



7th NILE BASIN DEVELOPMENT FORUM

Projected hydrology and water
resources systems of the Nile basin

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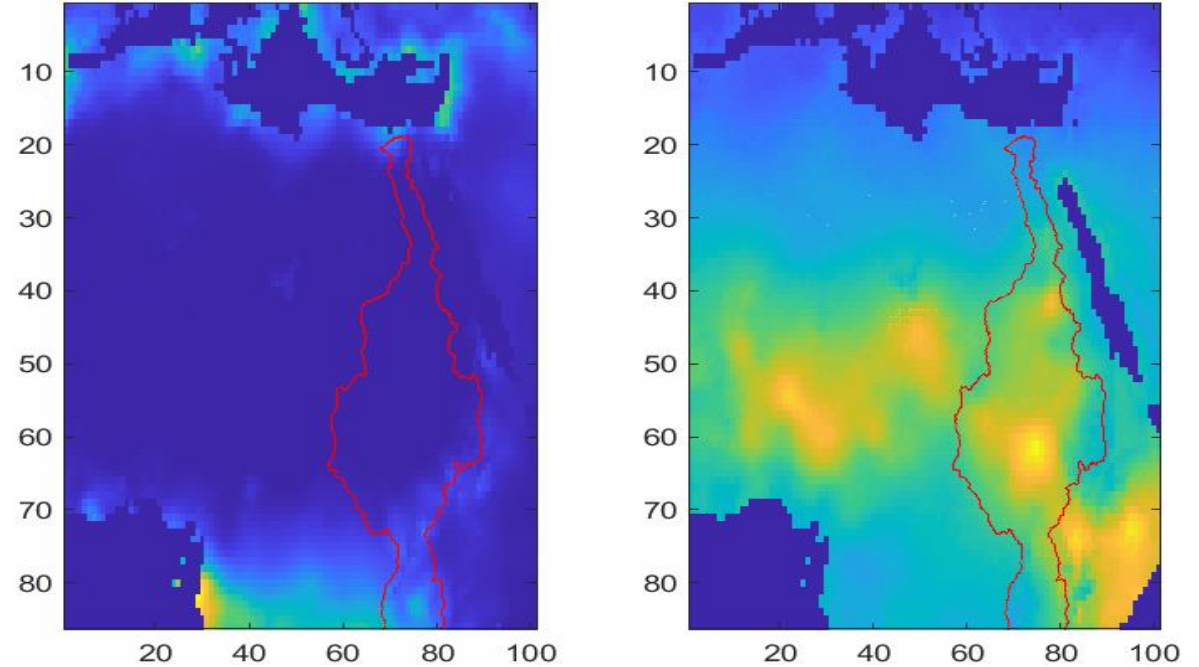
October 2023



Hydrology: IMPACT-IGHM

Indicators

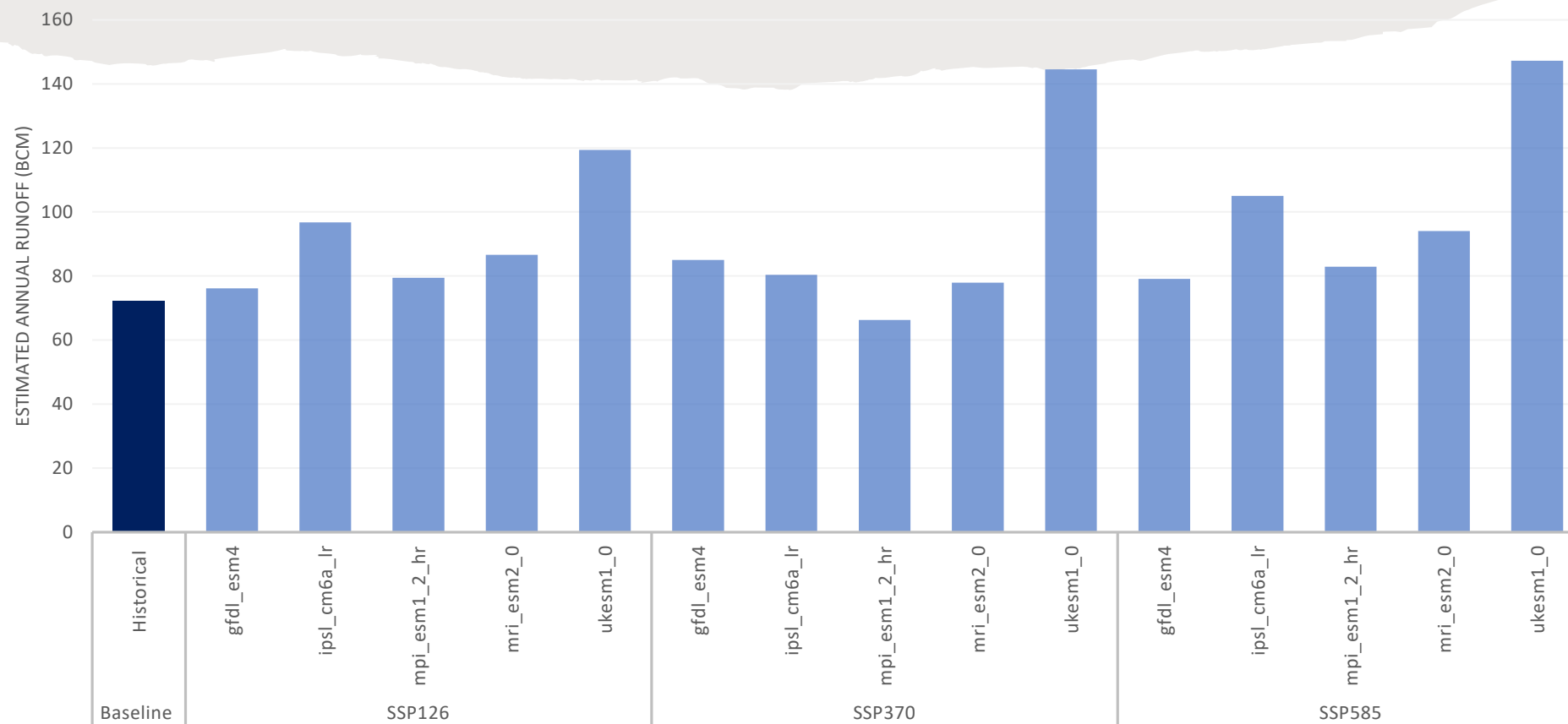
- Equatorial Nile: Nile flow at Jinja
- Eastern Nile: Combined flow of Baro-Akobo-Sobat, Blue Nile and Tekeze-Atbara-Setit
- Regional hydrologic processes (Machar, Sudd etc..)
- IGHM
 - Half degree grided model
 - Monthly Soil water accounting
 - Locally calibrated



| GCM | Full Name | Description |
|---------------|--|---|
| ukesm1_0 | UK Earth System Model 1.0 | A comprehensive Earth system model developed by the United Kingdom, contributing valuable insights into climate dynamics. |
| gfdl_esm4 | Geophysical Fluid Dynamics Laboratory ESM4 | A robust climate model with a comprehensive representation of Earth's climate system, widely used in climate research. |
| IPSL-CM6A-LR | Institut Pierre Simon Laplace CM6A - Low Res | An advanced climate model known for simulating various climate scenarios, valuable for studying climate change impacts. |
| MPI-ESM1.2-HR | Max Planck Institute ESM1.2 - High Res | A cutting-edge high-resolution climate model capturing intricate climate processes and regional climate patterns. |
| MRI-ESM2.0 | Meteorological Research Institute ESM2.0 | A comprehensive climate model providing refined regional climate projections, utilized for studying climate variability. |

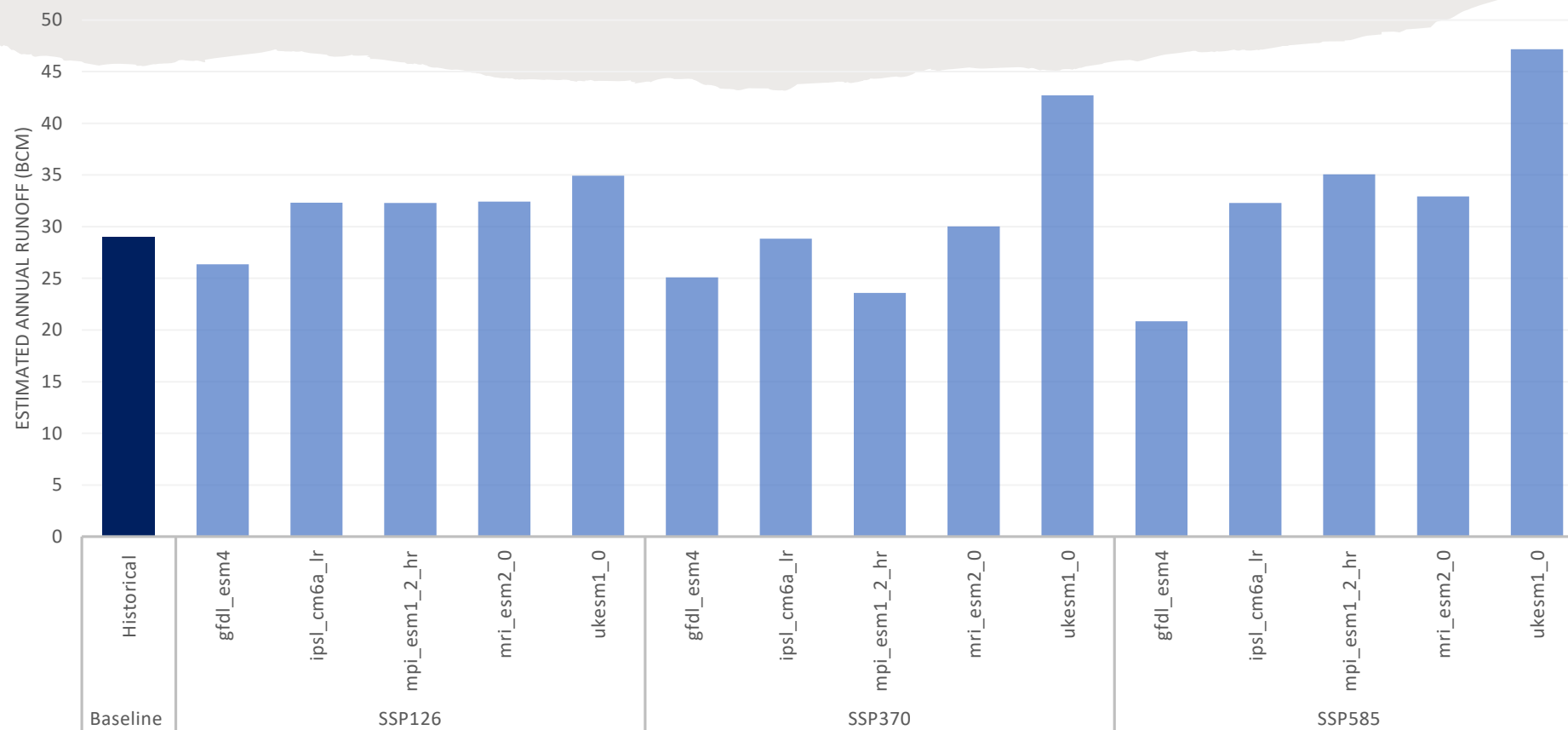
CMIP6 experiment results: runoff

Eastern Nile Runoff Indicators

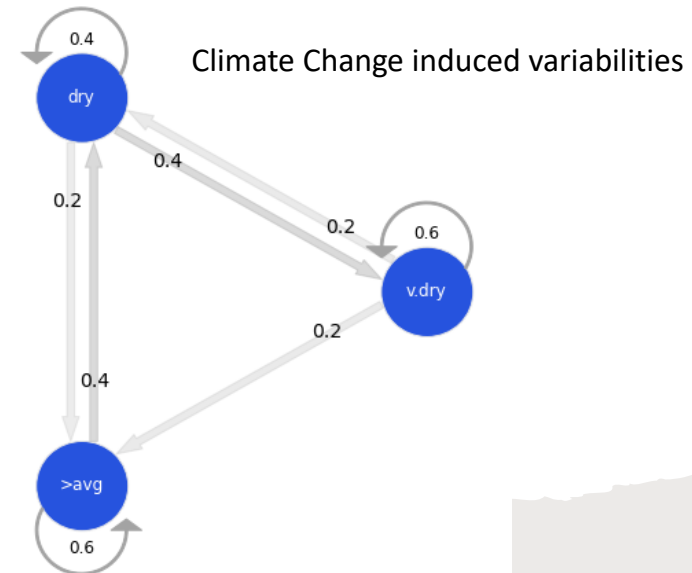
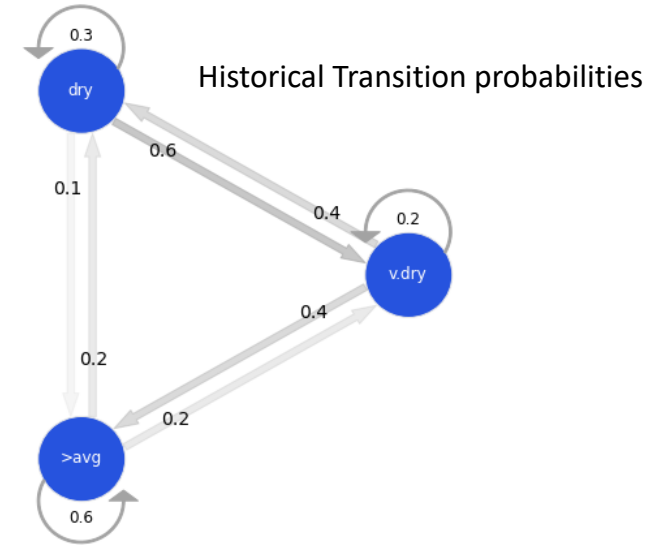
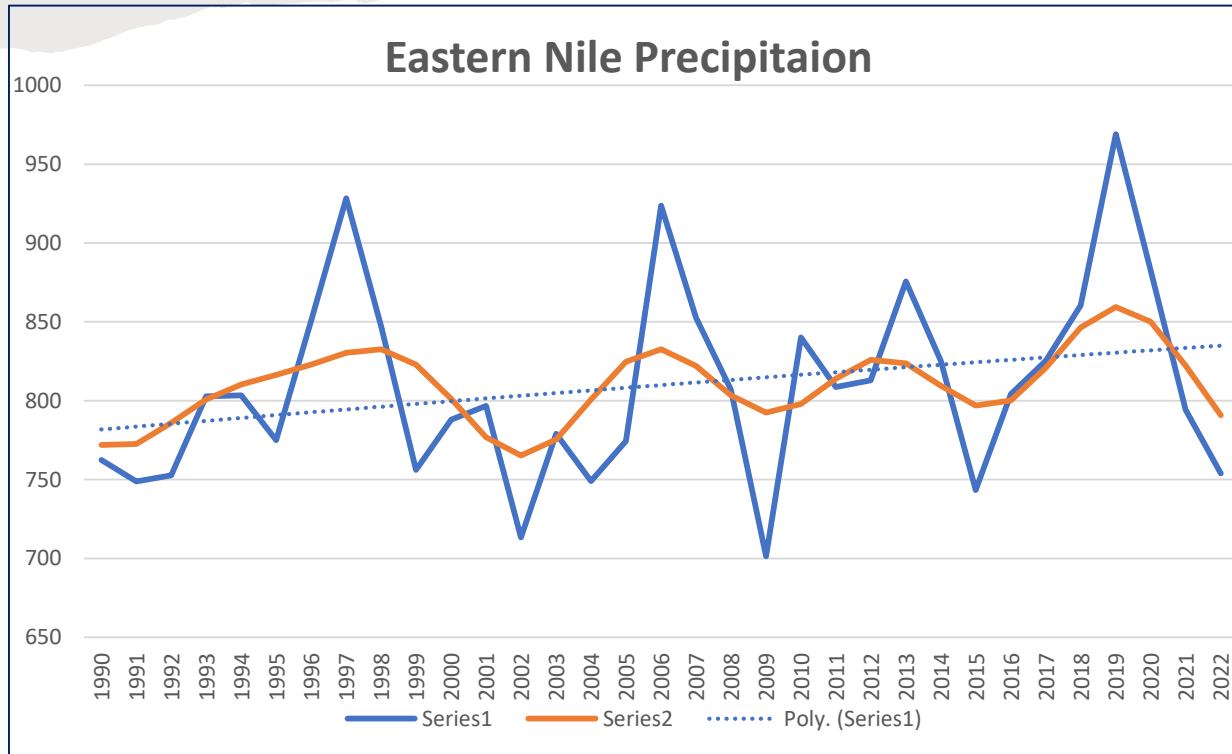


CMIP6 experiment results: runoff

Equatorial Nile Runoff Indicator



More flow but more draught



Irrigation water requirement

- Increased level of crop water requirement due to high temperatures
- Crop Yields- CO₂ fertilization
 - Increase in yield because of increase in CO₂
 - Altered water usage patterns in plants influenced by elevated CO₂ levels (preliminary results 10-20% increase)
 - This will have implication on the consumptive use of water in



Take away

Adaptation

- "Storing water will be vital to adapt to climate change" - world bank.
- More infrastructure upstream
- Catchment management
- Enhancing ground water storage

Regional implication

- Cooperation
- Looking at issues beyond water- Food and Energy Trade