



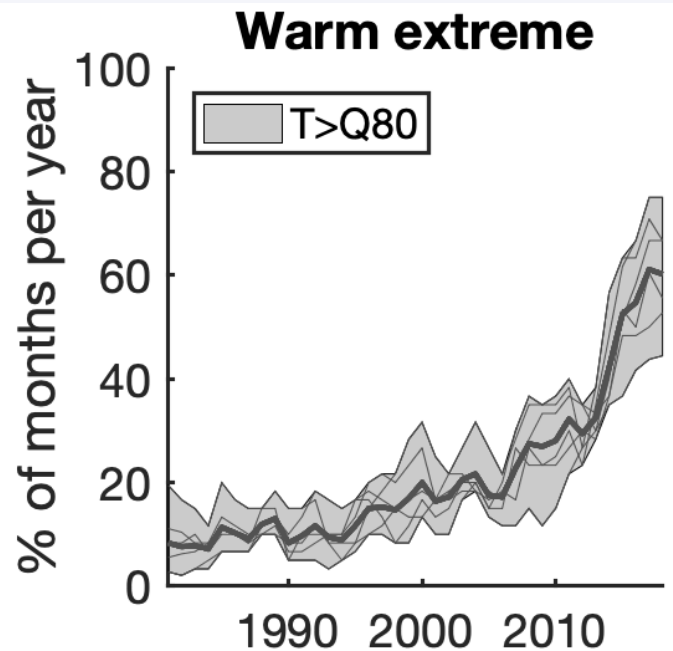
**NILE BASIN INITIATIVE**  
INITIATIVE DU BASSIN DU NIL

## Regional seasonal forecasting for the Blue Nile and Tekeze-Setit-Atbara Basins

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Karlsruhe Institute of Technology (KIT), Campus Alpin, Germany

# More climatic extremes...

ERA5-Land  
aggregated over  
several semi-arid  
river basins



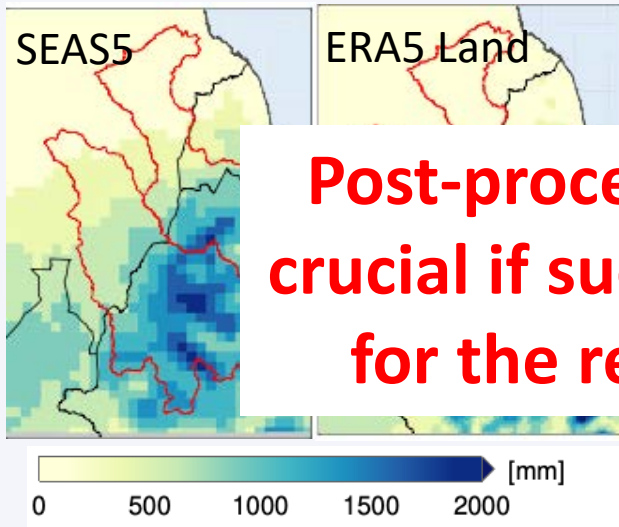
**Number of very warm months is increasing**

From Portele et al. (2020): Seasonal Forecasts offer Economic Benefit for Hydrological Decision Making in Semi-Arid Regions, Scientific Reports (in review)

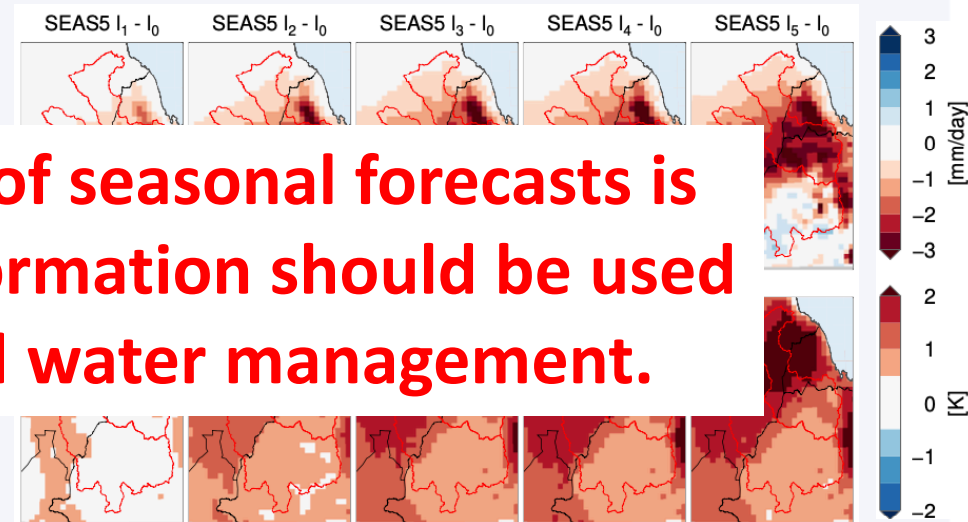
**Timely pro-active water management is getting more and more crucial!**

# Seasonal forecasts – but...

Model biases, coarse resolution

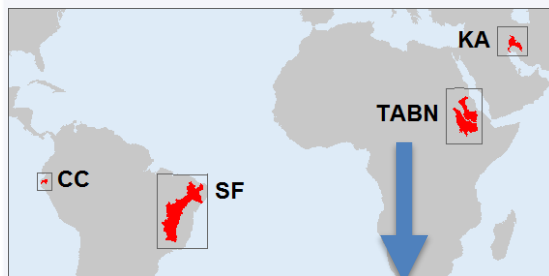


Model drifts



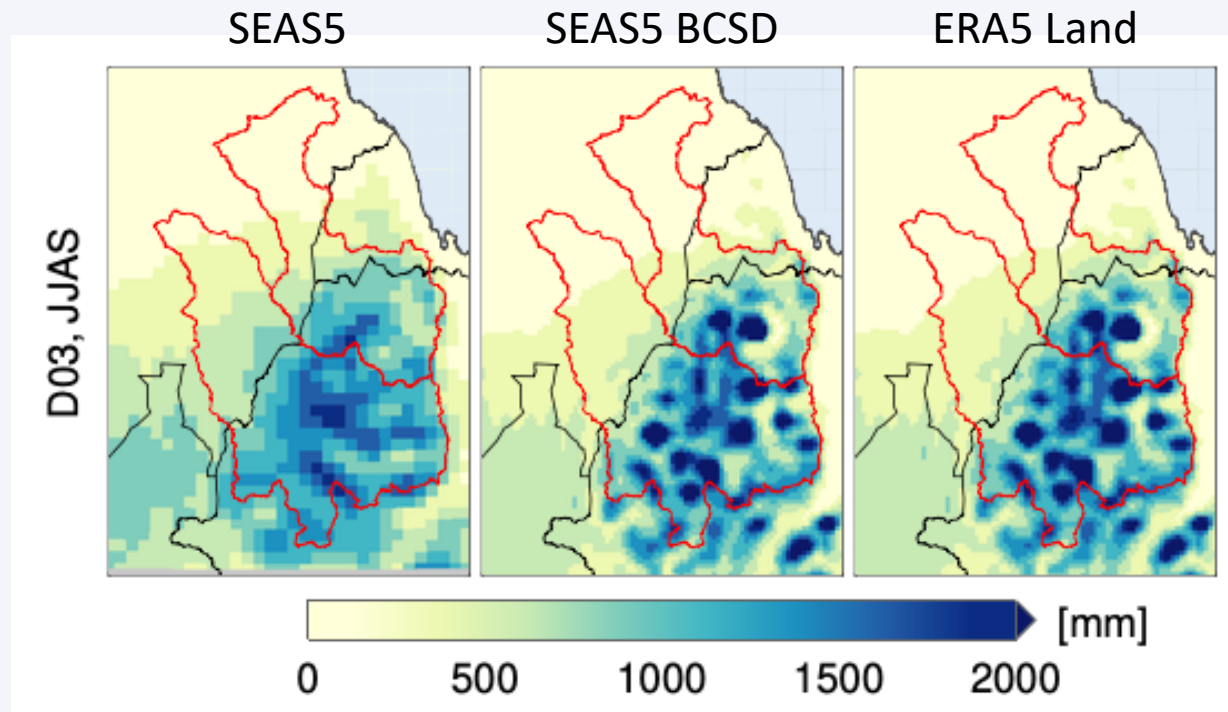
**Post-processing of seasonal forecasts is crucial if such information should be used for the regional water management.**

# SEAS-BCSD in a nutshell...



- **Development of regionalized seasonal forecasts** for several semi-arid river basins
- ...including the Basins of the Blue Nile and the Tekeze-Atbara (domain D03)
- **Bias-Correction and Spatial Disaggregation (BCSD)** of ECMWFs seasonal forecast product **SEAS5** towards **ERA5-Land**, which is the offline re-run of ERA5s land surface component with an enhanced resolution of 9km.
- **Free publication** of the dataset to **build capacity and knowledge** in the field of **seasonal ensemble forecasts**.
- **Operationalization** for providing **up-to-date seasonal forecasts and derived products** for supporting the regional water management

# Reduced biases and drifts, higher spatial resolution!

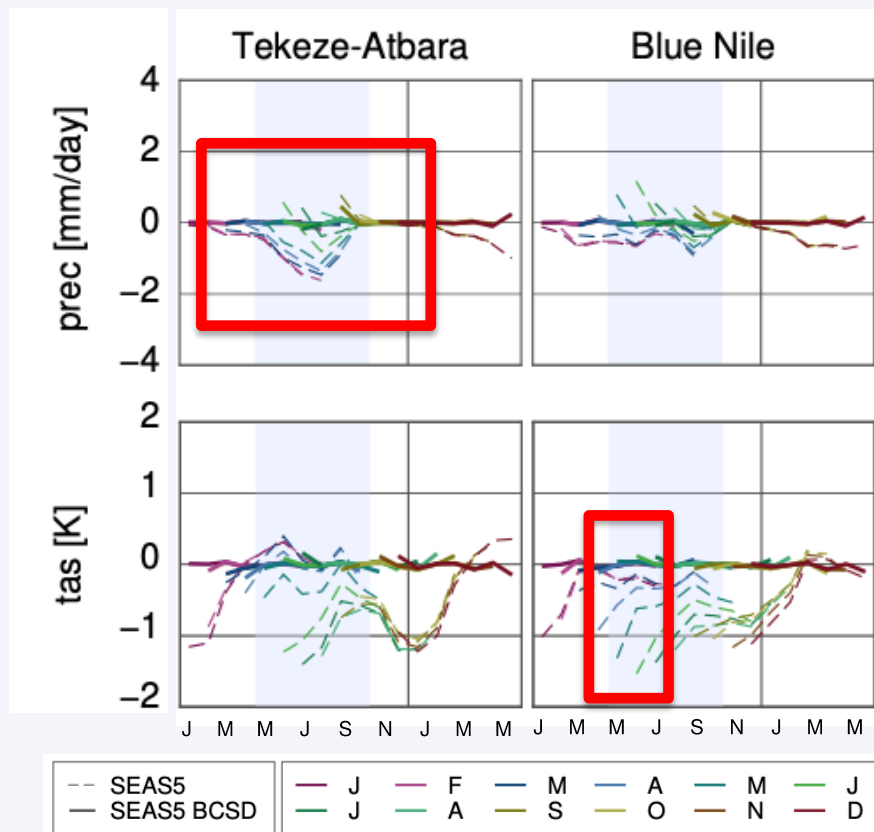


Seasonal precipitation sum from June to September, averaged over the period 1981 to 2016

**Significantly improved level of agreement w.r.t. ERA5 Land; reduced biases and drifts!**

# Improved basin-scale forecasts

Bias of precipitation (top) and temperature (bottom) between SEAS5 (dashed), SEAS5-BCSD (straight) and ERA5-Land from different issue months (colors)



- Biases after BCSD are close to 0
- Seasonality of biases is reduced
- Improved consistency across the lead times

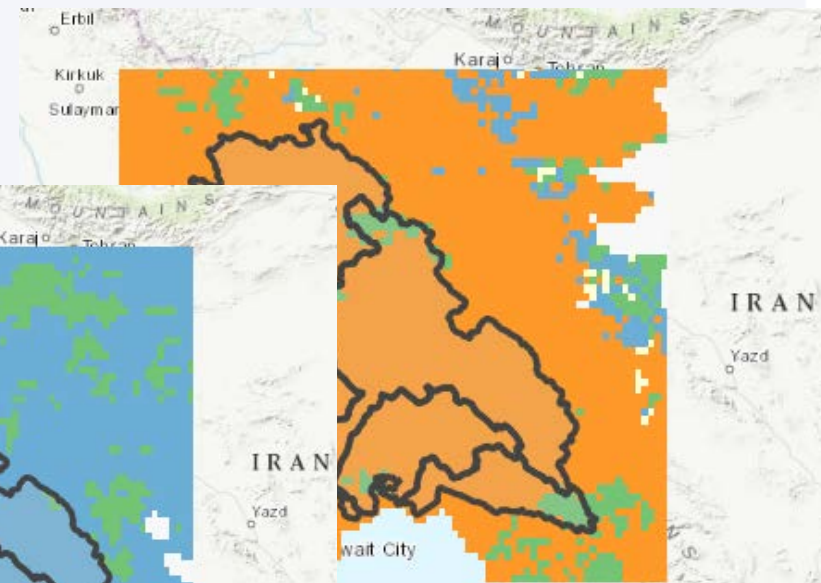
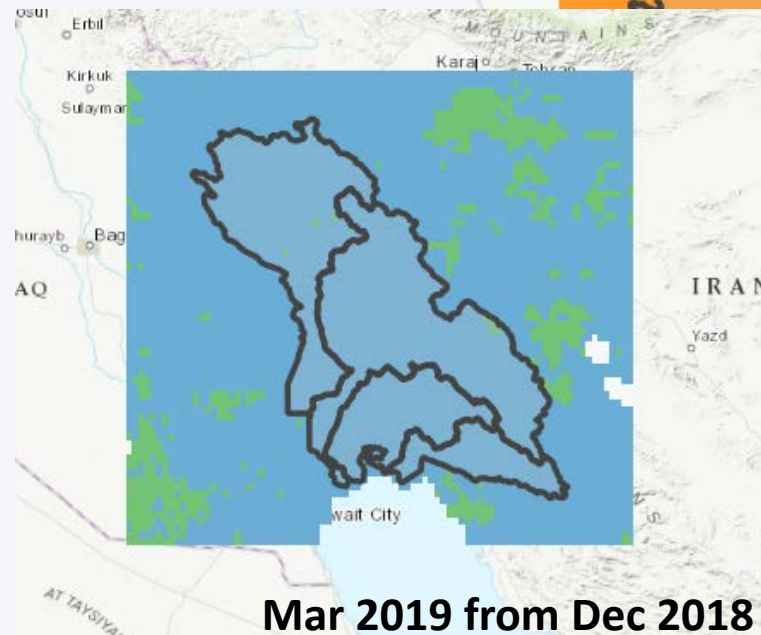
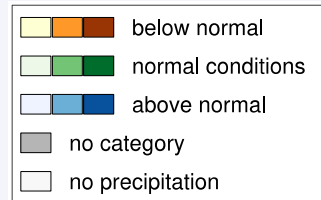
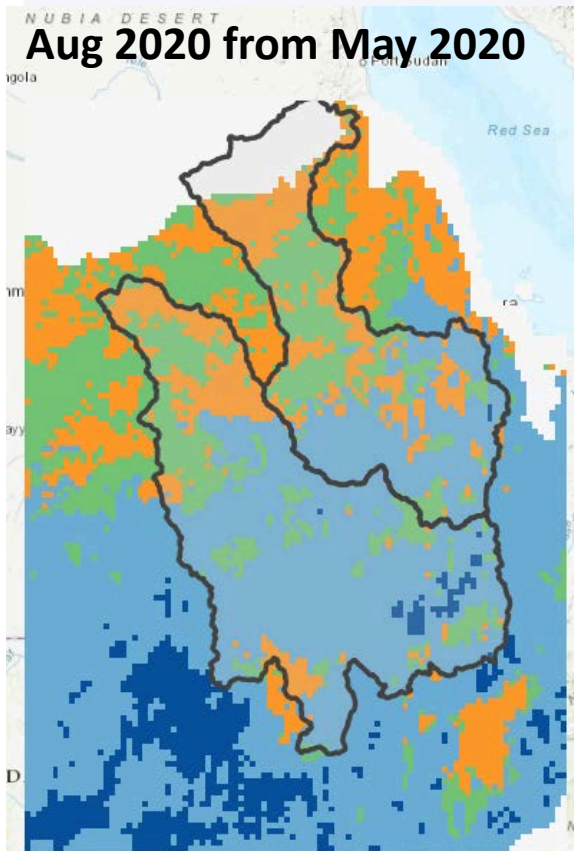
**BCSD is a simple, but effective method for reducing biases and model drifts.**

...more results in Lorenz et al. (2020): Bias-corrected and spatially disaggregated seasonal forecasts: a long-term reference forecast product for the water sector in semi-arid regions, ESSD, in review, doi: 10.5194/essd-2020-177

# Abnormal events in the past...

Wet conditions during July/August 2020 across large parts of Ethiopia/South Sudan were predicted from around May 2020

Over Iran, below normal conditions during the first months of the rainy season 2017/2018 were predicted from October 2017; above normal conditions during the rainy season 2018/2019 were predicted from autumn 2018;



# Current forecasts indicate wet conditions during rainy season

## Categorical (tercile) precipitation forecasts from 1.3.2021

Mar 2021

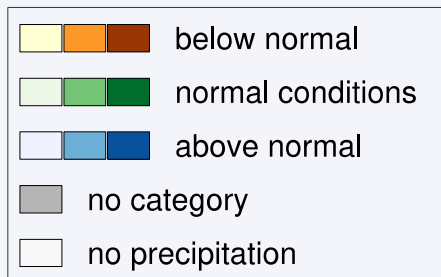
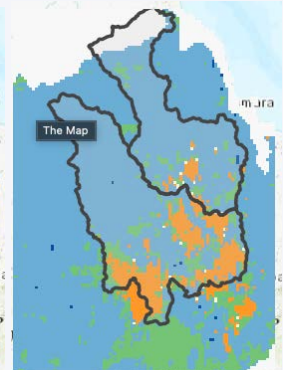
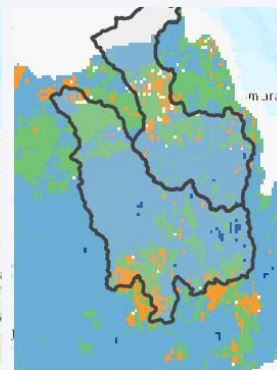
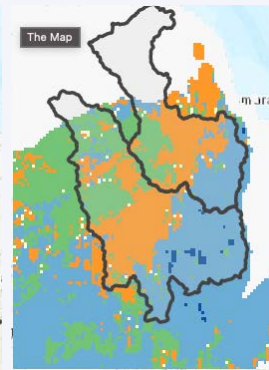
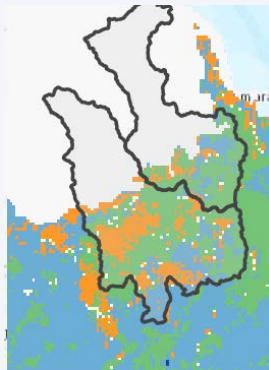
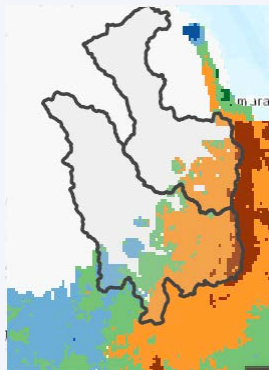
Apr 2021

May 2021

Jun 2021

Jul 2021

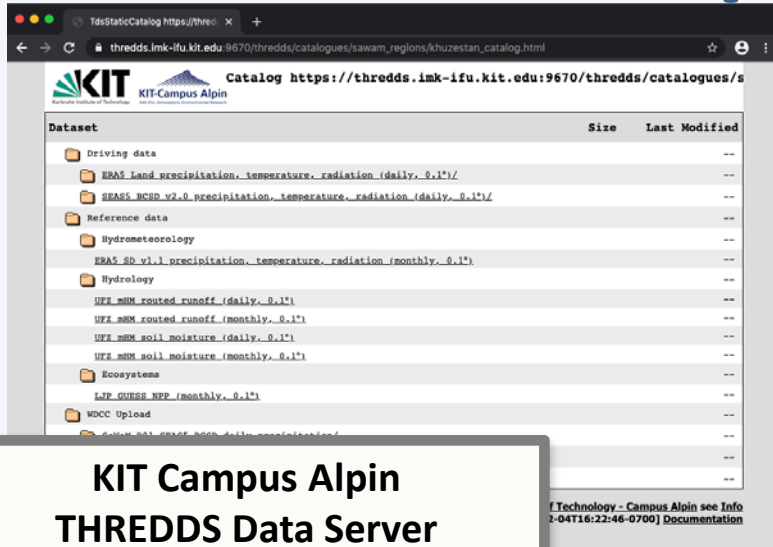
Aug 2021



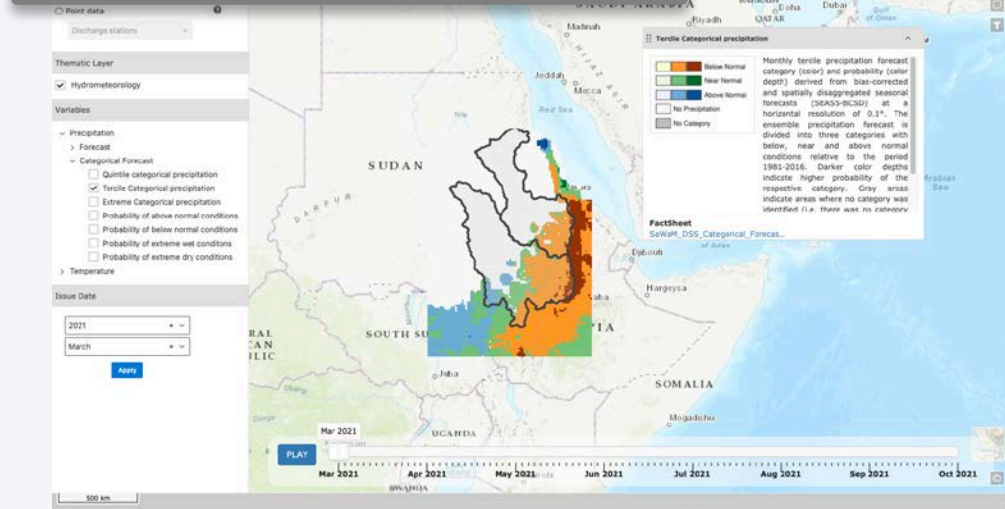
- Dry conditions across large parts of the headwaters during March and May
- Wet conditions across the South-Western part of the domain throughout the season
- Period Jun to Aug 2021 seems to become (very) wet and warm (similar to last year...)



# SEAS5-BCSD is publicly available



...via an online Decision Support System (<https://sawam.gaf.de>)



**KIT Campus Alpin  
THREDDS Data Server  
for operational products**

**Publication of the full daily and monthly ensemble (re)forecasts from 1981 to 2019 through the World Data Center for Climate ([WDCC](https://www.wdcci.org/))**



Metadata for 'SaWaM D02 SEAS5 BCSD'  
doi:10.26050/WDCC/SaWaM\_D02\_SEAS5\_BCSD

DOI: dataset\_group

General Information Quality Contacts Data Hierarchy

**General Information**

**Name**  
SaWaM D02 SEAS5 BCSD

**Summary**  
This dataset group contains the regionalized seasonal forecasts for the SaWaM study domain D02 (Rio São Francisco, Brazil). The data is based on the latest seasonal forecast product SEAS5 from the European Centre for Medium Range Weather Forecast (ECMWF), which has been Bias-Corrected and Spatially Disaggregated (BCSD) towards the ERA5-Land high-resolution replay of the land component of ECMWF's ERA5 climate reanalysis. It hence provides a temporally and spatially consistent set of land surface variables for driving e.g. hydrological models or assessing the regional forecast skill of seasonal forecasts.

Currently, the dataset group contains daily and monthly ensemble (re)forecasts during the period 1981 to 2019. In particular, each forecast with 25 (before 2017) and 51 (since 2017) ensemble members contains daily and monthly forecasts for precipitation, maximum, minimum, and average temperature as well as radiation from the issue date for the next 215 days.

**Contact**  
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**Keywords**  
bias-correction, ECMWF SEAS5, ERA5-Land, seasonal forecasts, semi-arid basins, spatial disaggregation

**Spatial Coverage**  
Longitude -49 to -35 Latitude -22.5 to 2.5

**Use constraints**  
Creative Commons Attribution 4.0 International (CC BY 4.0) (<https://creativecommons.org/licenses/by/4.0/>)

**Size**  
329.76 GB (31407020446 bytes)

**Format**  
netCDF

**Progress**  
completely archived

**Creation Date**  
2020-05-04

**Future Review Date**  
2030-05-07

Find data Export Dataset acronym



Citation Lorenz, Christof; Portela, Tanja; Laus, Patrick; Kunstmann, Harald (2020): Seasonal Water Resources Management for Semiarid Areas: Bias-corrected and spatially disaggregated seasonal forecasts for the Rio São Francisco Basin (Brazil). World Data Center for Climate (WDCC) at DKRZ. [https://doi.org/10.26050/WDCC/SaWaM\\_D02\\_SEAS5\\_BCSD](https://doi.org/10.26050/WDCC/SaWaM_D02_SEAS5_BCSD)

# Conclusion & outlook

- A baseline forecasting product for the Blue Nile and Tekeze-Atbara including precipitation, temperature and radiation is freely available
- Improved performance compared to the raw SEAS5 forecasts
- Release of new forecasts approx. 1 day after official ECMWF release (5th of each month)
- Next:
  - Extension of variables (e.g., wind, humidity, etc.)
  - Extension of domain (e.g., White Nile)
  - Evaluation of new and innovative regionalization approaches (e.g., machine learning)
  - Hydrological modeling approaches



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**THANK YOU!**