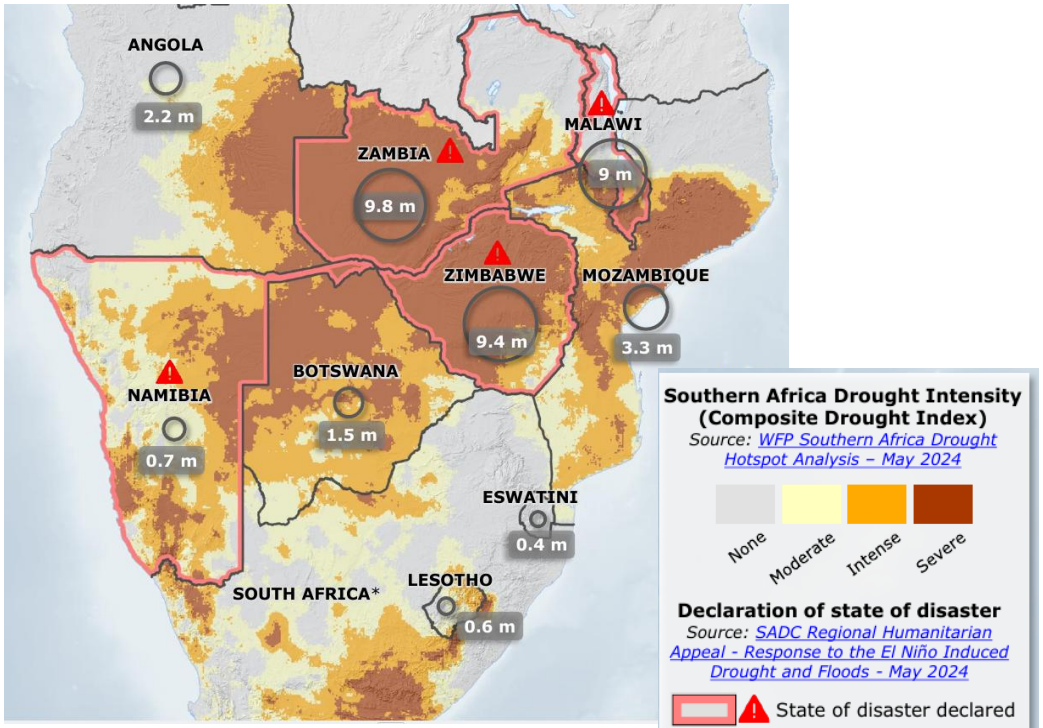
Co-design of Hydrometeorological Information System for sustainable water resources management in Southern Africa (Co-HYDIM-SA)

Dr. Simon Ageet

07.10.2025 | “Ask the Expert” Webinar

Motivation: Severe Hydrometeorological disasters



Source: Emergency Response Coordination Centre (ERCC) – DG ECHO Daily Map | 14/06/2024; ***European Union, 2024***

- Severe droughts: **2023/2024 - food insecurity for millions of people ~ 61 million affected (OCHA, 2024).**



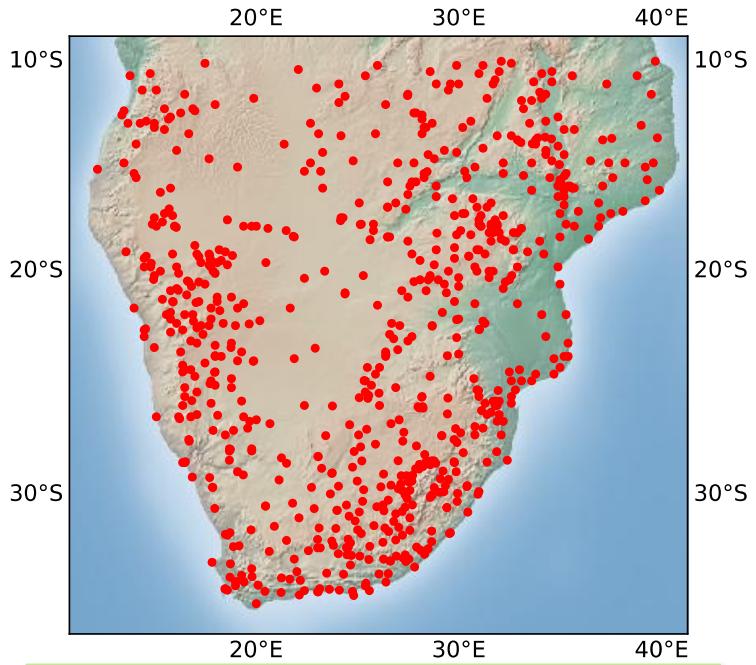
Source: VoA

- Deadly floods: **Deadly floods of February 2025 in Gaborone**.

Response of Co-HYDIM-SA to hydrometeorological extremes in Southern Africa

- **Southern-Africa (regional):**
  - **Improving ground- and satellite-based monitoring of droughts and floods**
  - Improving sub-seasonal (up to six weeks) to seasonal (up to seven months) predictions of hydro-meteorological parameters
- In two **transboundary focal catchments**:
  - **CUVEWIS**: "Cuvelai-Basin Early Warning and Information System (CUVEWIS)", includes the Cunene River
  - **EWIS: "Early Warning and information system" for the Notwane catchment, including the Gaborone dam (Upper Limpopo).**

KASS-D: A large rainfall data set (monthly and daily)
Example: Monthly, 1920-2024

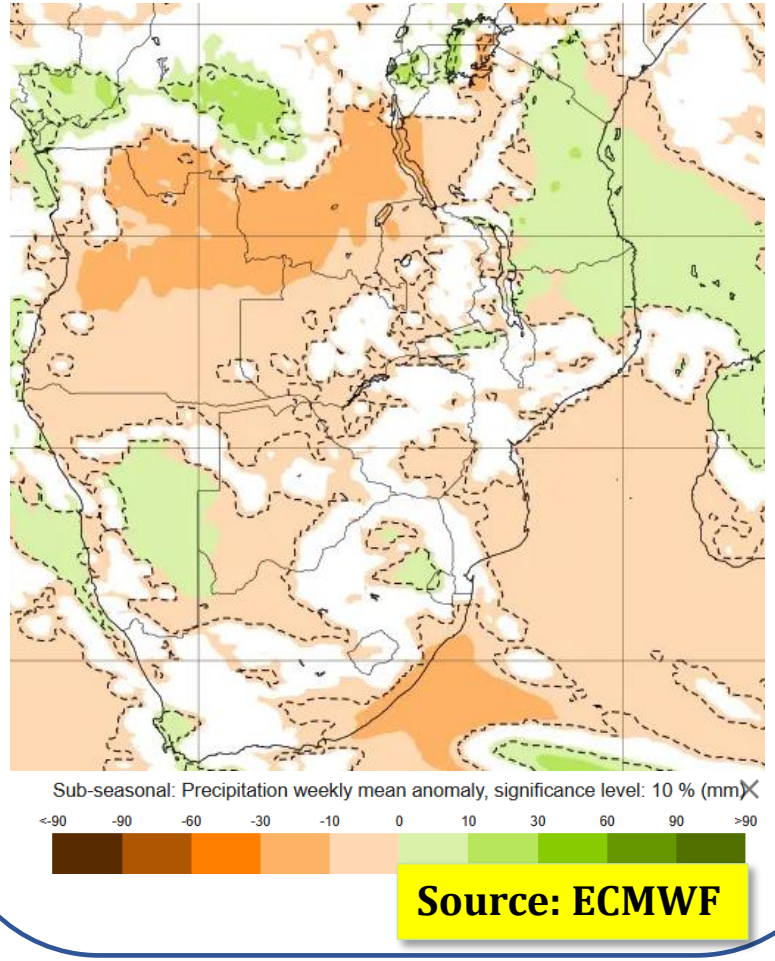


IMKTRO, Fink, Ageet, Ssemujju, Co-HYDIM-SA,
See also Nicholson, Funk, Fink (2018)

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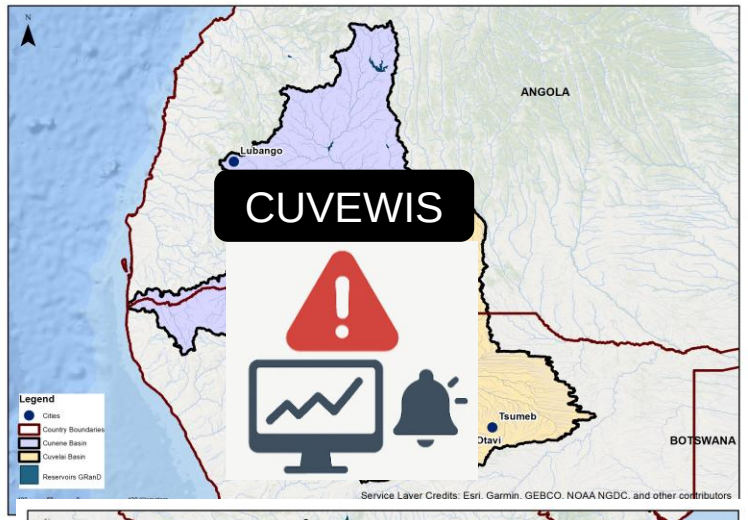
Precipitation: Mean weekly anomalies for 06.10 – 13.10.2025

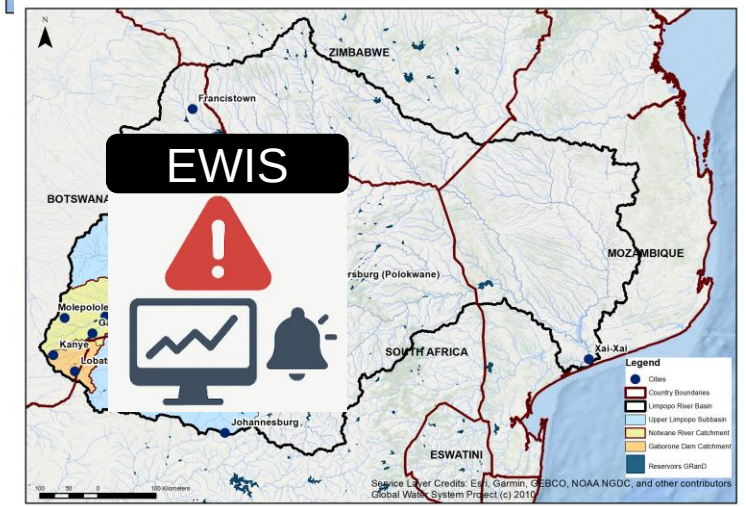


Response of Co-HYDIM-SA to hydrometeorological extremes in Southern Africa

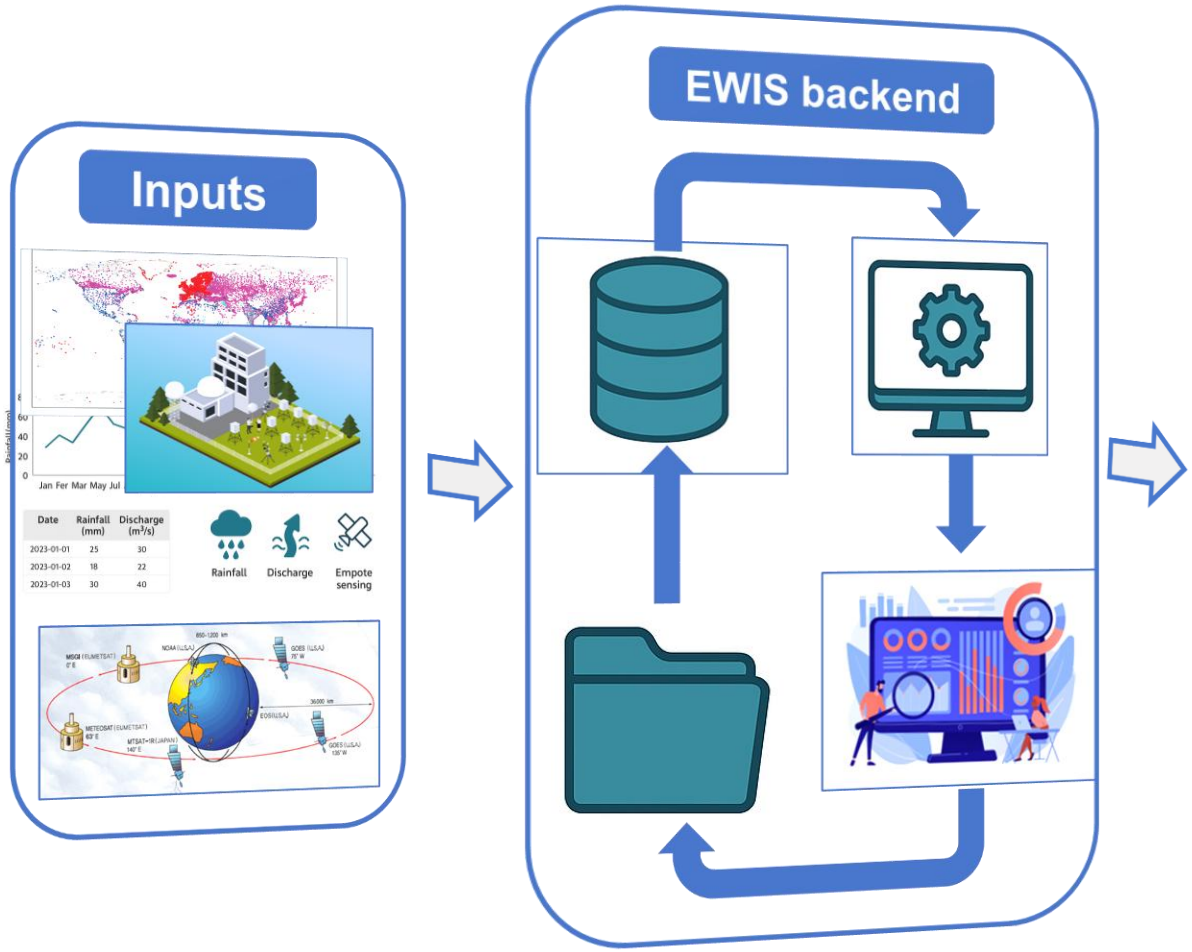
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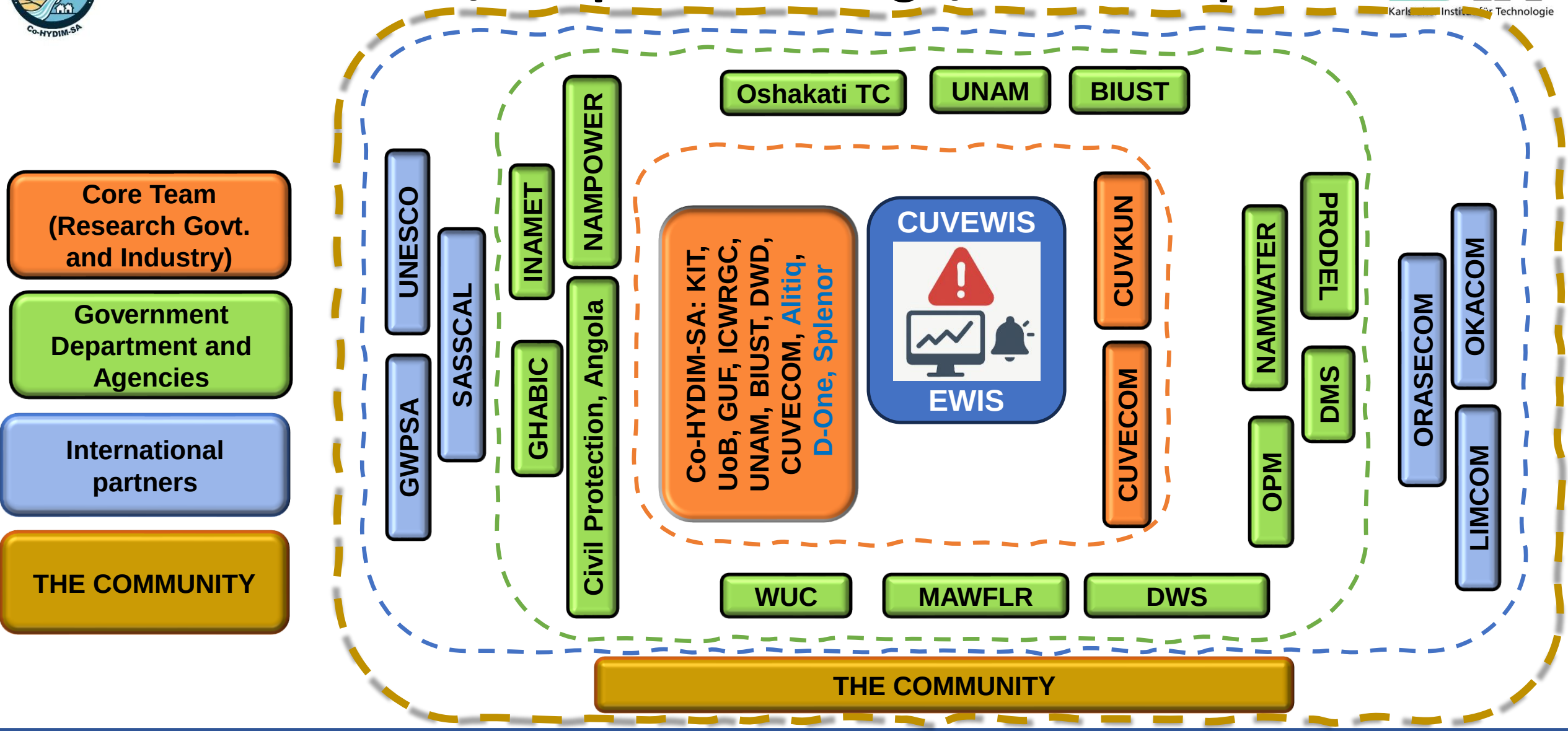
The Information system



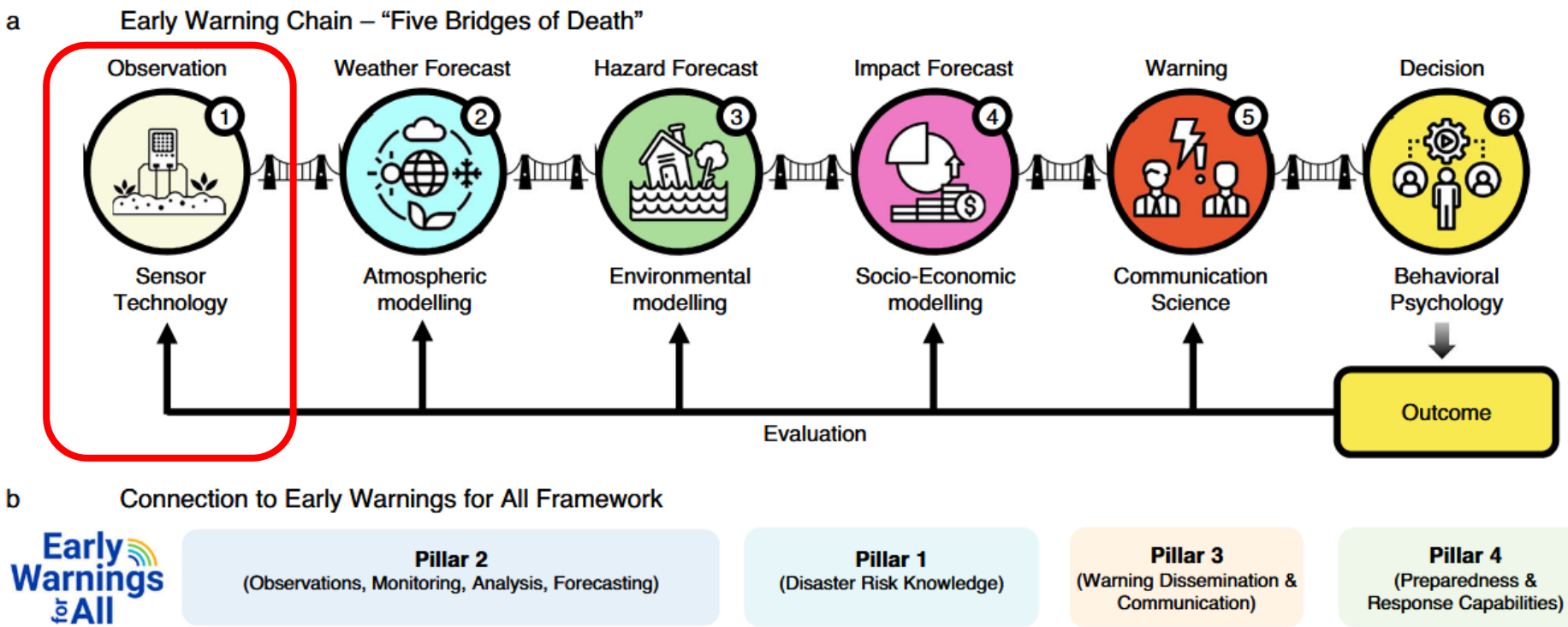
What is novel/unique?

- Using an unprecedently broad variety of ground- and satellite-based meteorological and hydrological data sets
- Tapping into opportunities of novel, freely available, sub-seasonal (up to six weeks) ensemble meteorological forecast
- Short-cutting the introduction of Artificial Intelligence (AI) methods in providing more accurate sub-seasonal and seasonal forecasts
- Getting these novelties in a co-design and co-development process from the very beginning with practitioners on the ground
- Getting two information systems operationally installed at partner institutions

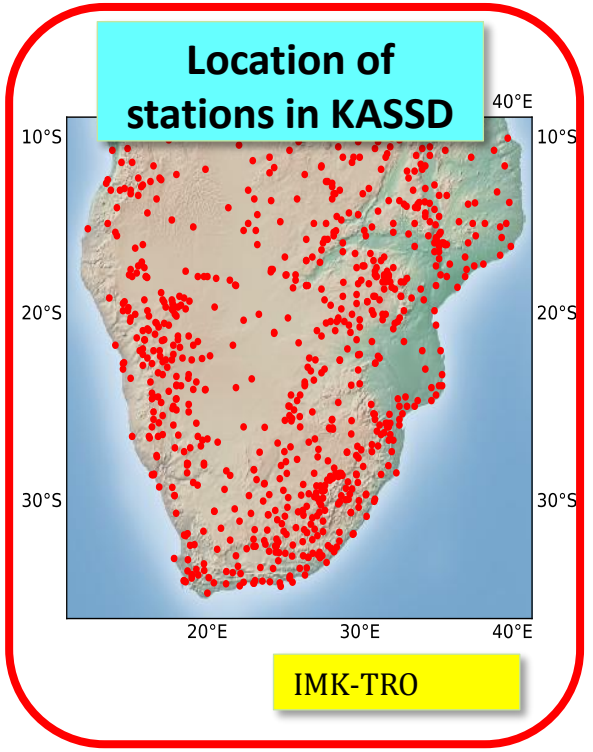
What is novel/unique? Co-design/co-development



Early warning from observation to decision in Co-HYDIM-SA

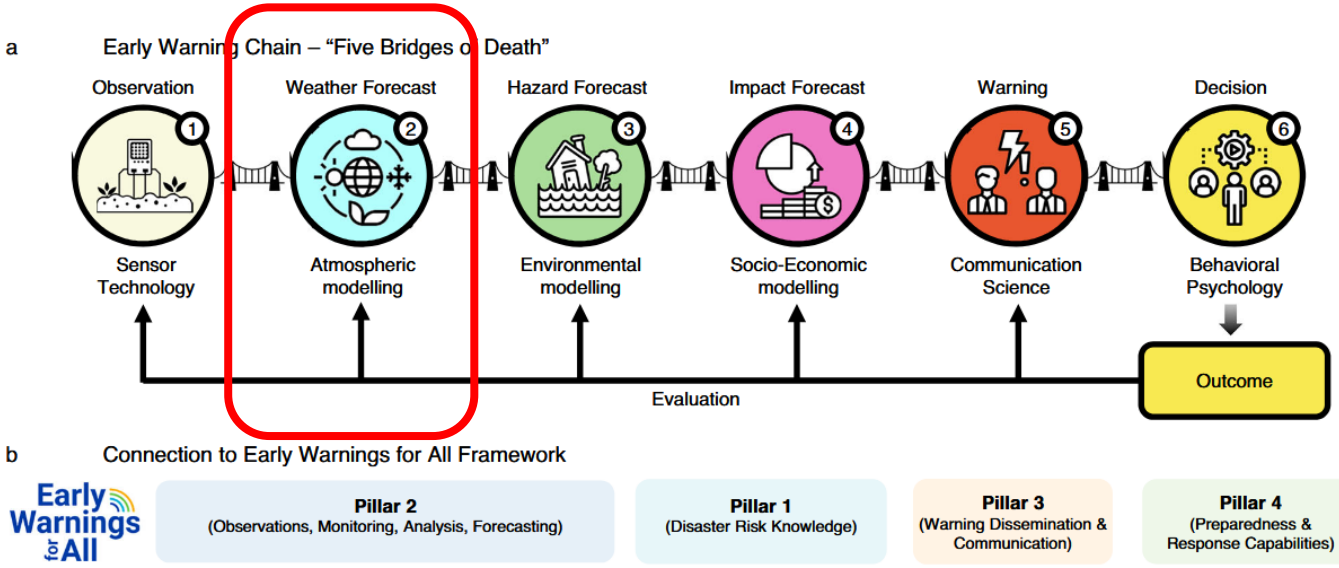


Reichstein et al. 2024



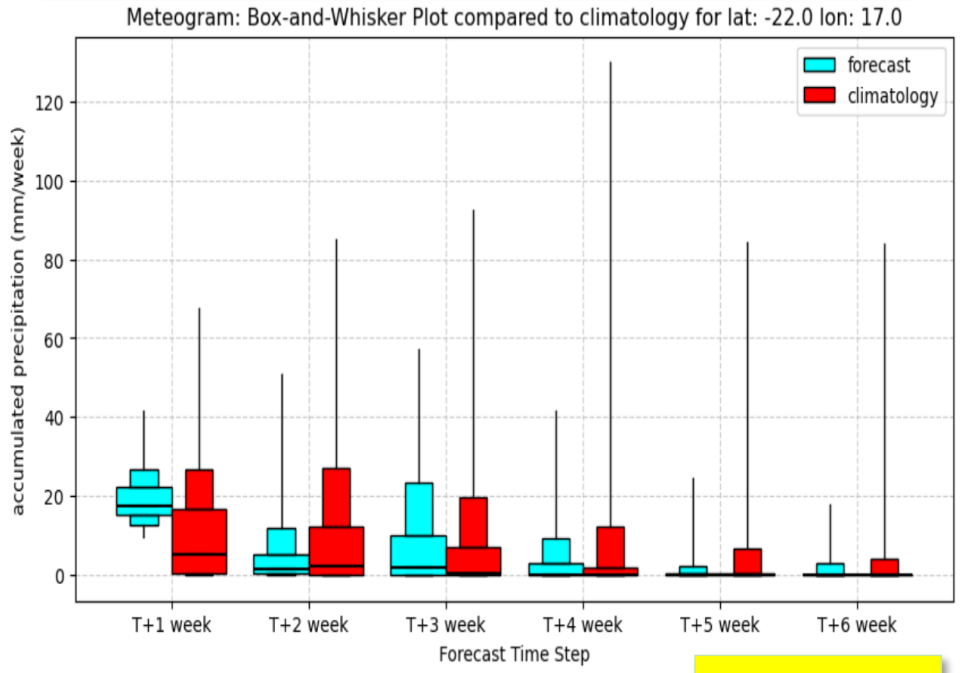
- Research must be interdisciplinary, and users/stakeholders must be involved from the outset

Early warning from observation to decision in Co-HYDIM-SA



Reichstein et al. 2024

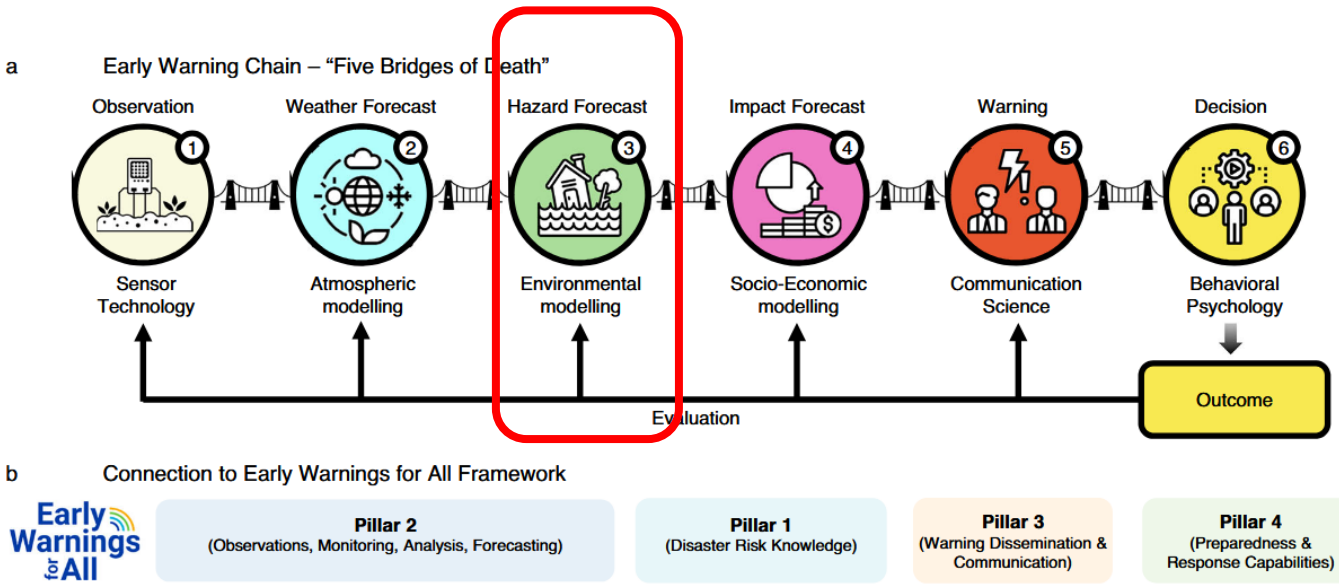
Forecast of weekly rainfall for Windhoek



IMK-TRO

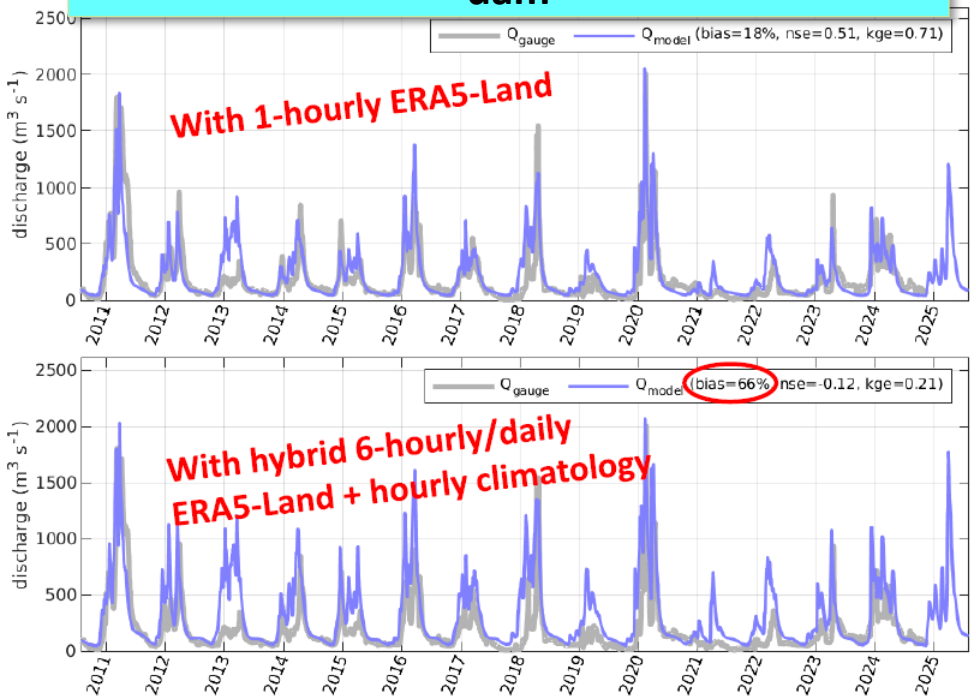
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Early warning from observation to decision in Co-HYDIM-SA



Reichstein et al. 2024

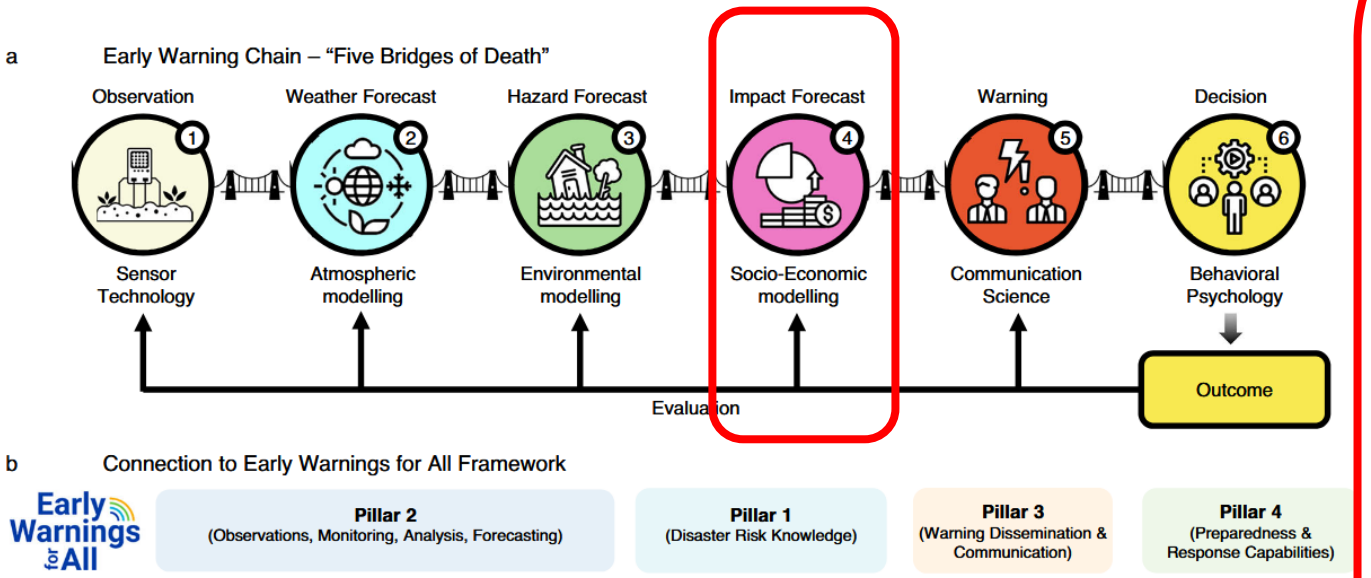
WRF-Hydro model output for the Ruacana dam



IMK-IFU

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Early warning from observation to decision in Co-HYDIM-SA

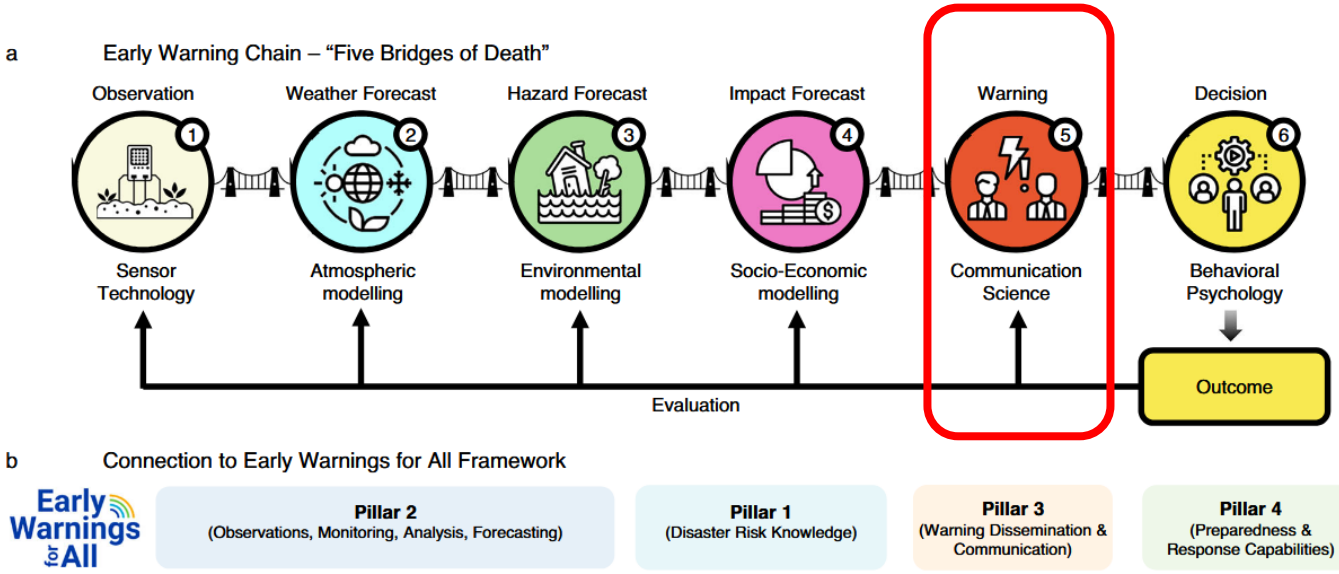


Reichstein et al. 2024

Working with stakeholder responsible for impact forecasting like the Meteorological services and Office of the Prime Minister → Co-HYDIM-SA will provide accurate forecasts.

- Research must be interdisciplinary, and users/stakeholders must be involved from the outset

Early warning from observation to decision in Co-HYDIM-SA



Reichstein et al. 2024

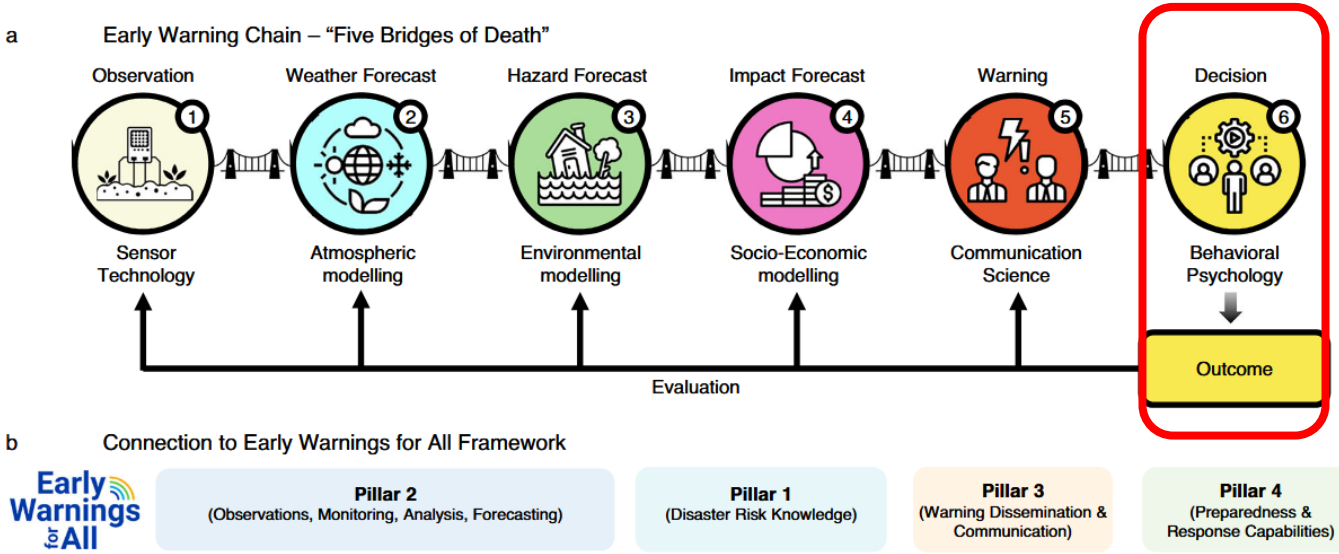
CUVEWIS

EWIS

CUVEWIS and EWIS will give information and warnings.

- Research must be interdisciplinary, and users/stakeholders must be involved from the outset

Early warning from observation to decision in Co-HYDIM-SA



Reichstein et al. 2024

Working with stakeholder (Government Department and Agencies, international agencies and the local community) to make decisions

- Research must be interdisciplinary, and users/stakeholders must be involved from the outset

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THANK YOU FOR YOUR ATTENTION!