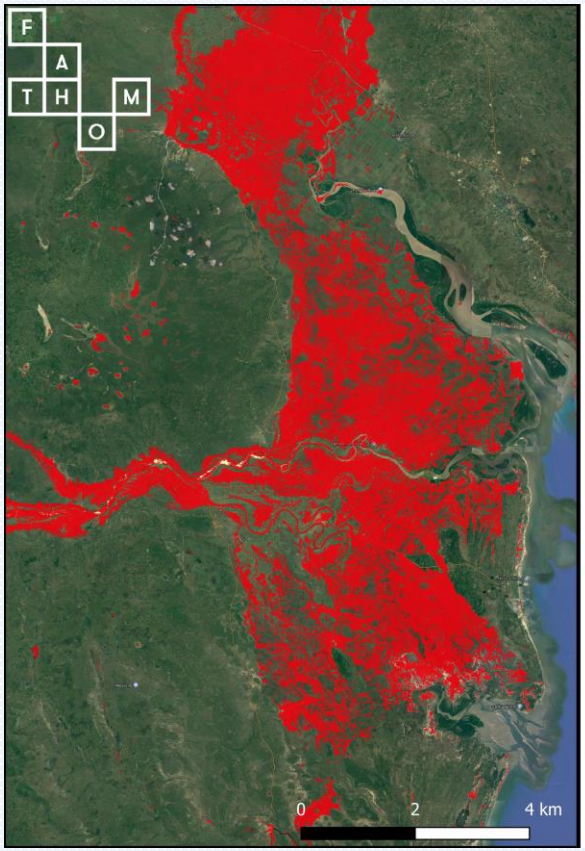



Monitoring

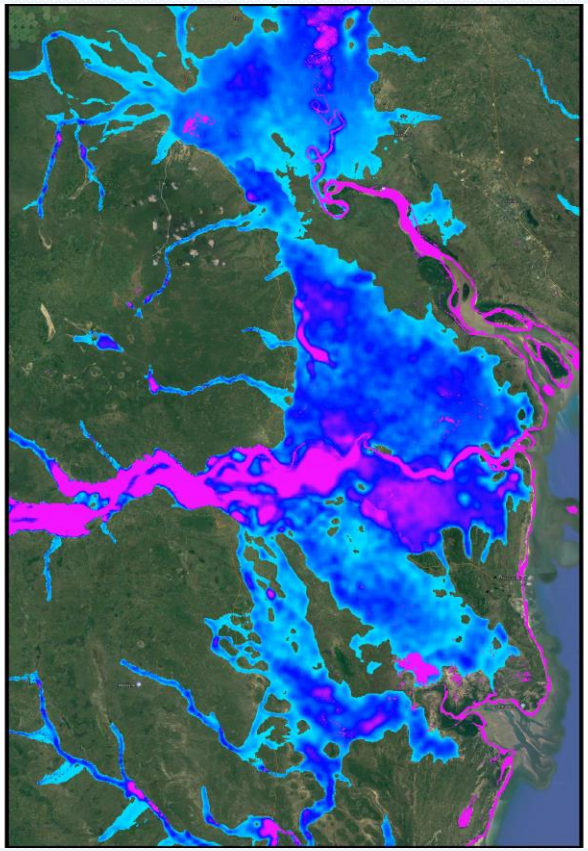


# Cyclone Idai: flood extent monitoring and early warning

Sentinel-1 inundated area

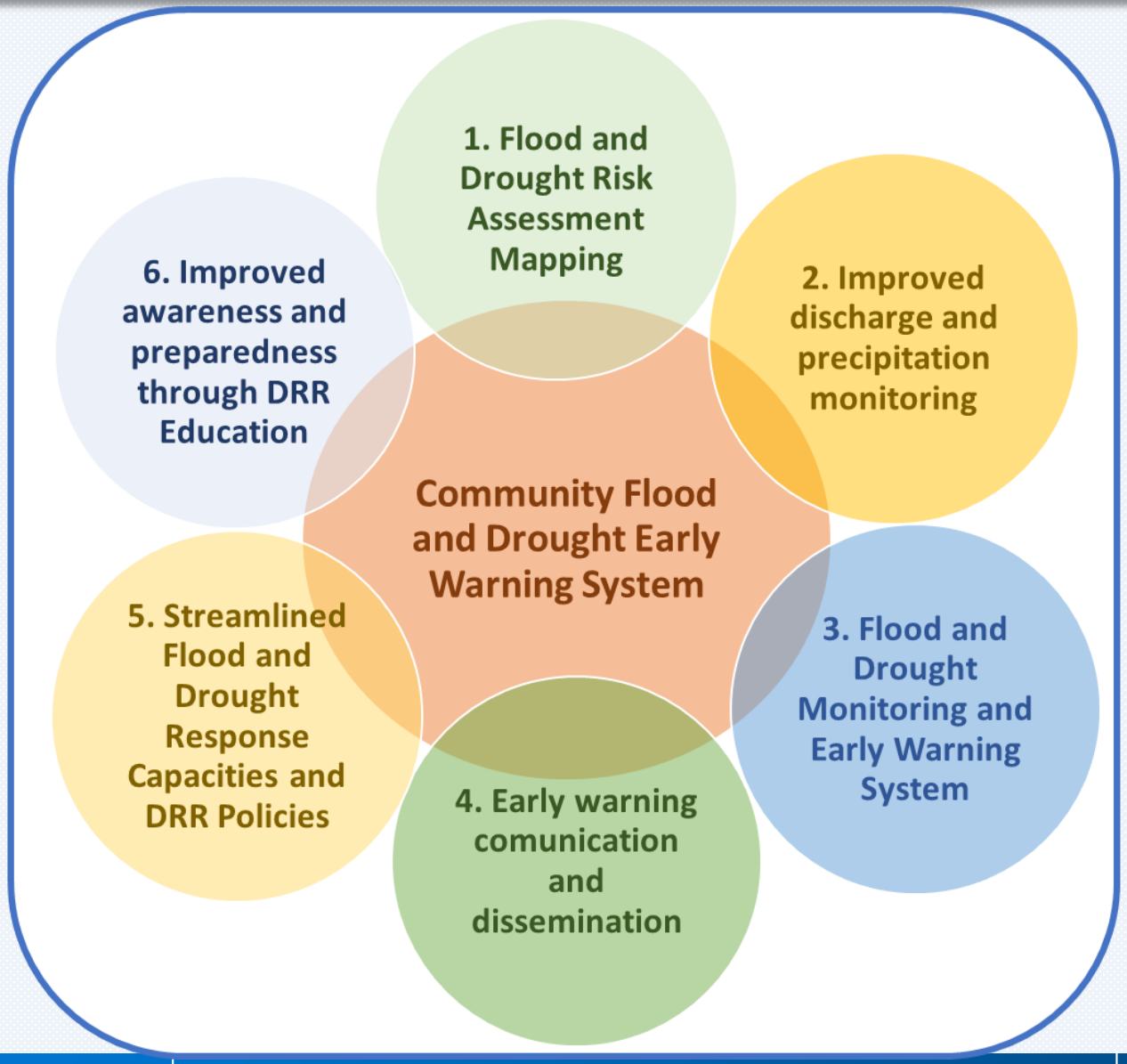



Modeled water-depths



Assimilated Sentinel-1 and Model

# Towards community-based Flood Early Warning



# Launch of the Zimbabwe and Mozambique FDM

- **25-27 November**, Harare, Zimbabwe: Training and Launch of the Zimbabwe Flood and Drought Pilot Early Warning System, integrated into the National Framework for Climate Services
- **Early January**, Maputo, Mozambique: Training and Launch of the Mozambique Flood and Drought Pilot Early Warning System, (potentially integrated into the National Framework for Climate Services)

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# SADC Integrated Water Resources Management Initiative (SADC-WIN)

*Taking Communities Beyond Short Term Relief*