

Hydrometeorological forcing for SERVIR Climate Services (HydroSCS) — *Developing a global forcing dataset to support subseasonal-to-seasonal (S2S) forecasting applications*

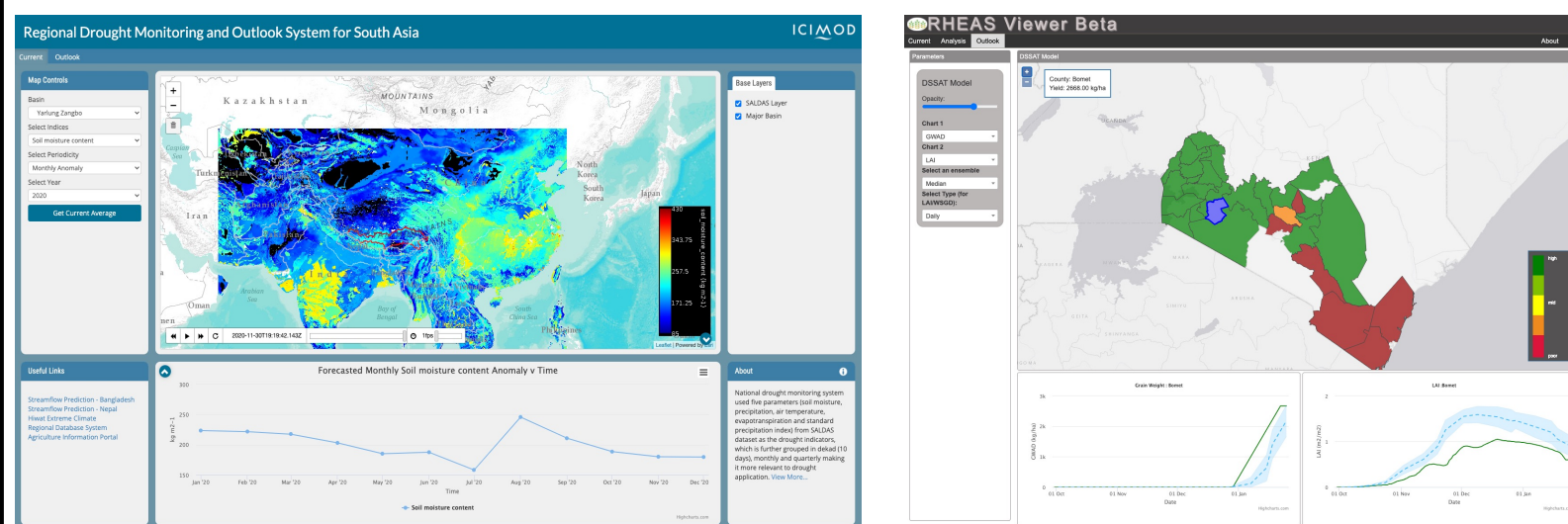
J. Brent Roberts¹, Sujay Kumar², Clay Blankenship³, Kristi Arsenault⁴, Jayanthi Srikishen³, Ryan Zamora⁴

¹NASA MSFC, ²NASA GSFC, ³USRA, ⁴SAIC

SERVIR S2S Forecast Applications

SERVIR, a joint initiative between NASA and USAID, builds capacity for stakeholders to use NASA Earth Observations including S2S forecasts:

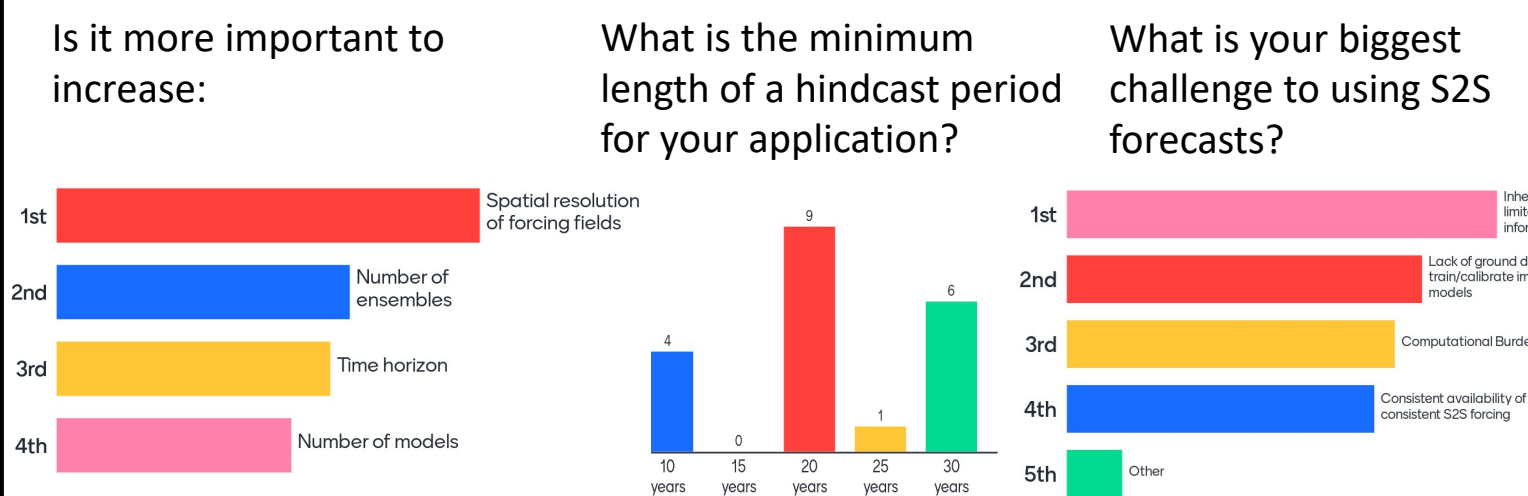
- Land Data Assimilation Systems
- Hydrologic Forecasts
- Cropping System Models
- Direct Forecasts (e.g., monsoon start and stop)



The South Asia Land Data Assimilation System (SALDAS) supports both analyses and hydrologic outlooks using land surface modeling.

The Regional Hydrologic Extremes Assessment System (RHEAS) adds crop modelling using DSSAT.

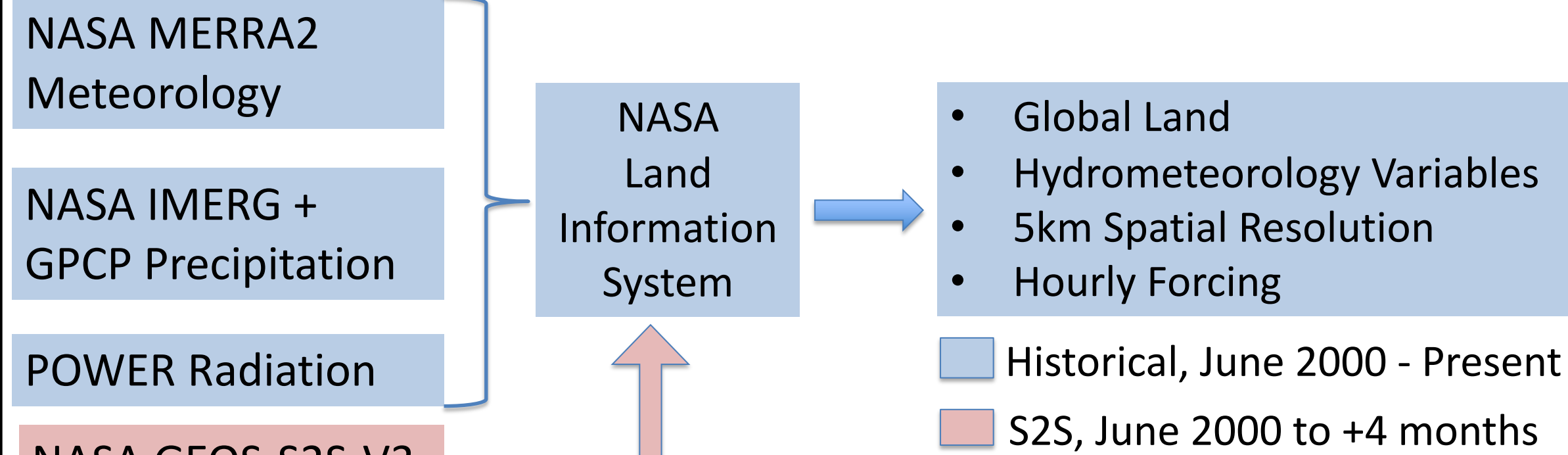
SERVIR User Needs



SERVIR Requests	Spatial	Temporal	Period of Record	Variables
	1km-5km	Hourly to Daily	1981 to +6 months	<i>Precip, T2M, Tmin, Tmax, Psfc, Q2M, RH, Wind, Shortwave, Longwave</i> + <i>“LSM” — RefET, PET, ET, Runoff, SM, SWE, PDSI, VPD, Water Deficit</i>

- A canvas of existing data products found none that satisfy these requirements for operational forecast applications.

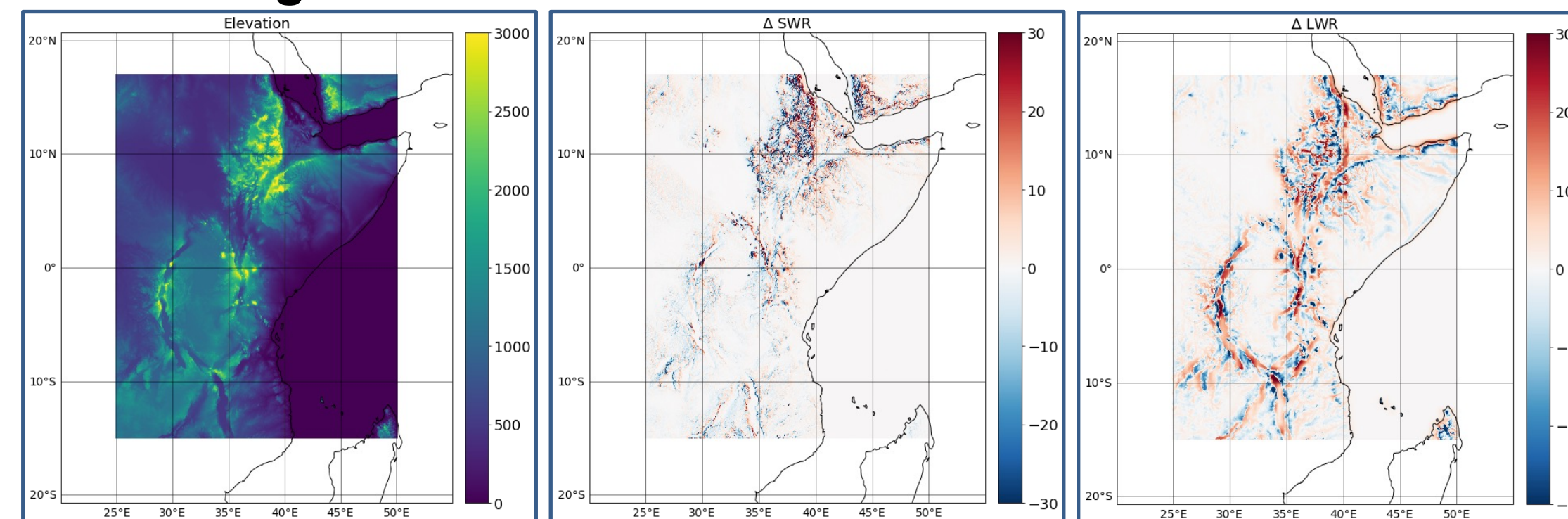
HydroSCS — Using NASA Earth Observations (EO) and Modeling to Address Needs



Summary

1. SERVIR users need high-resolution, bias-corrected hydrometeorological S2S forecasts to calibrate and run application models.
2. We have brought together multiple NASA EO products together through the NASA LIS to produce both a historical dataset and S2S forecasting workflow to support applications.
3. Expecting to make this data publicly available to the broader science research and application communities in 2025

Downscaling and Bias Correction

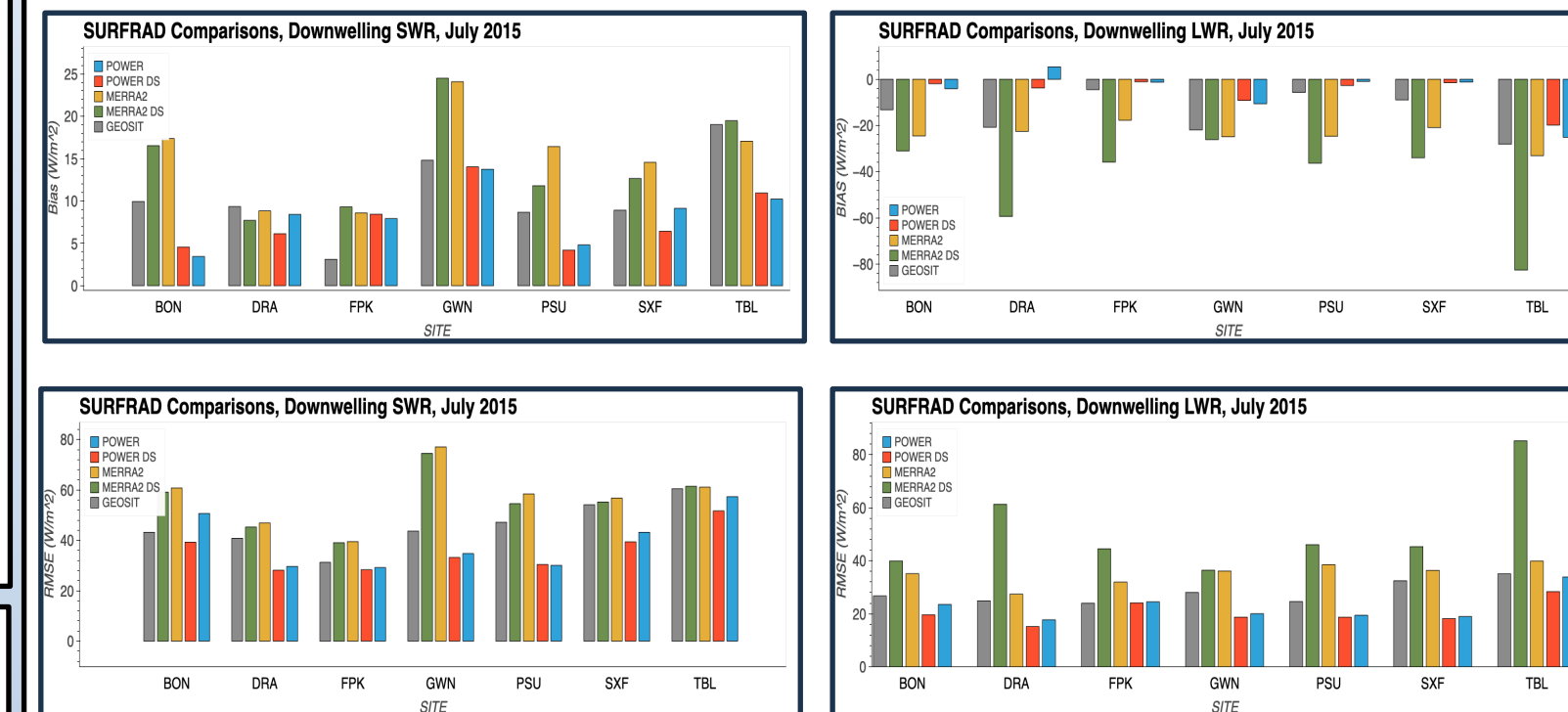


- Shortwave radiative fluxes include slope-aspect corrections.
- Air temperature, humidity, pressure, and longwave radiation include lapse rate corrections.
- IMERG V07B precipitation includes a monthly bias-constraint to GPCPv3.2 estimates.

Evaluation

Radiation

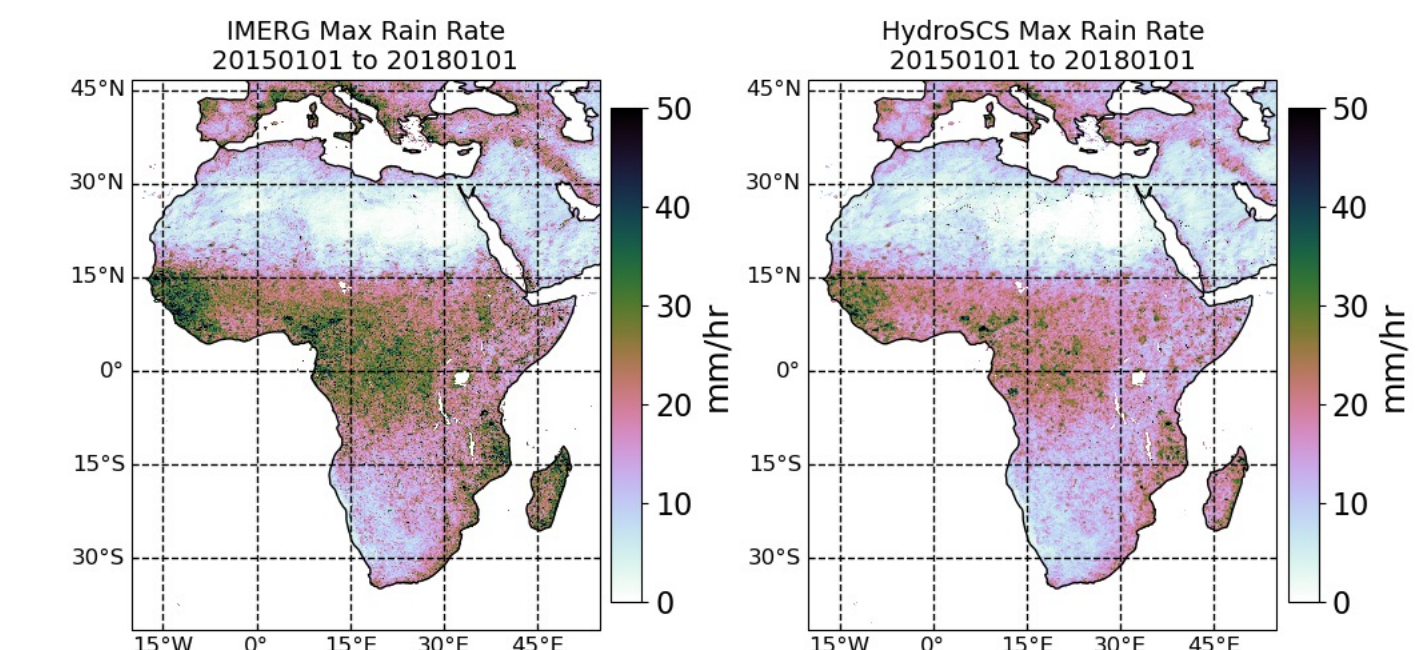
- Downscaled radiative fluxes show slightly improved performance to POWER and both are improvements over NASA model analyses.



Comparisons of radiative fluxes estimates to SURFRAD point observations.

Precipitation

- The bias correction of IMERG not only impacts the monthly means but the magnitudes of extremes.



Air Temperature

- HydroSCS performs on par with other products but does not include additional bias corrections to other gridded air temperature observations.

