Supplement of Hydrol. Earth Syst. Sci., 30, 3399–3423, 2026
https://doi.org/10.5194/hess-30-3399-2026-supplement

Hydrology and Earth System Sciences
Open Access
EGU

Supplement of

Comprehensive Global Assessment of 24 Gridded Precipitation Datasets Across 18 428 Catchments Using Hydrological Modeling

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Supplementary Contents

S1 Performance Comparison Across Köppen-Geiger Climate Zones

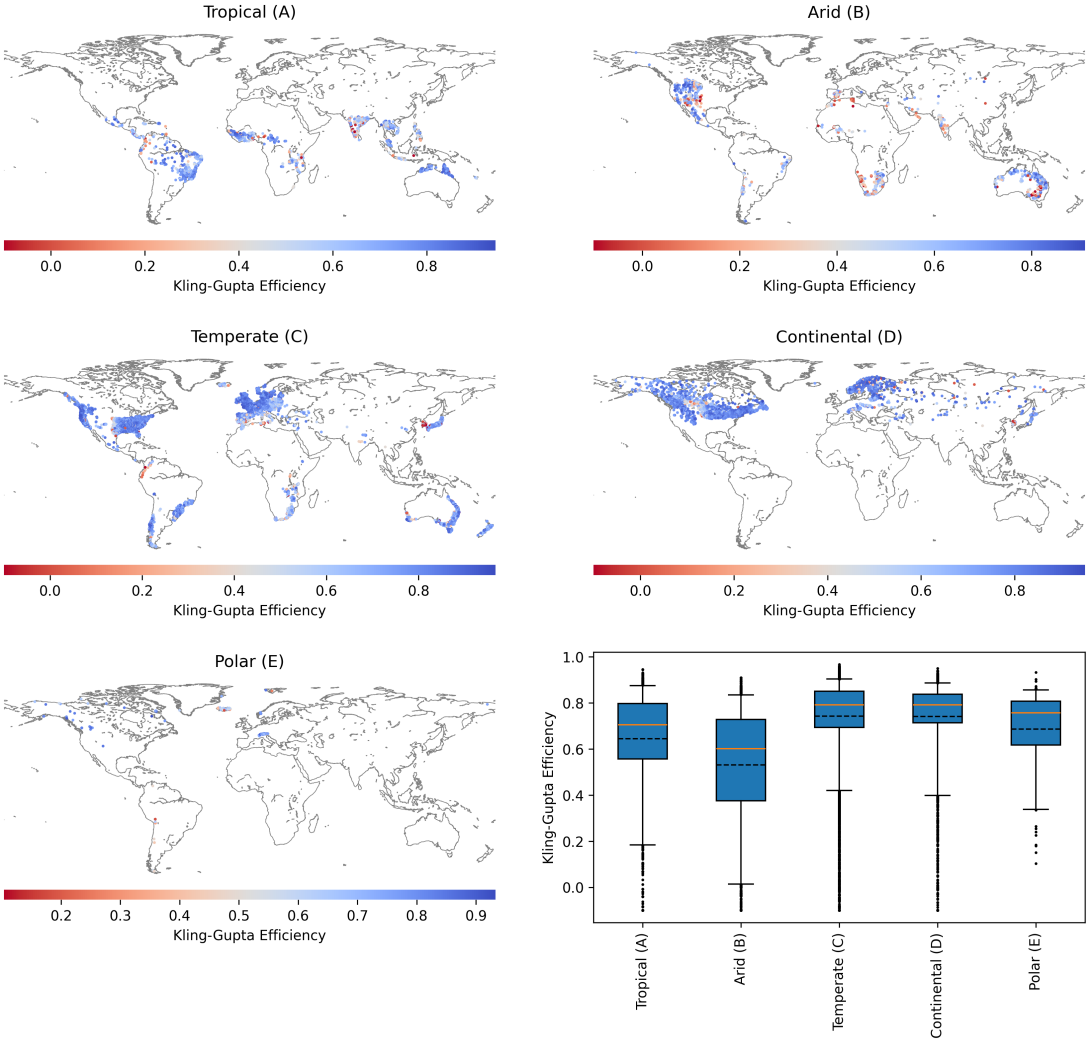


Figure S1: Spatial maps and distribution of Kling-Gupta Efficiency for MSWEP V2.8 dataset.

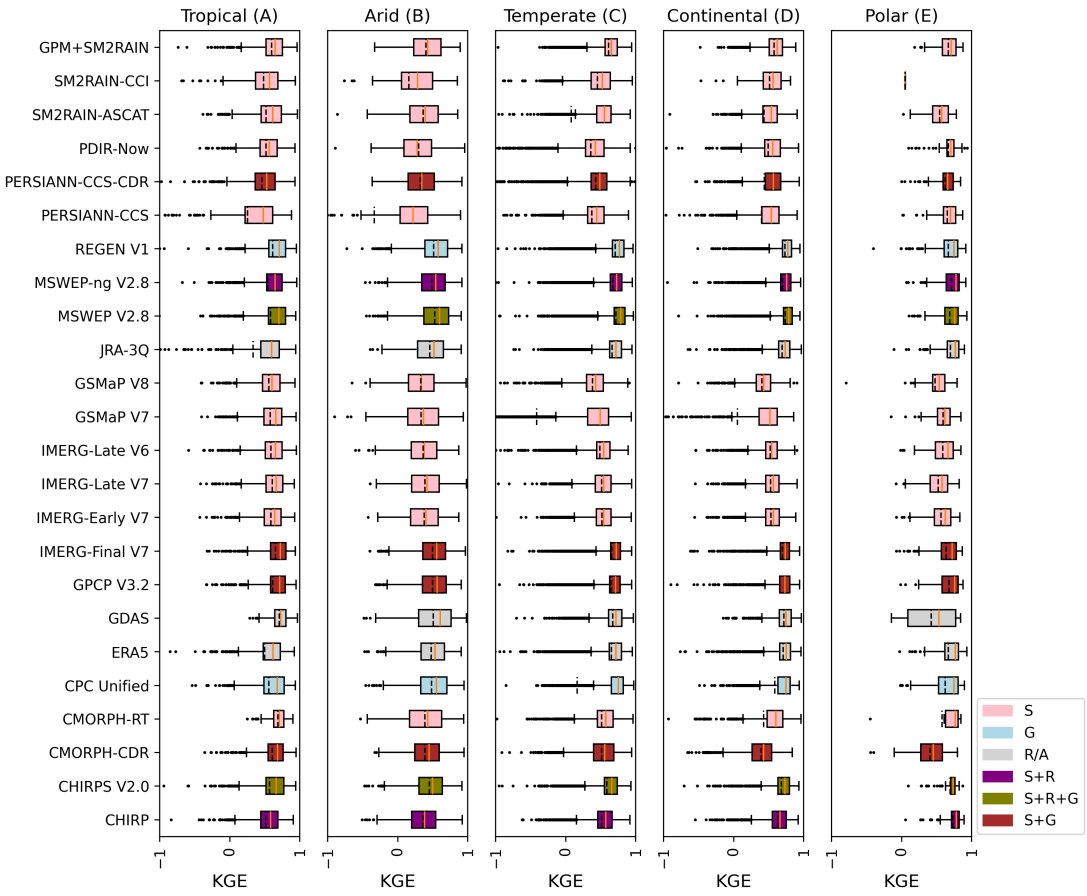


Figure S2: Performance of 24 P datasets in major Köppen-Geiger climate zones.

S2 Spatial Maps of Calibration Performance for P Datasets

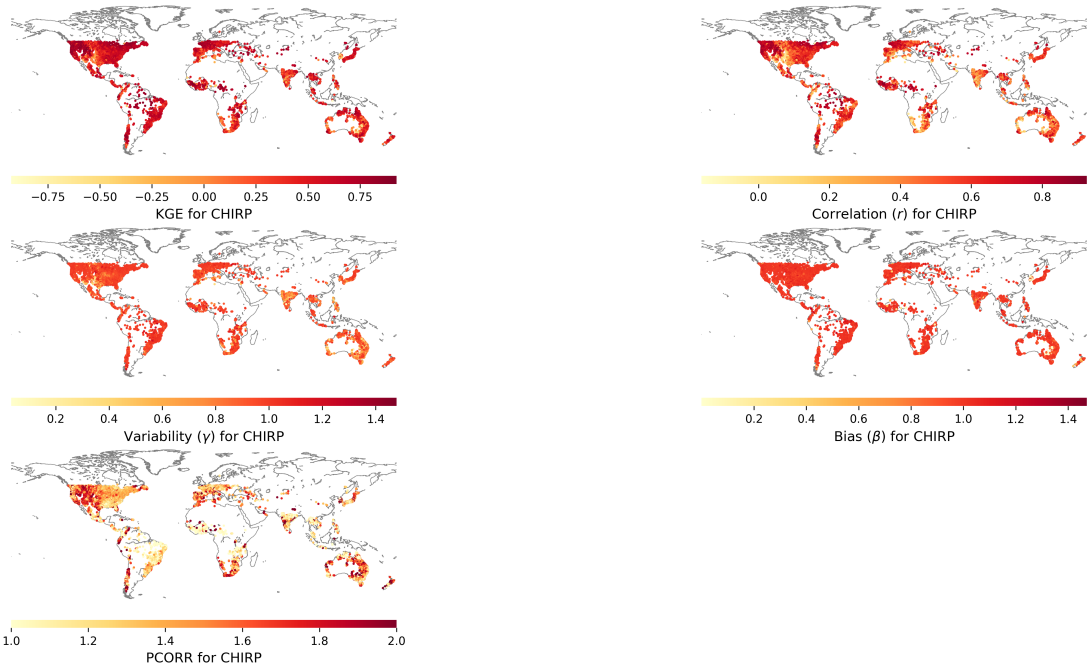
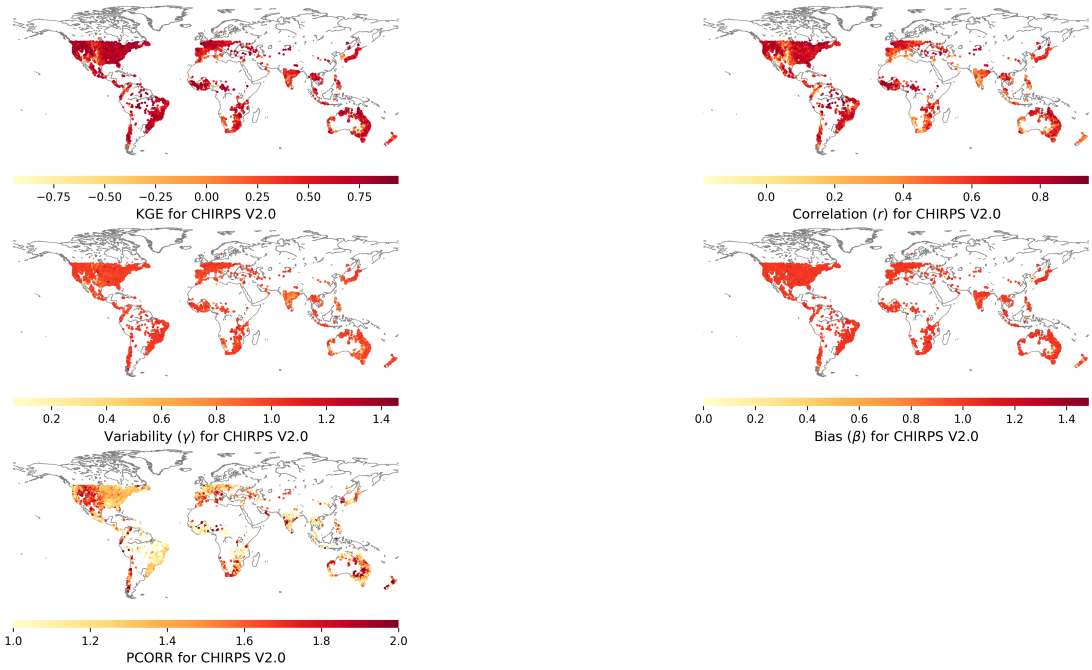


Figure S3: Calibration performance (KGE, correlation, variability, and bias) and PCORR values for CHIRP.



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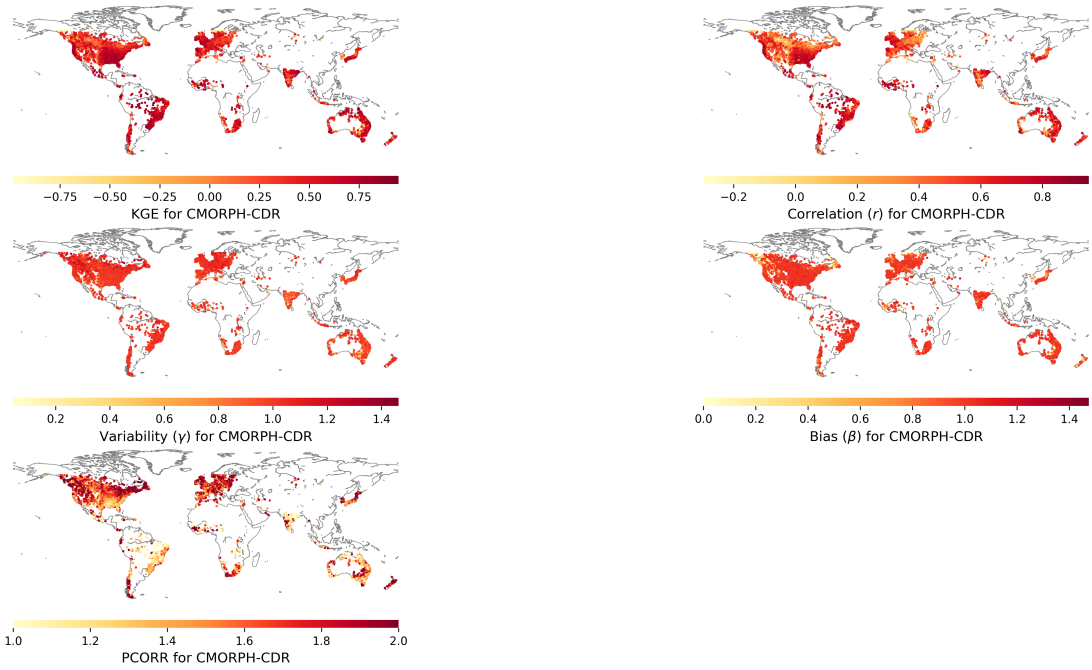

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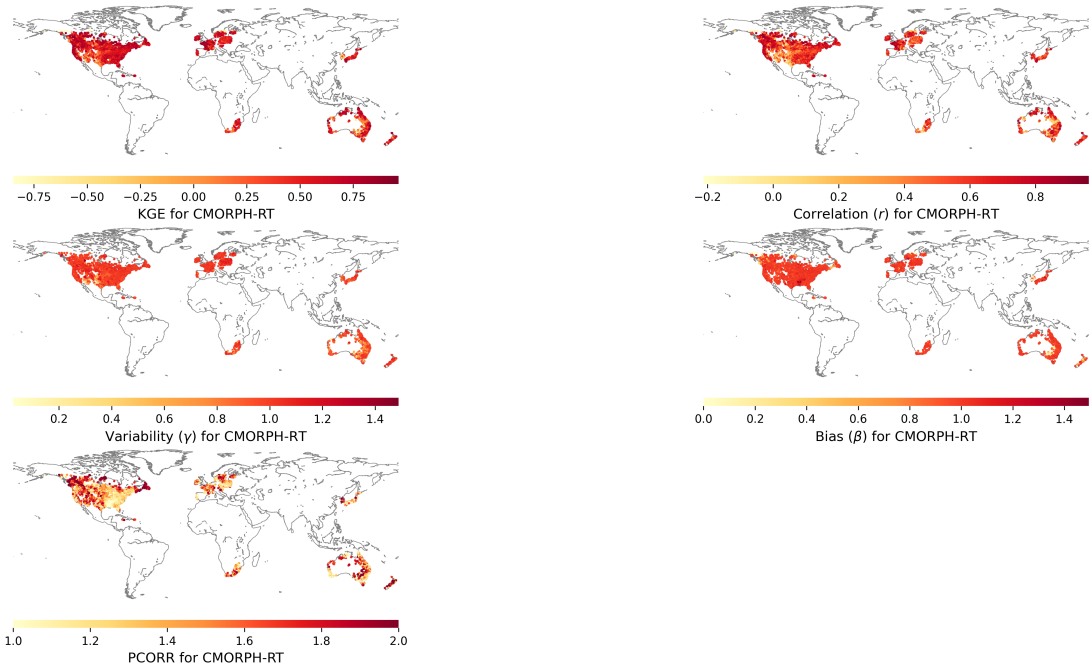

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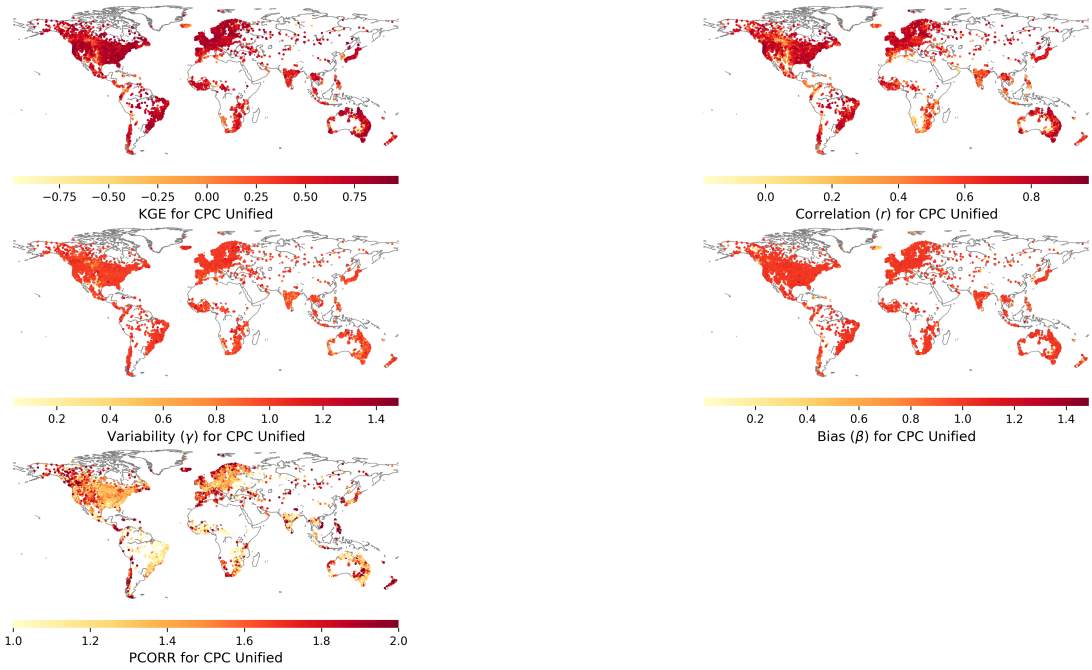

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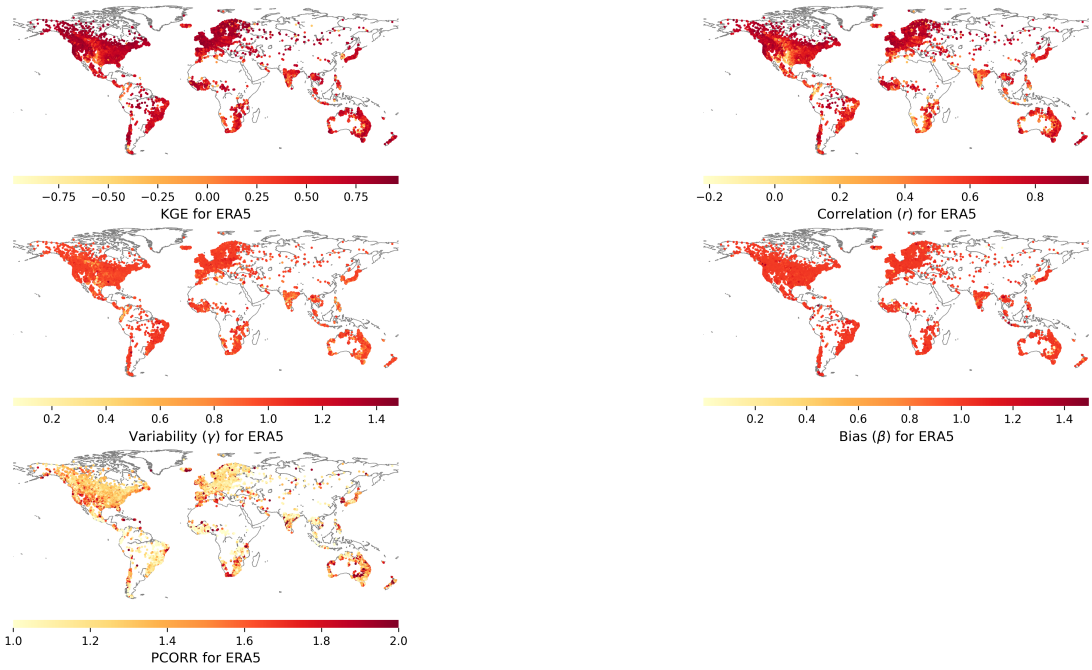

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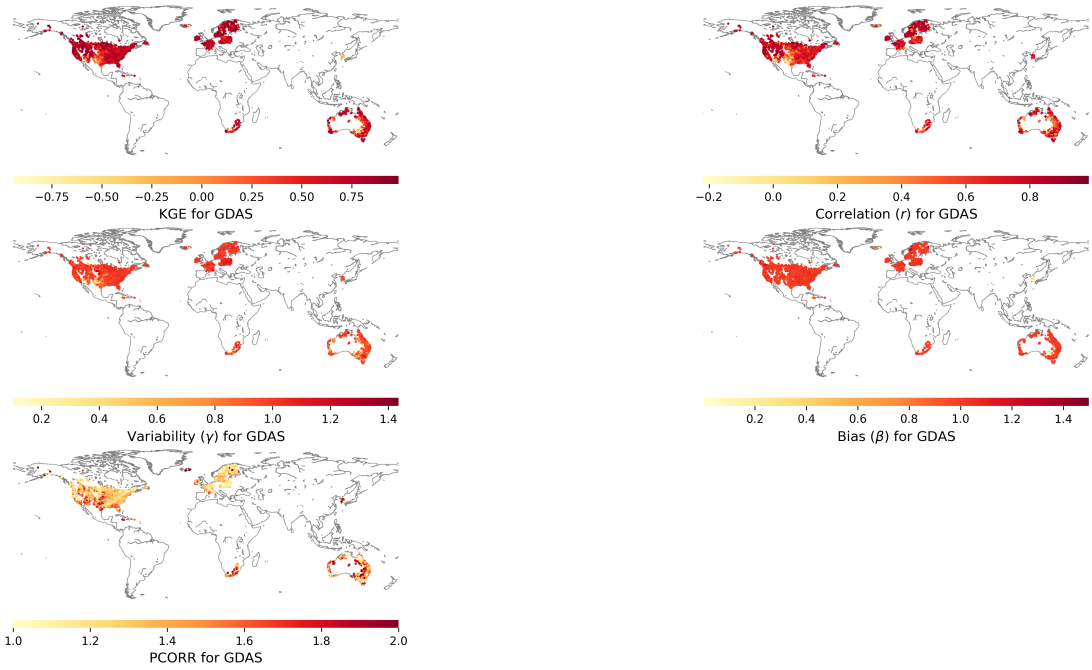
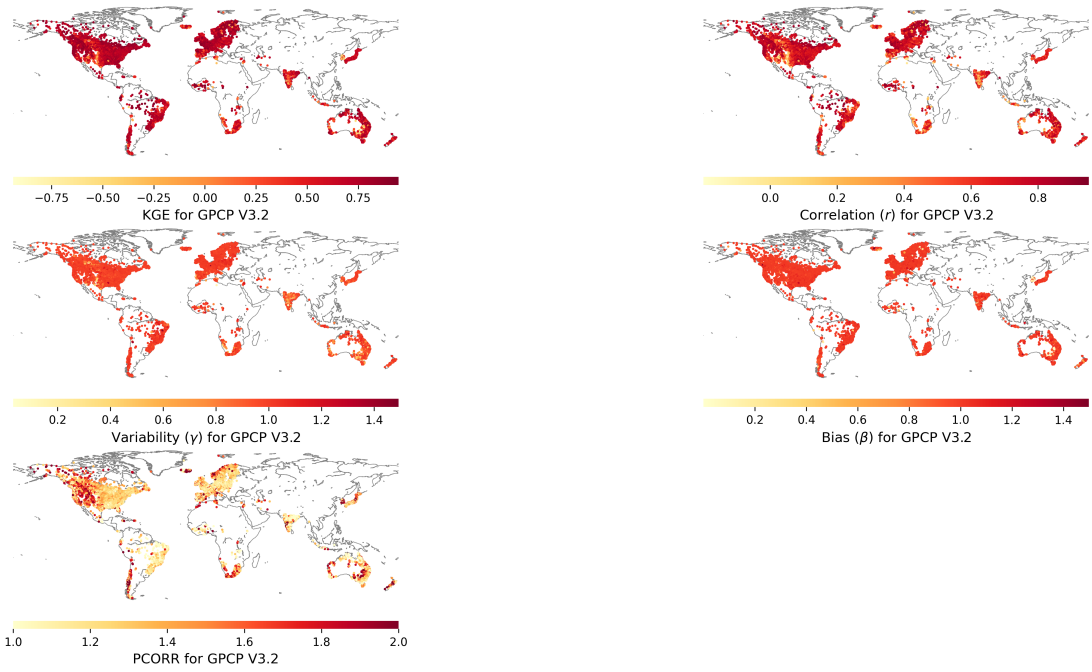


Figure S9: Calibration performance (KGE, correlation, variability, and bias) and PCORR values for GDAS.



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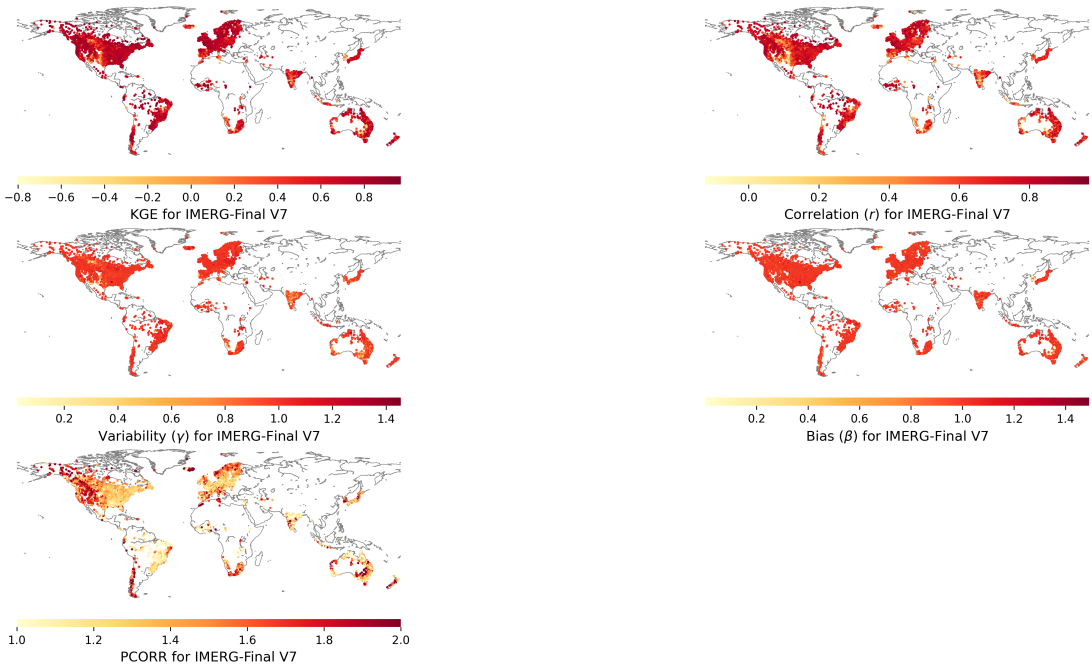

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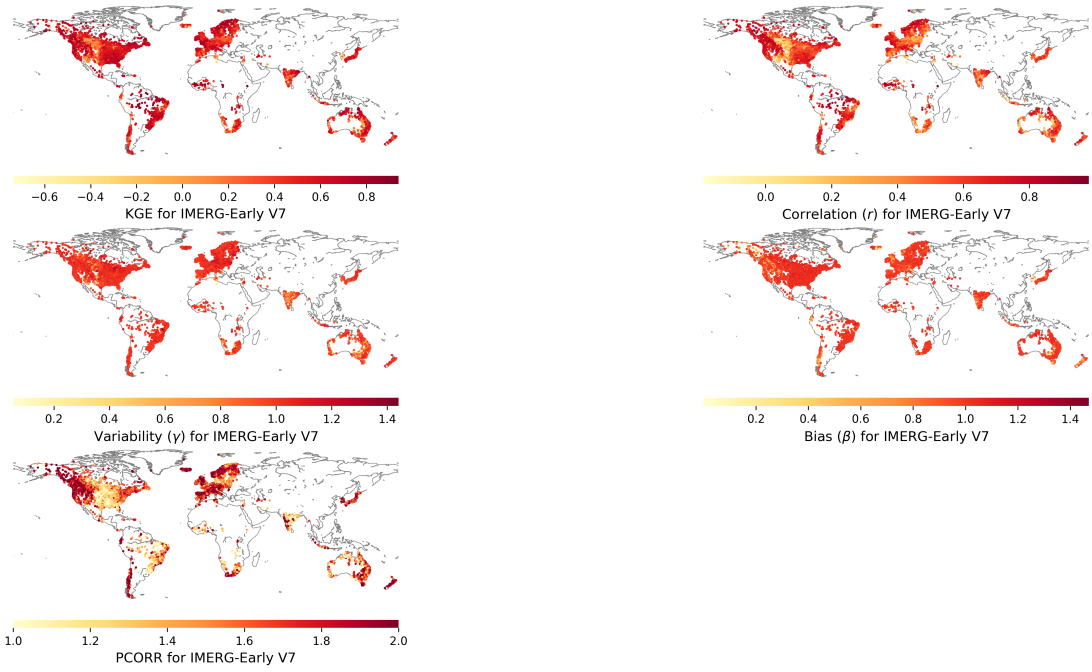

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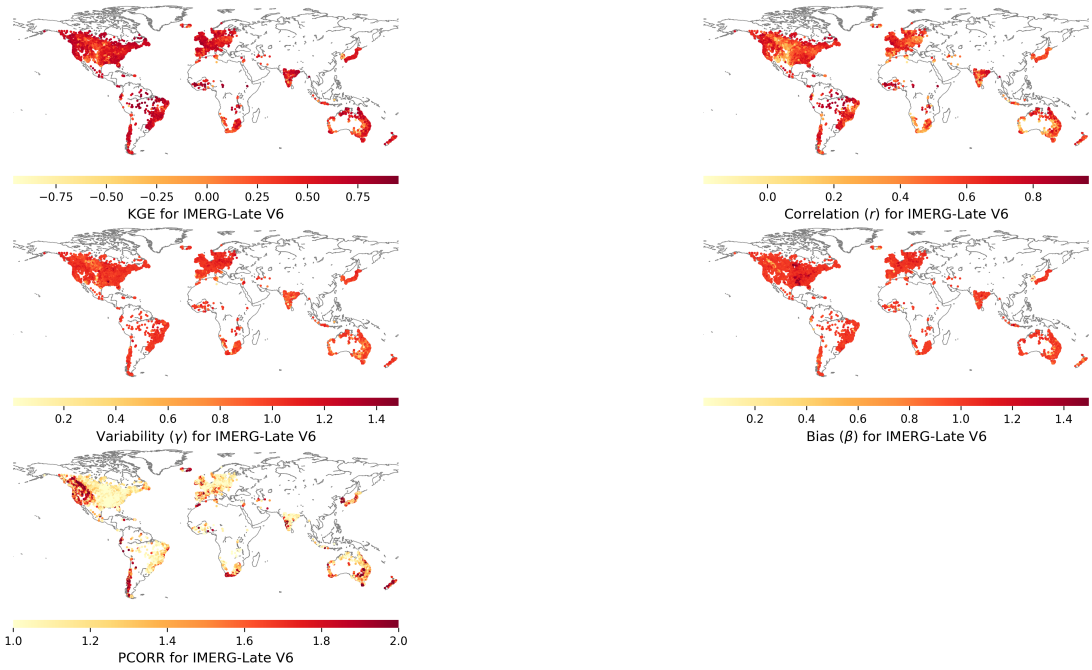
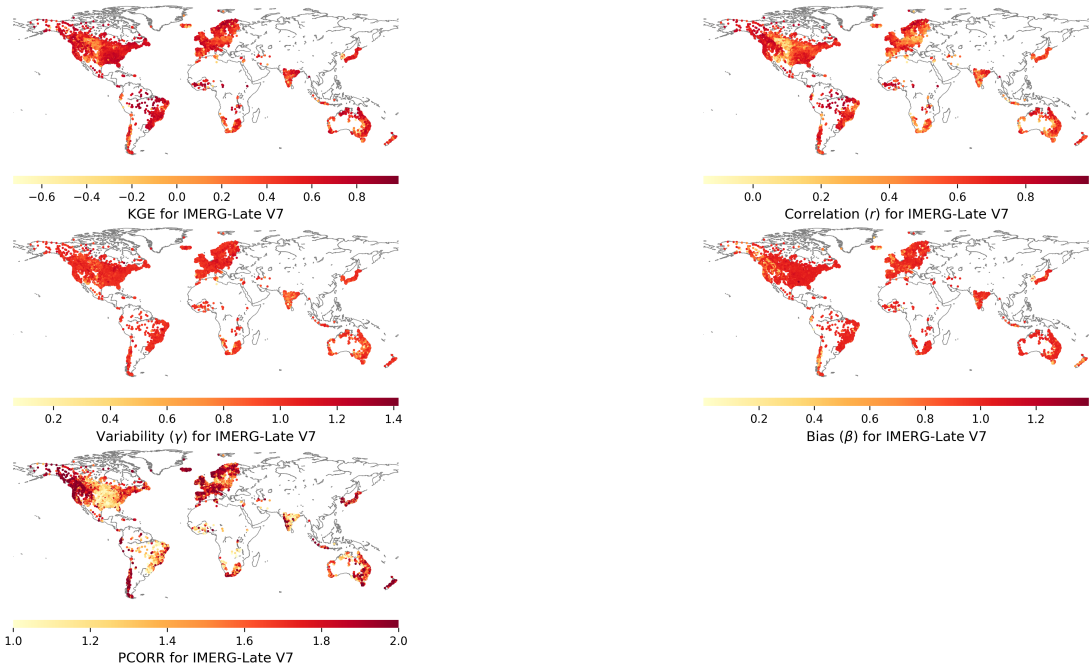


Figure S13: Calibration performance (KGE, correlation, variability, and bias) and PCORR values for IMERG-Late V6.



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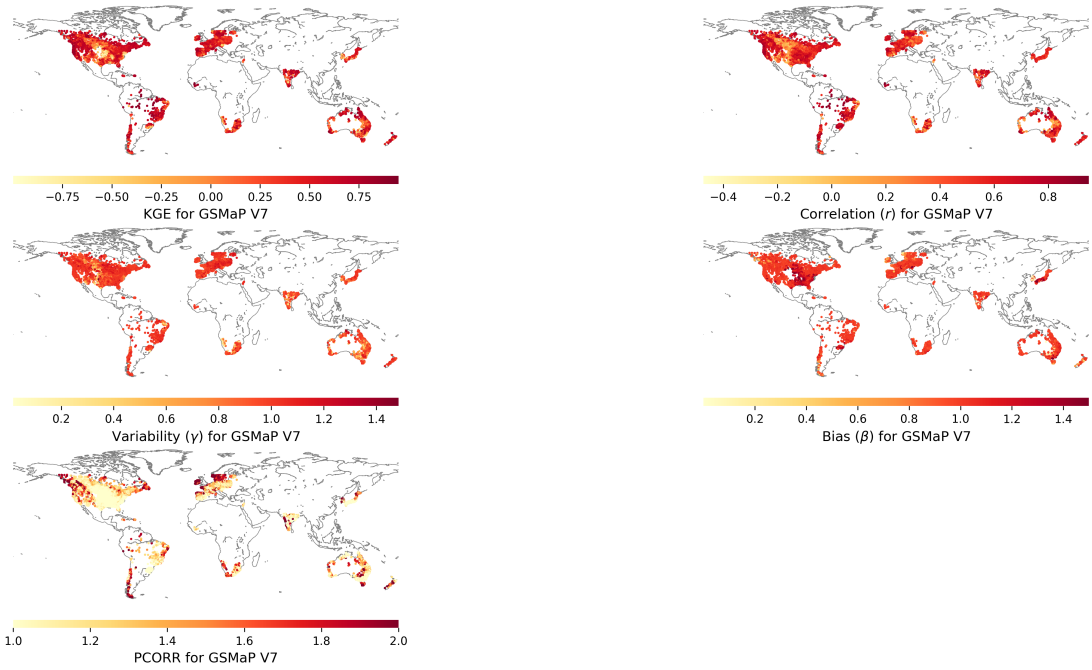

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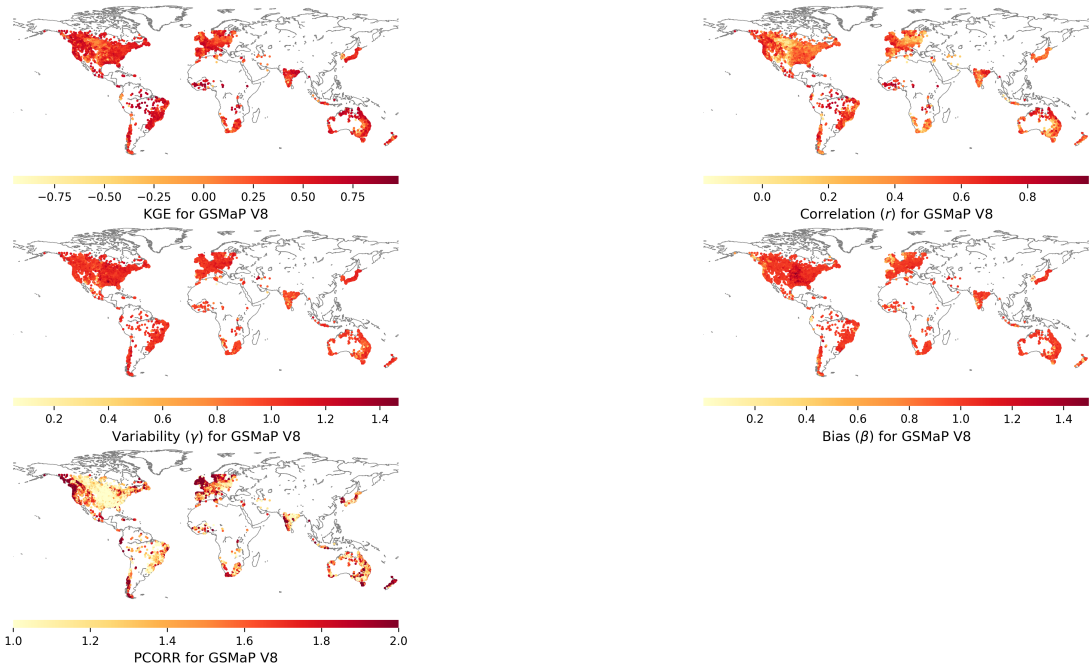

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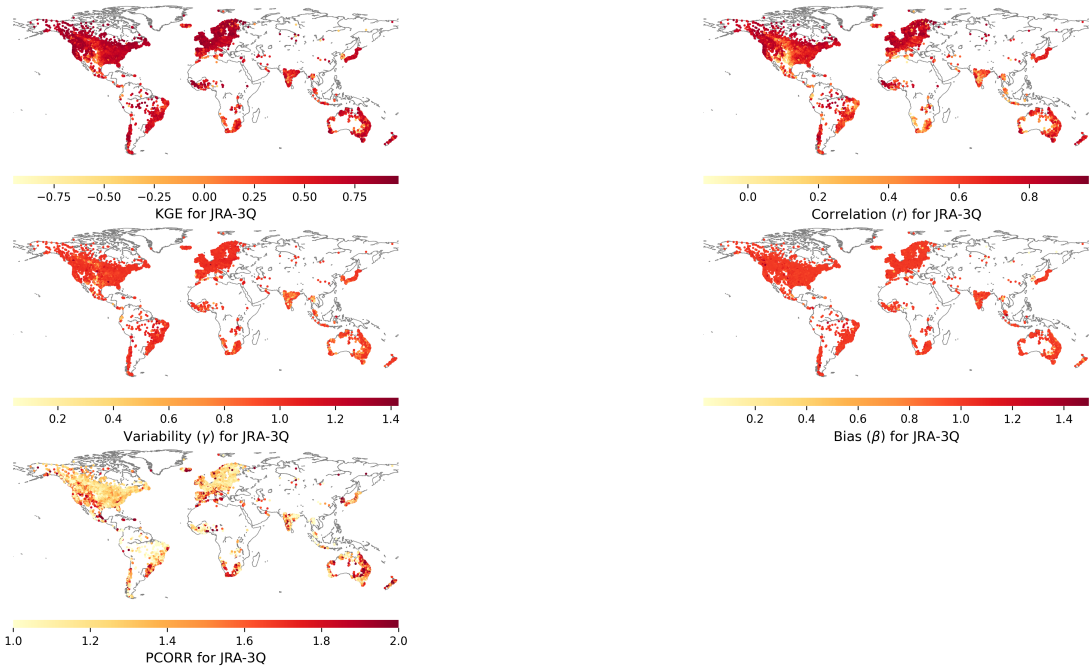
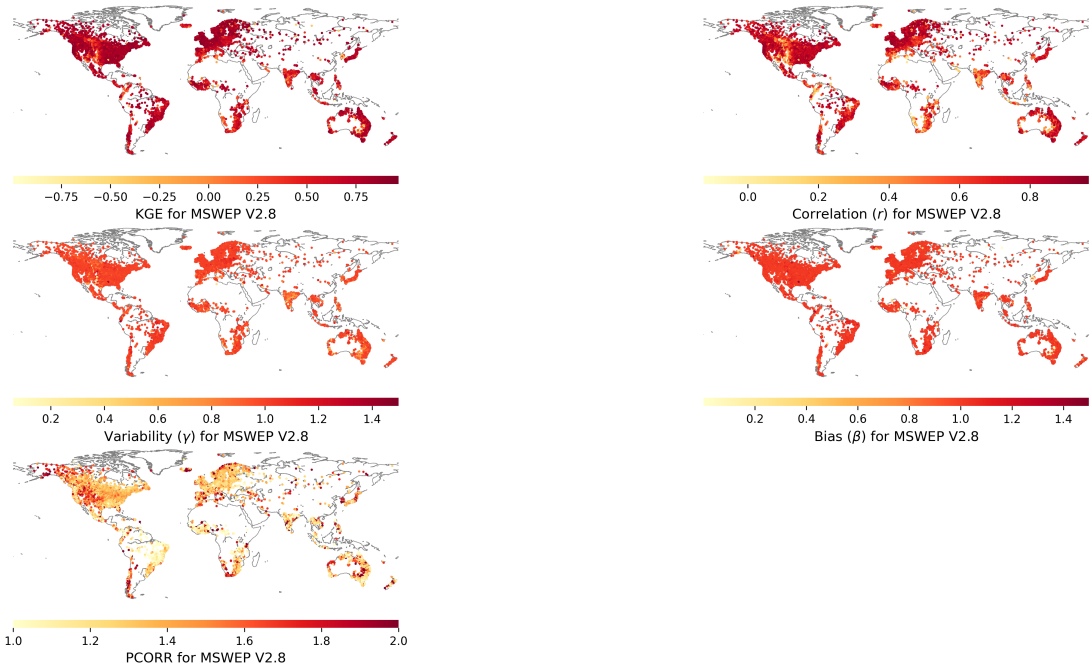


Figure S17: Calibration performance (KGE, correlation, variability, and bias) and PCORR values for JRA-3Q.



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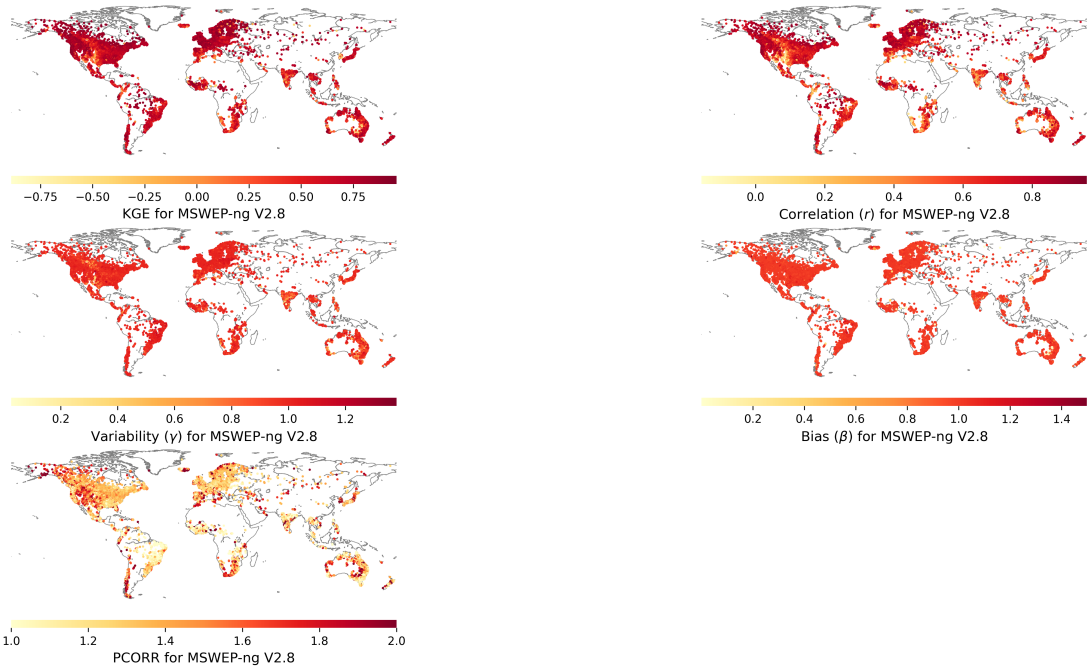

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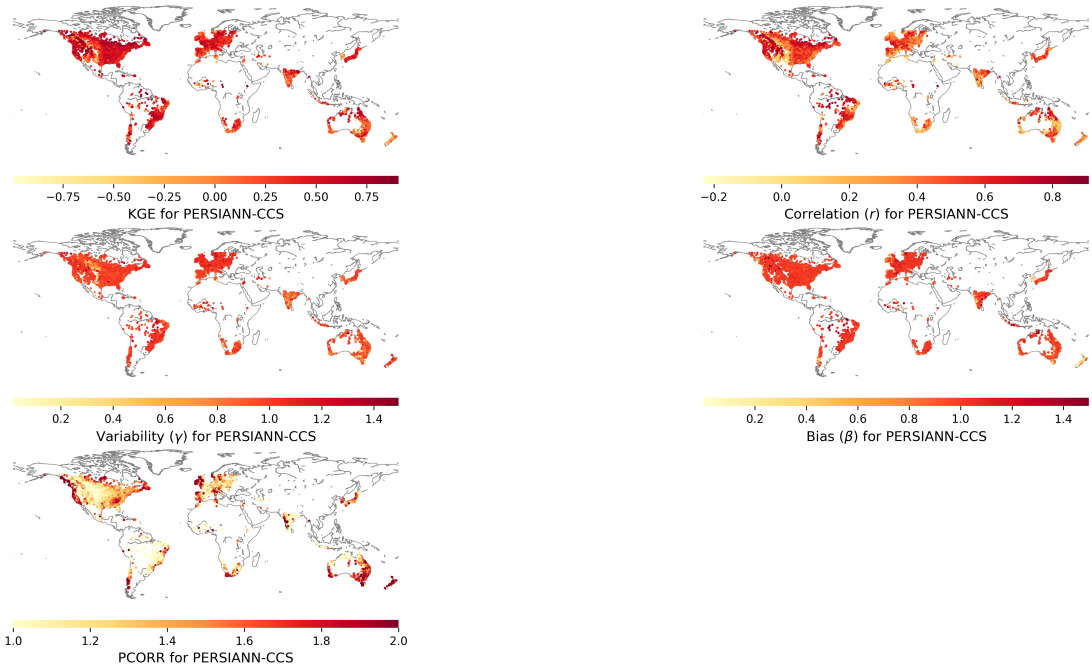
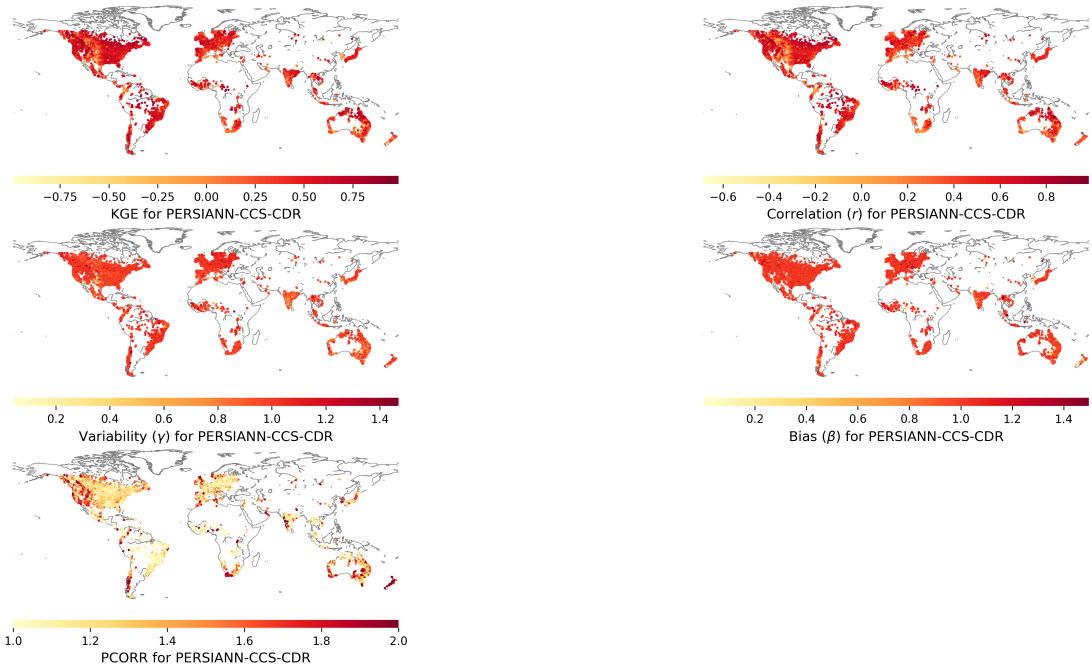


Figure S20: Calibration performance (KGE, correlation, variability, and bias) and PCORR values for PERSIANN-CCS.



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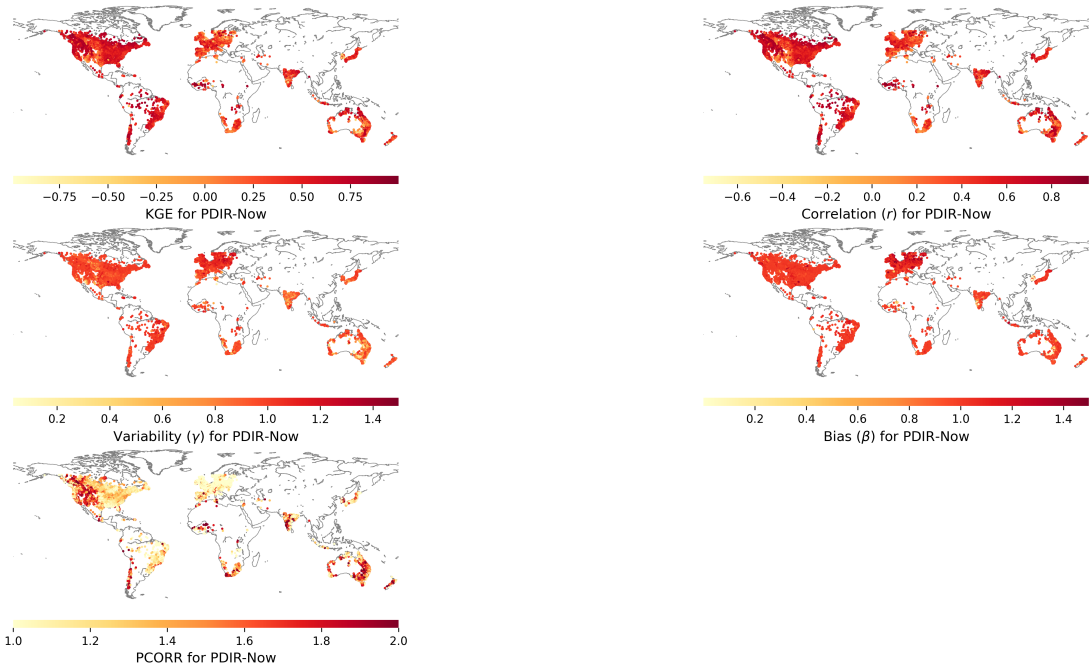
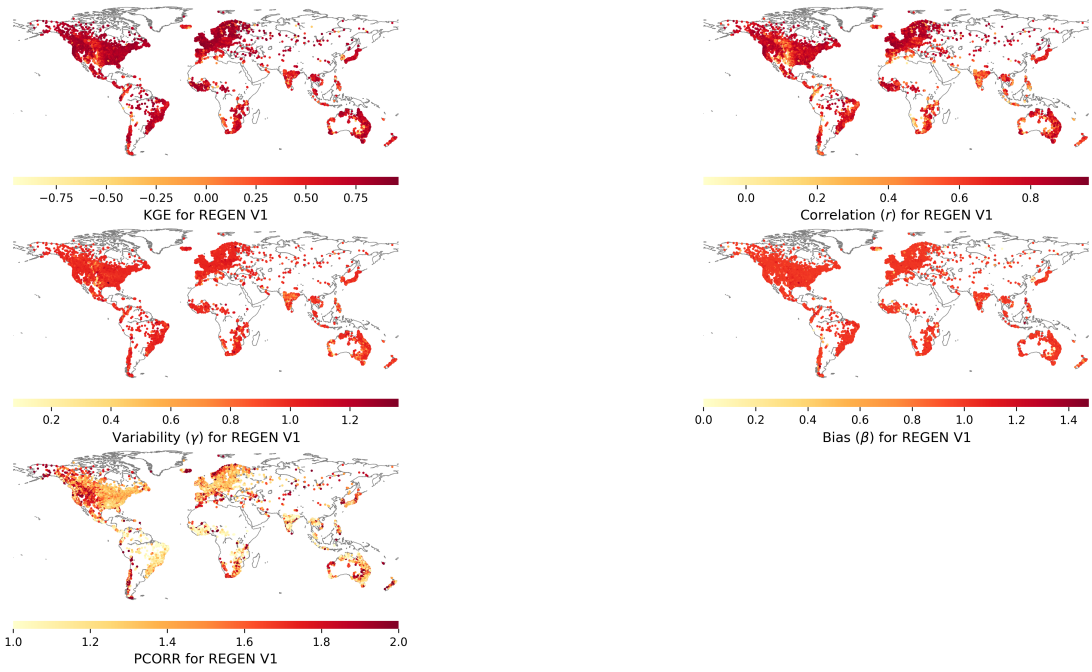


Figure S22: Calibration performance (KGE, correlation, variability, and bias) and PCORR values for PDIR-Now.



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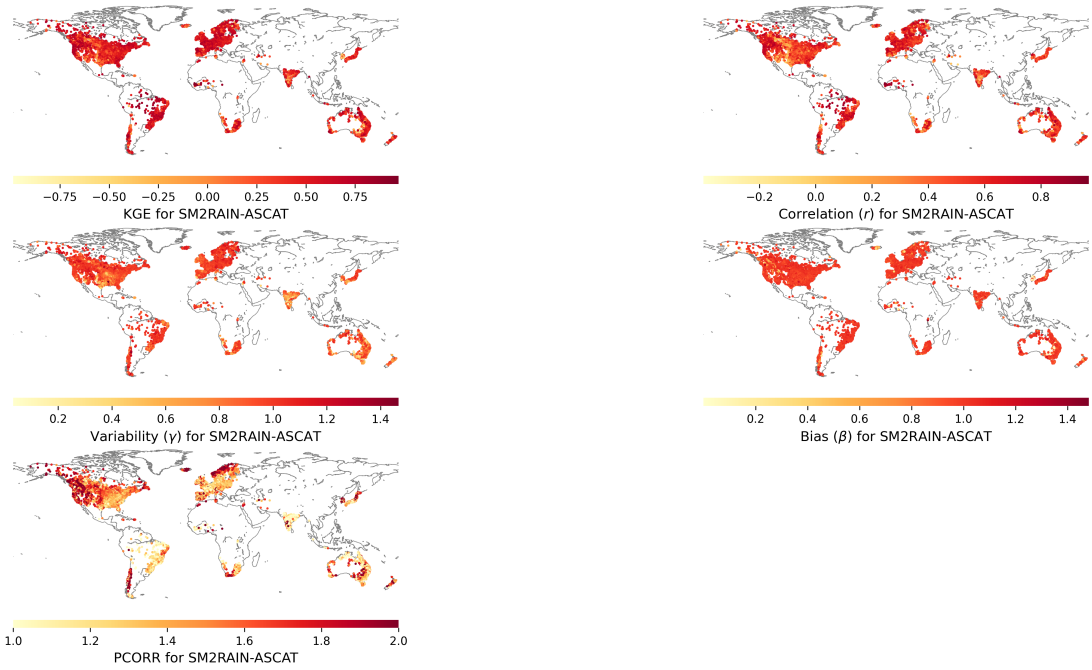

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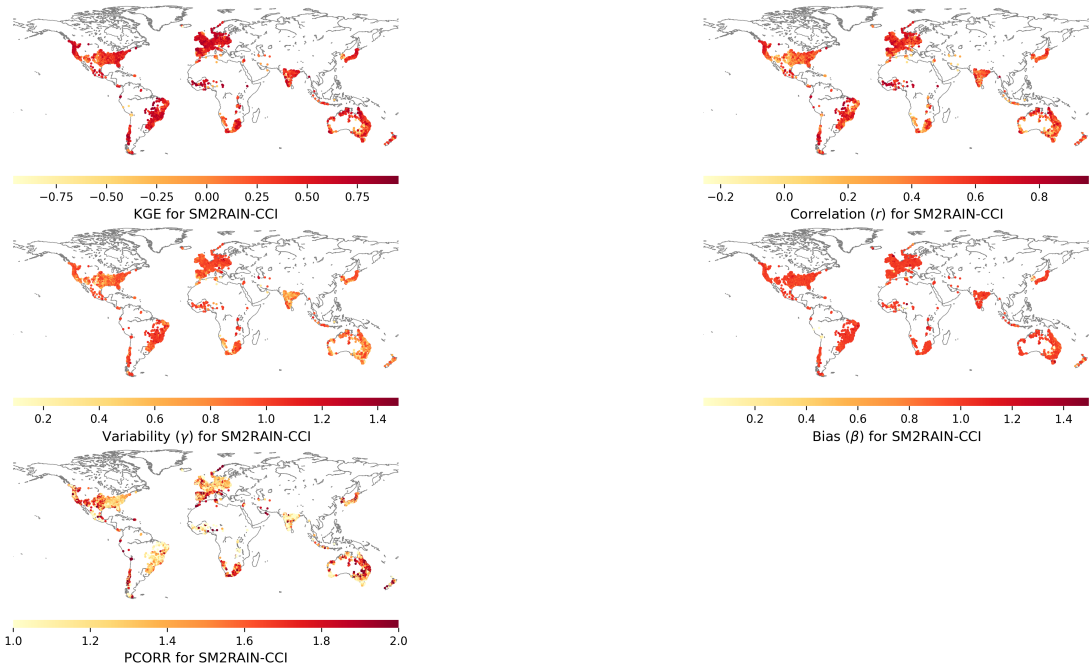

Figure S25: Calibration performance (KGE, correlation, variability, and bias) and PCORR values achieved for SM2RAIN-CCI.

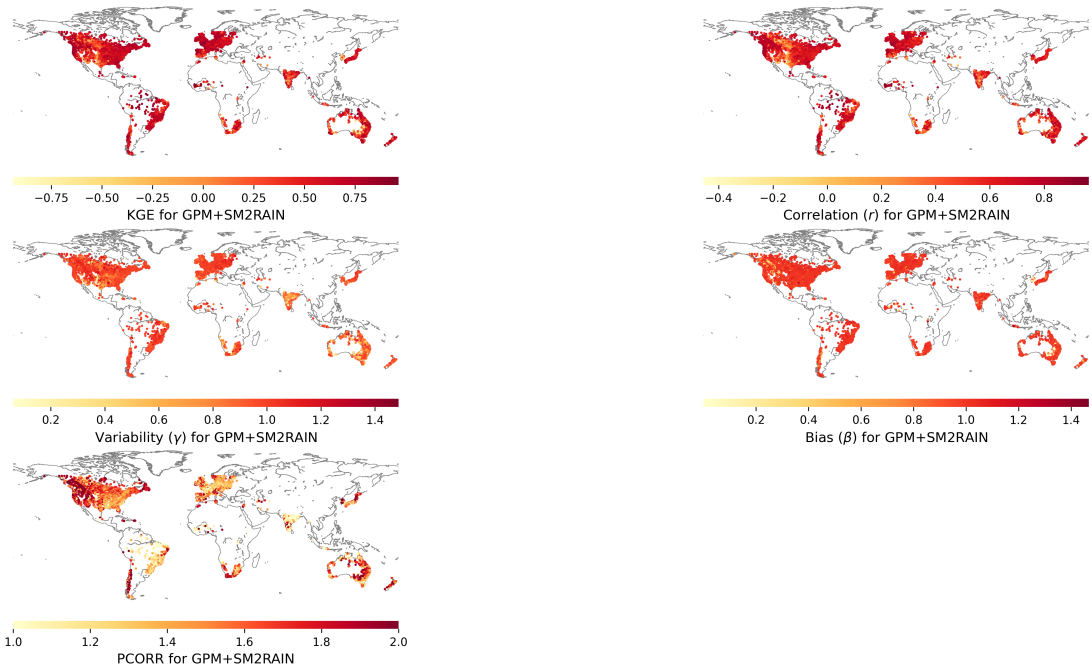

Figure S26: Calibration performance (KGE, correlation, variability, and bias) and PCORR values for GPM+SM2RAIN.

S3 Performance Variation Across Streamflow Data Sources

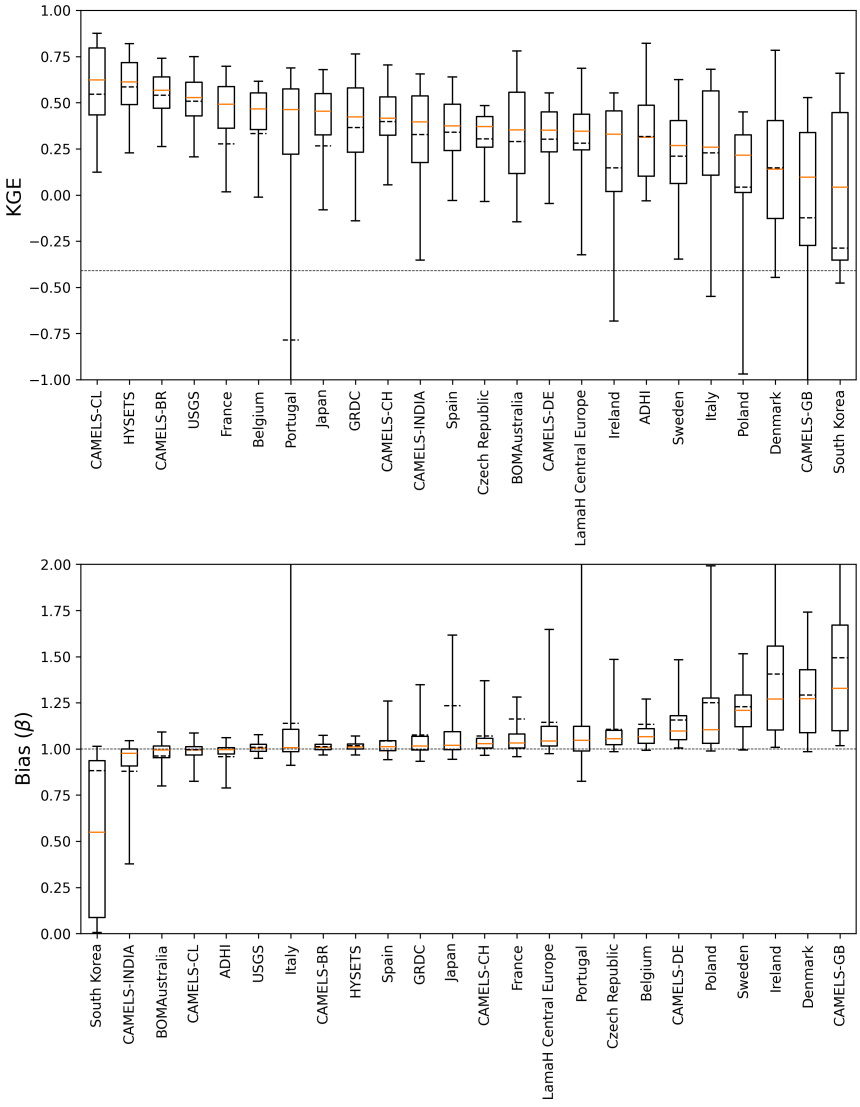

Figure S27: Distribution of calibration KGE and bias for different streamflow data sources for PDIR-Now.

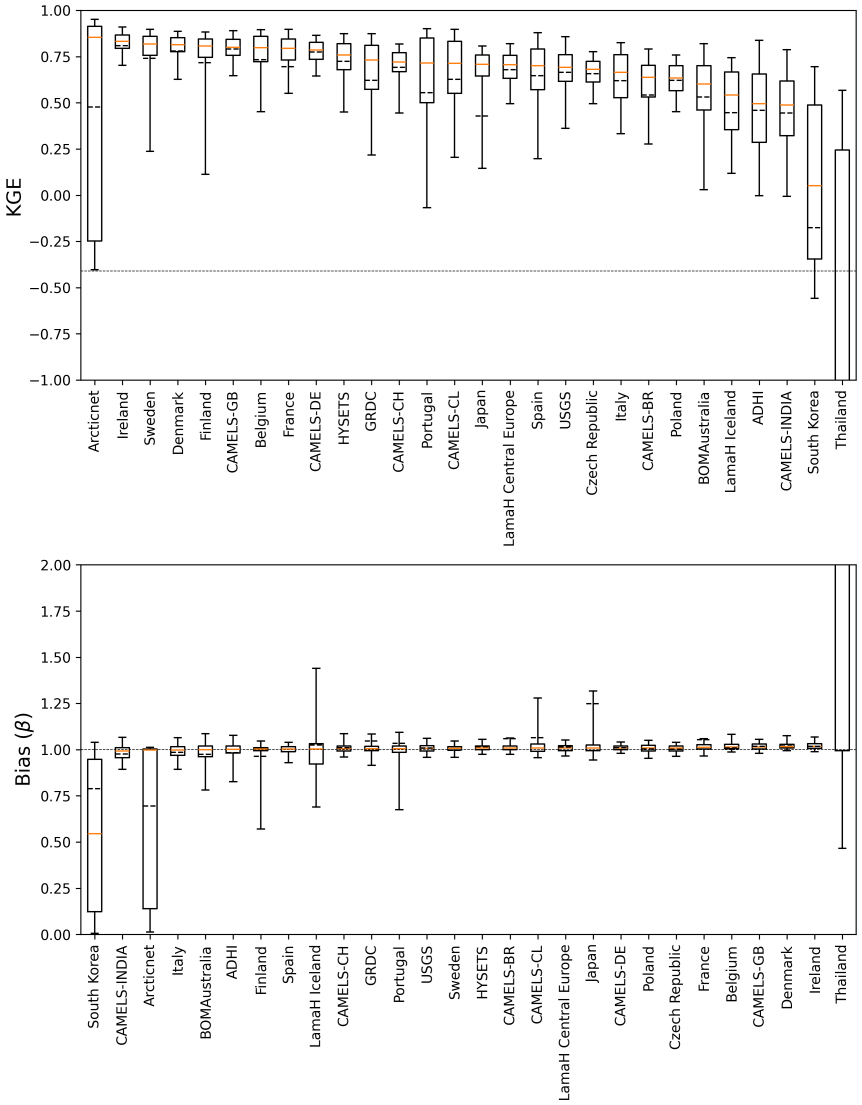

Figure S28: Distribution of calibration KGE and bias for different streamflow data sources for JRA-3Q.

S4 Impact of Rain Gauge Density on Model Performance

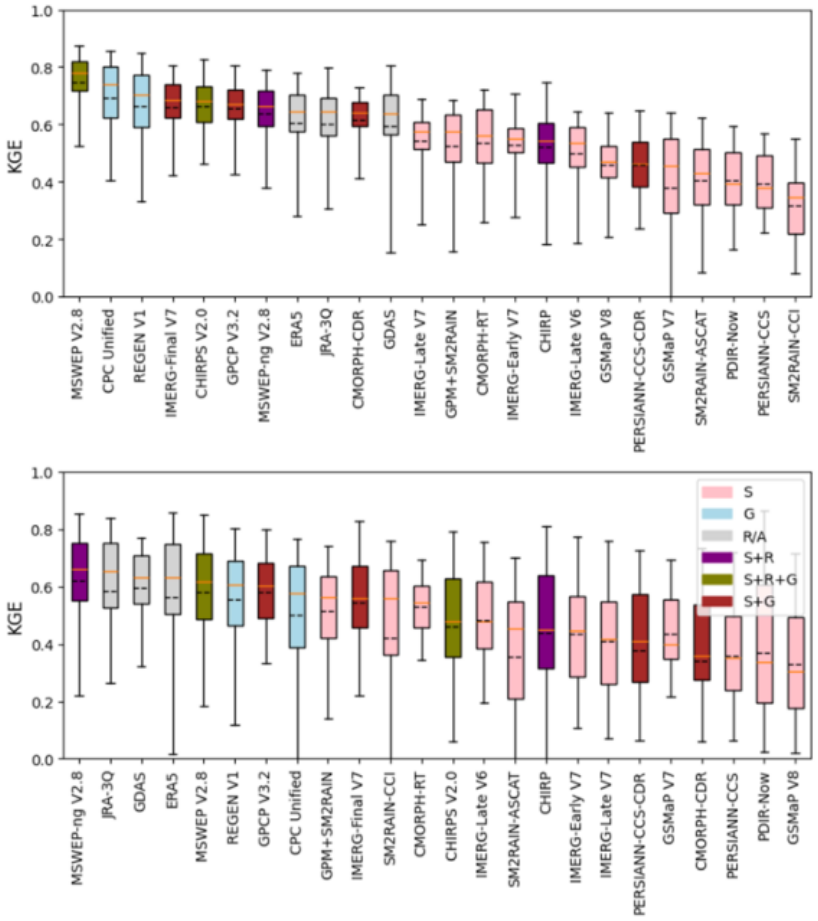

Figure S29: Comparison of P dataset performance for 100 catchments with highest rain gauge densities (top) vs 100 catchments with lowest rain gauge densities (bottom)

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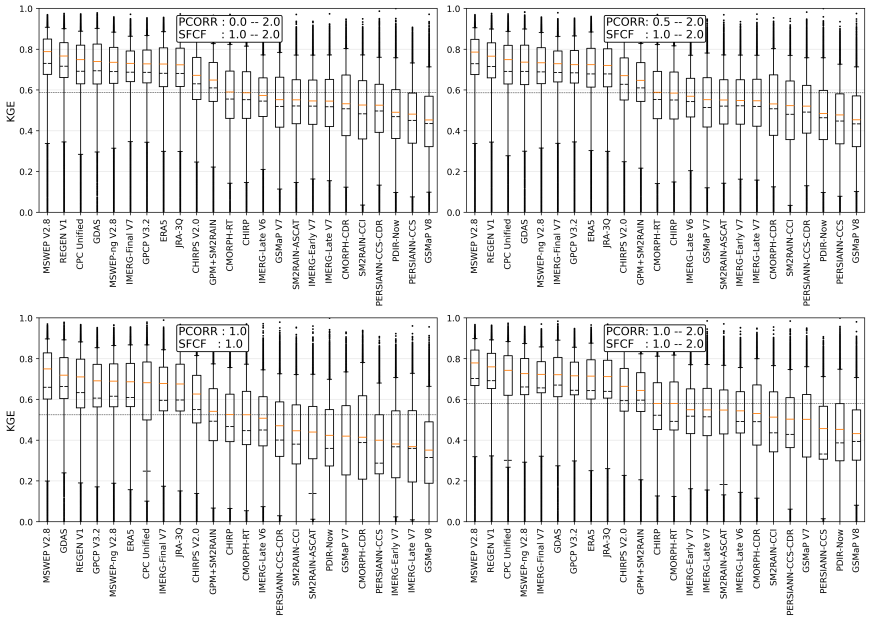
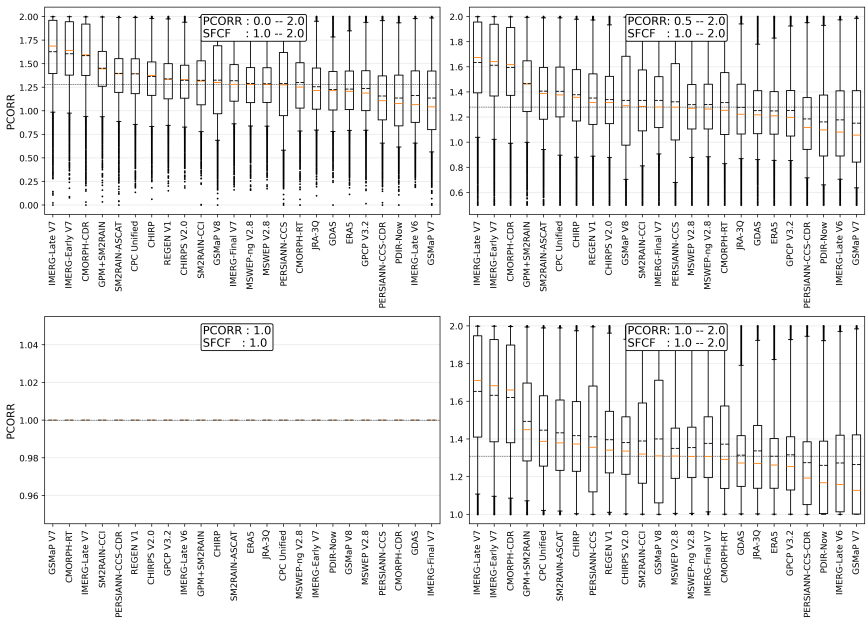


Figure S30: Kling-Gupta Efficiency values for P datasets in different scenarios of PCORR and SFCF calibration.



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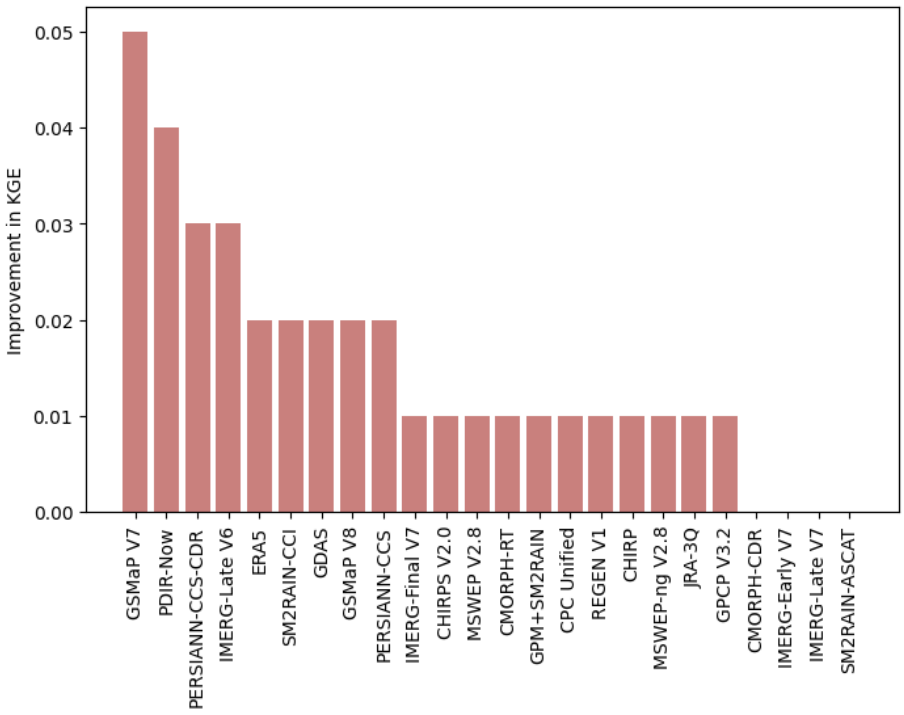

Figure S32: Improvement in KGE values for different P datasets by increasing the range of PCORR from 1.0-2.0 to 0.0 to 2.0 during calibration.

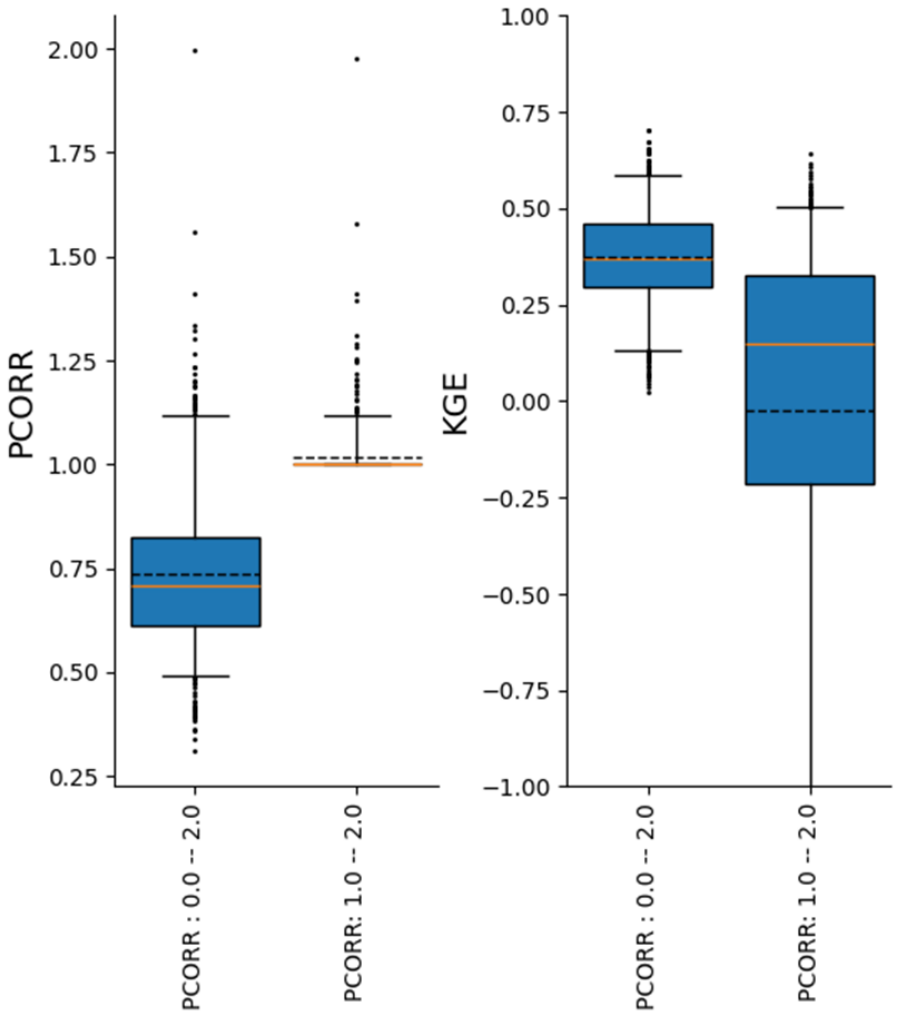

Figure S33: Comparison of calibrated PCORR and corresponding KGE values from 531 catchments from CAMELS-GB using PDIR-Now P dataset.

S6 Differences in Mean Annual Precipitation

This section includes 24 maps displaying difference between the mean annual P of each product and the multi-product mean.

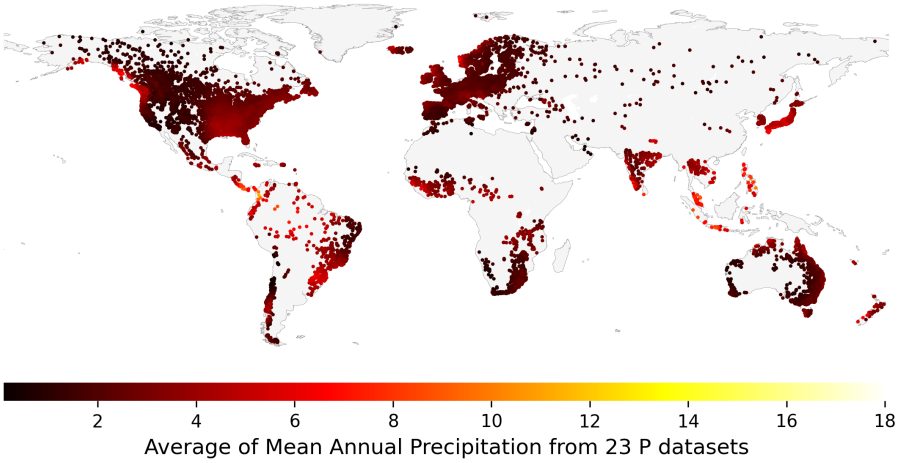

Figure S34: Average of the mean annual precipitation from 24 datasets.

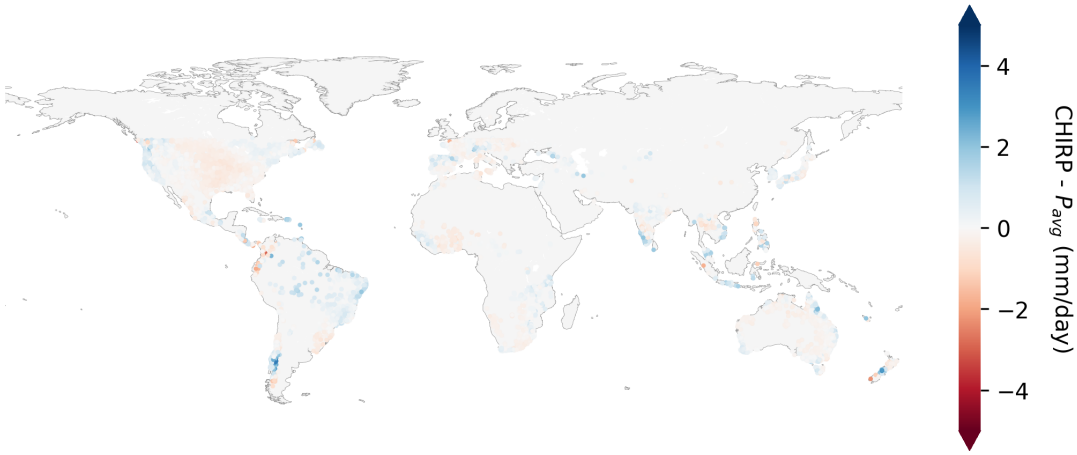

Figure S35: Difference between mean annual precipitation of CHIRP and average of mean annual precipitation of all datasets (P_{avg}).

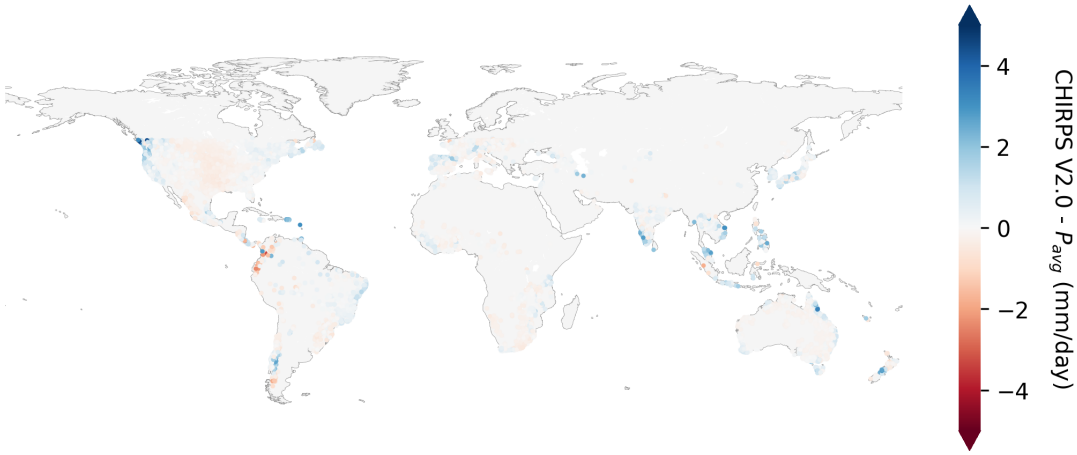

Figure S36: Difference between mean annual precipitation of CHIRPS V2.0 and average of mean annual precipitation of all datasets (P_{avg}).

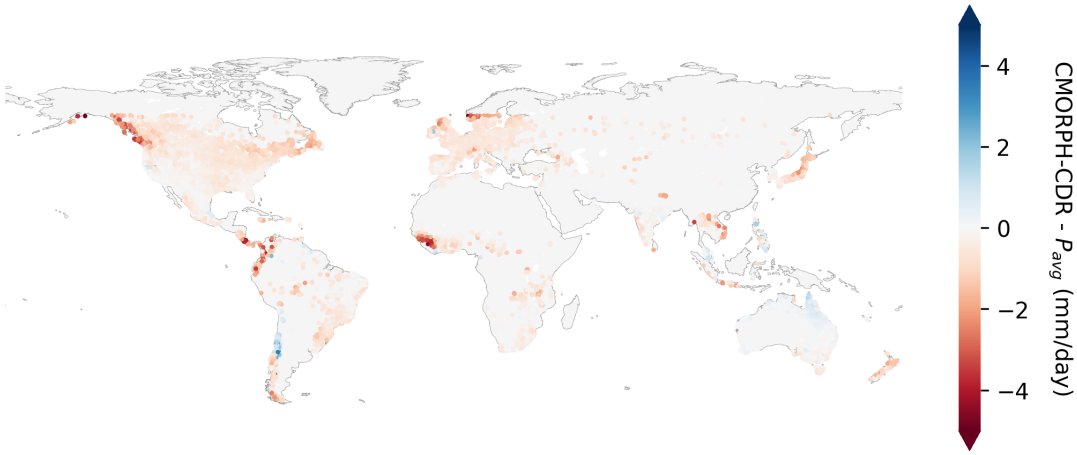

Figure S37: Difference between mean annual precipitation of CMORPH-CDR Unified and average of mean annual precipitation of all datasets (P_{avg}).

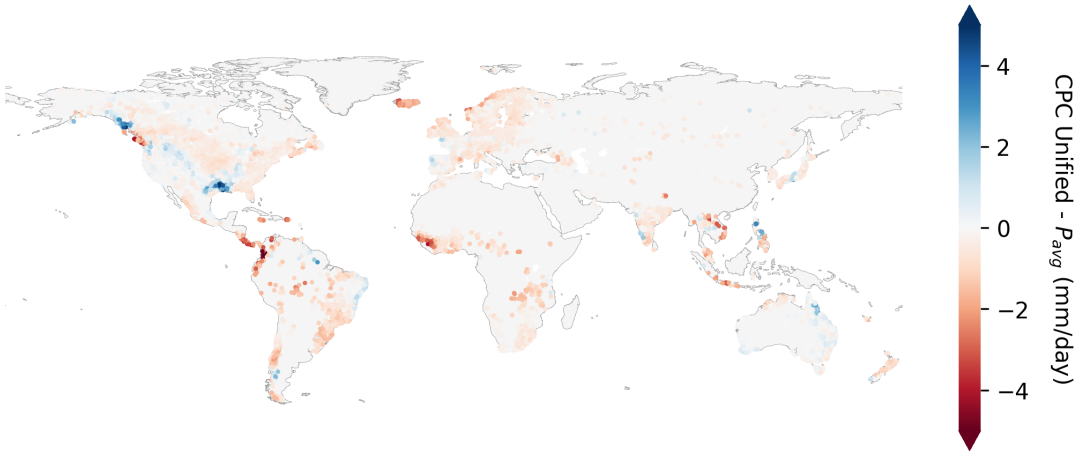

Figure S38: Difference between mean annual precipitation of CPC Unified and average of mean annual precipitation of all datasets (P_{avg}).

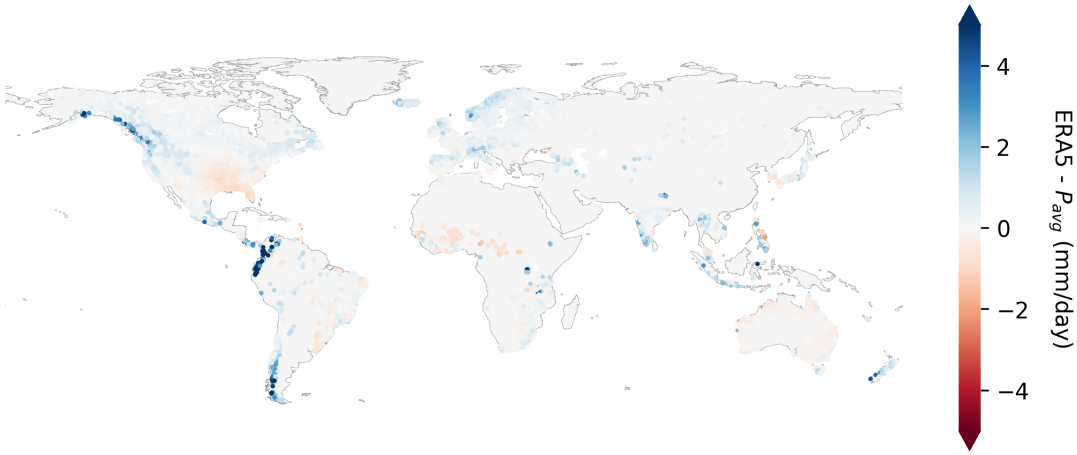

Figure S39: Difference between mean annual precipitation of ERA5 and average of mean annual precipitation of all datasets (P_{avg}).

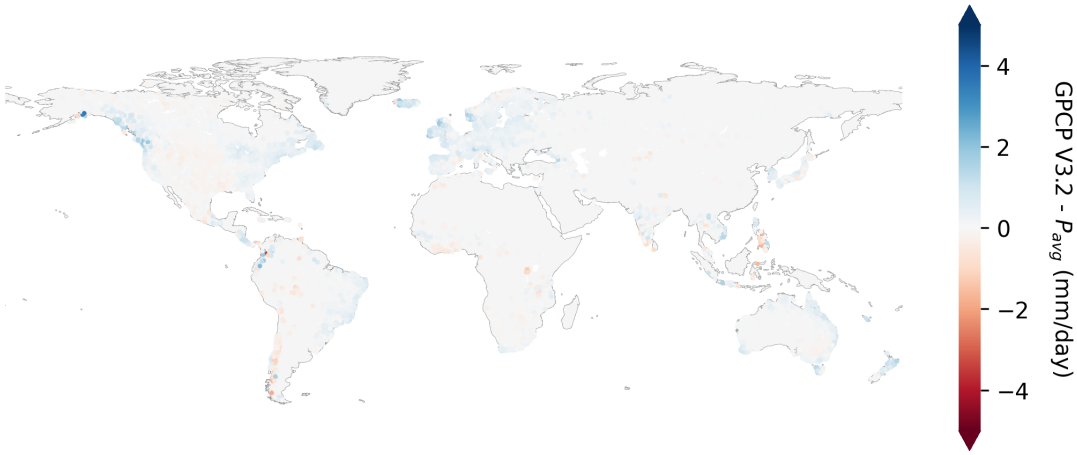

Figure S40: Difference between mean annual precipitation of GPCP V3.2 and average of mean annual precipitation of all datasets (P_{avg}).

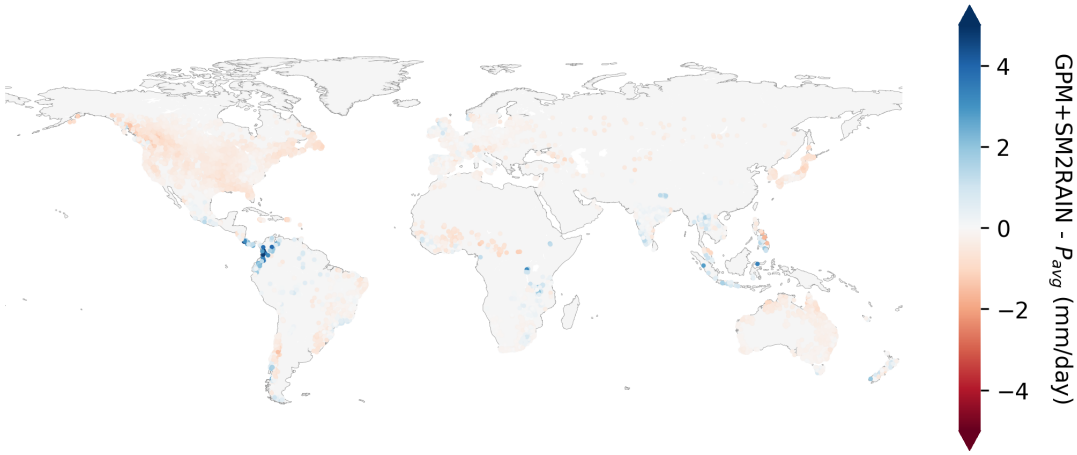

Figure S41: Difference between mean annual precipitation of GPM+SM2RAIN and average of mean annual precipitation of all datasets (P_{avg}).

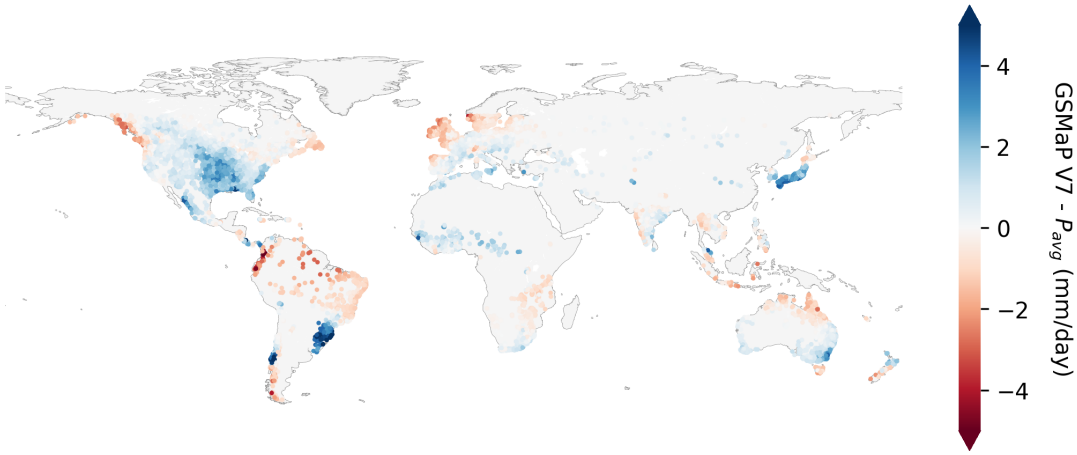

Figure S42: Difference between mean annual precipitation of GSMaP V7 and average of mean annual precipitation of all datasets (P_{avg}).

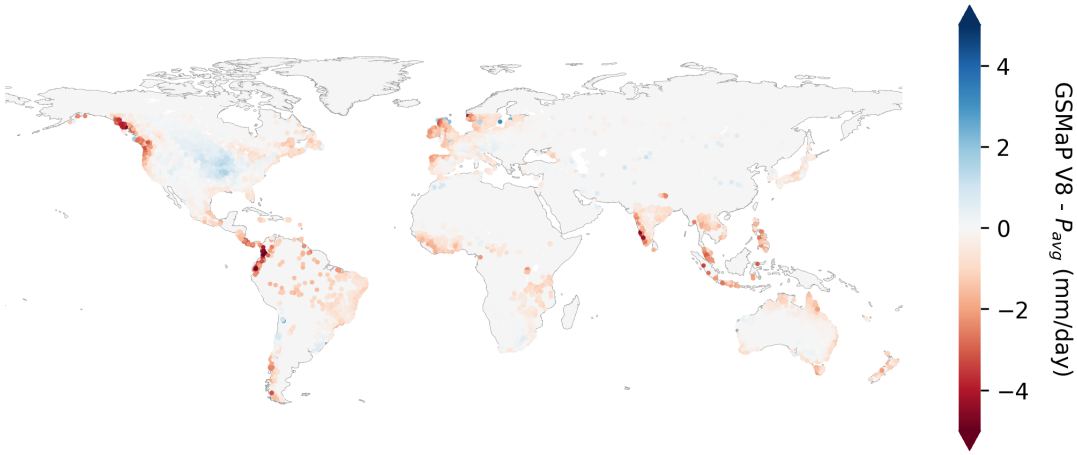

Figure S43: Difference between mean annual precipitation of GSMaP V8 and average of mean annual precipitation of all datasets (P_{avg}).

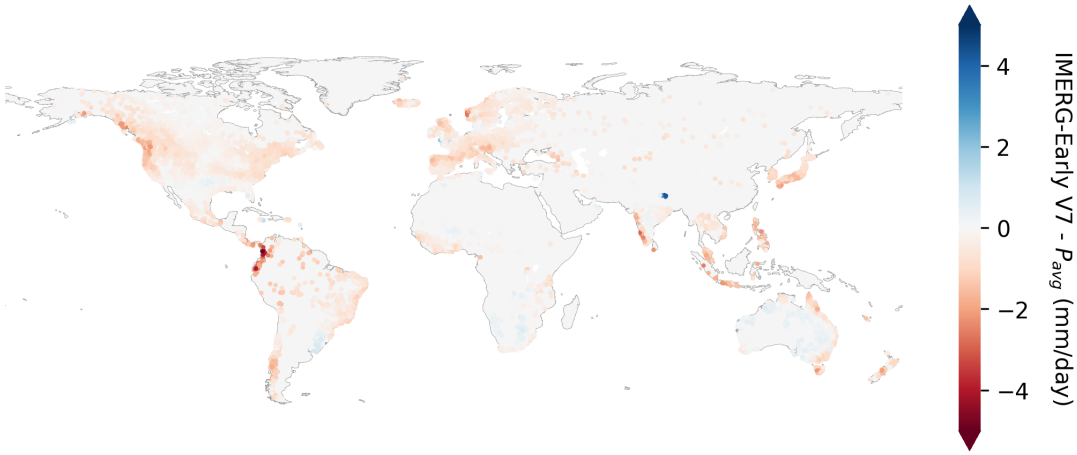

Figure S44: Difference between mean annual precipitation of IMERG-Early V7 and average of mean annual precipitation of all datasets (P_{avg}).

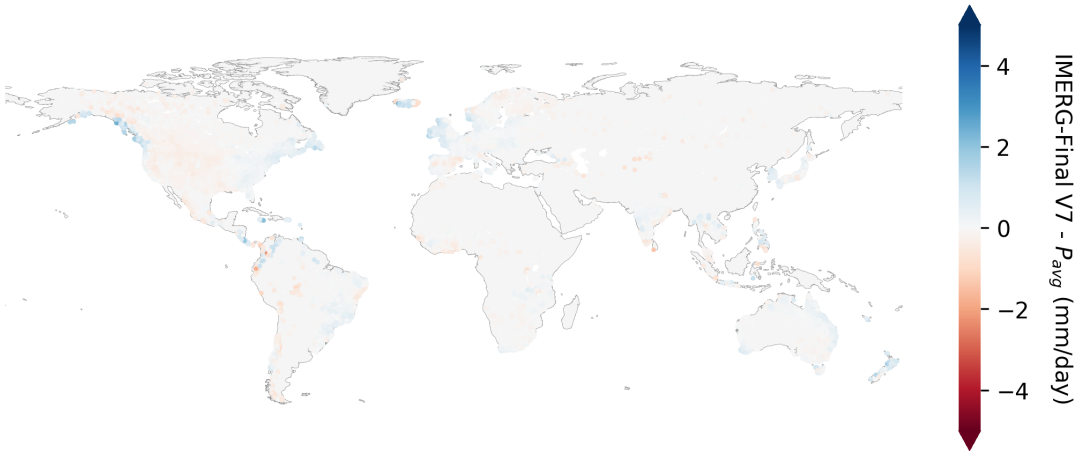

Figure S45: Difference between mean annual precipitation of IMERG-Final V7 and average of mean annual precipitation of all datasets (P_{avg}).

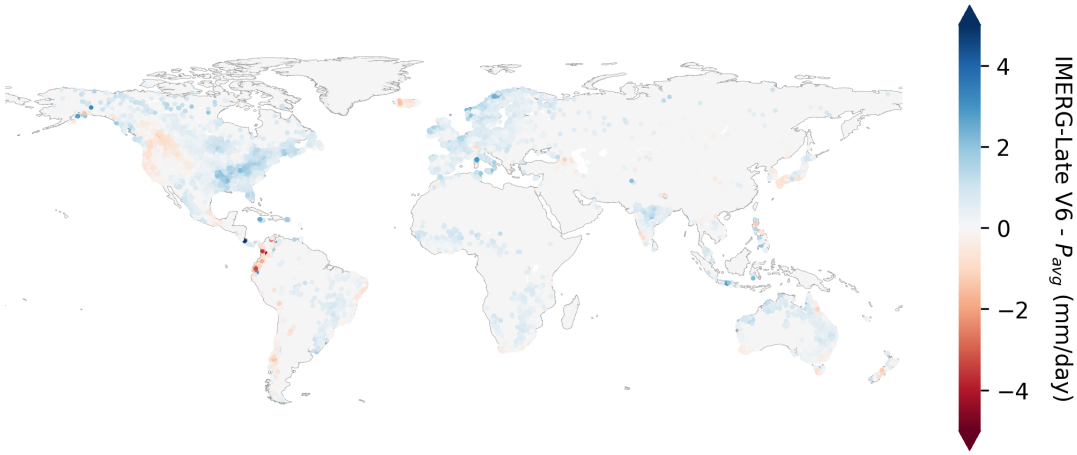

Figure S46: Difference between mean annual precipitation of IMERG-Late V6 and average of mean annual precipitation of all datasets (P_{avg}).

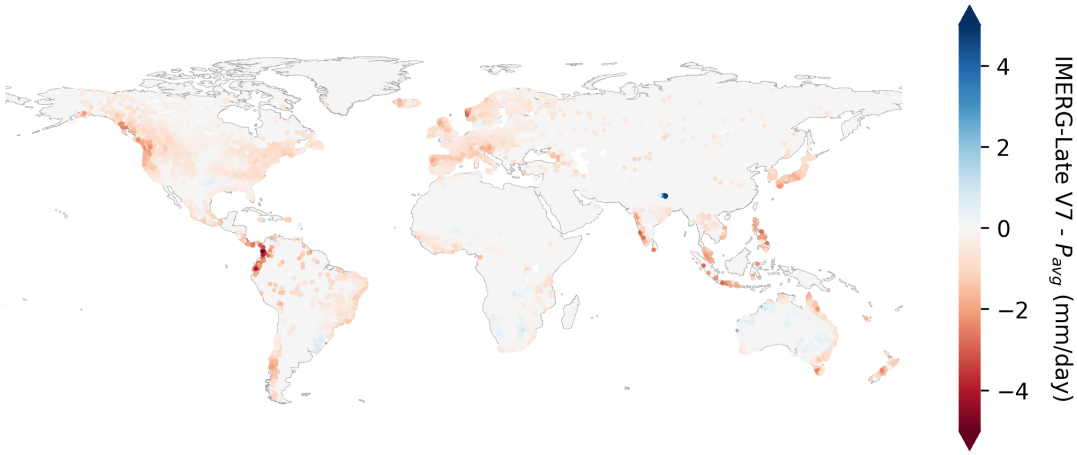

Figure S47: Difference between mean annual precipitation of IMERG-Late V7 and average of mean annual precipitation of all datasets (P_{avg}).

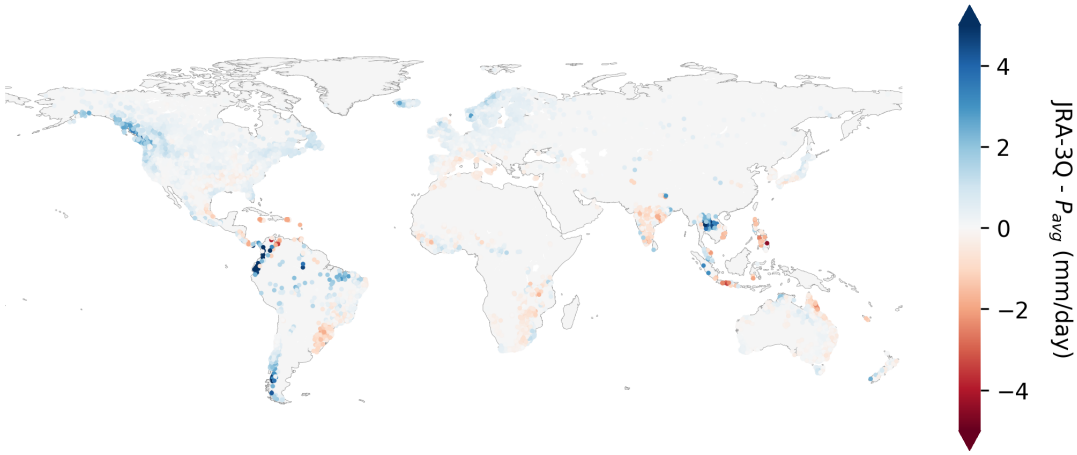

Figure S48: Difference between mean annual precipitation of JRA-3Q and average of mean annual precipitation of all datasets (P_{avg}).

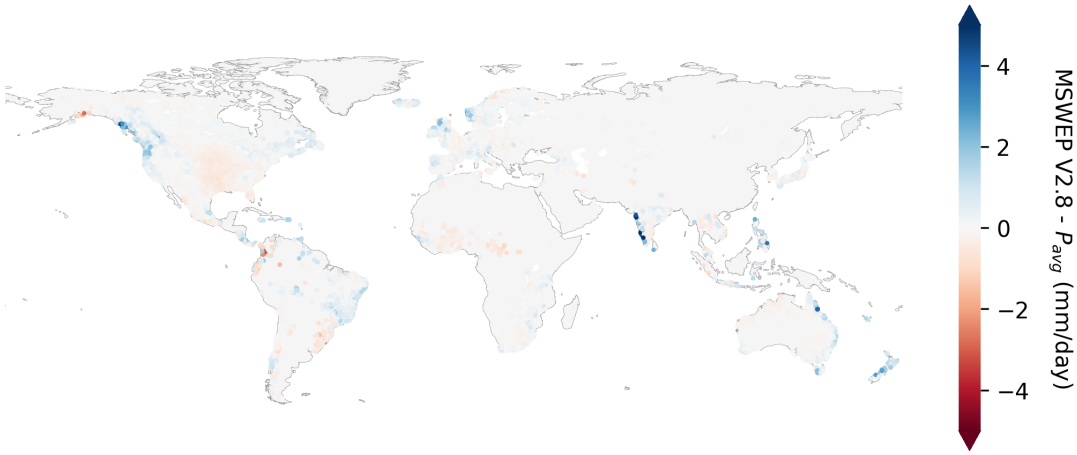

Figure S49: Difference between mean annual precipitation of MSWEP V2.8 and average of mean annual precipitation of all datasets (P_{avg}).

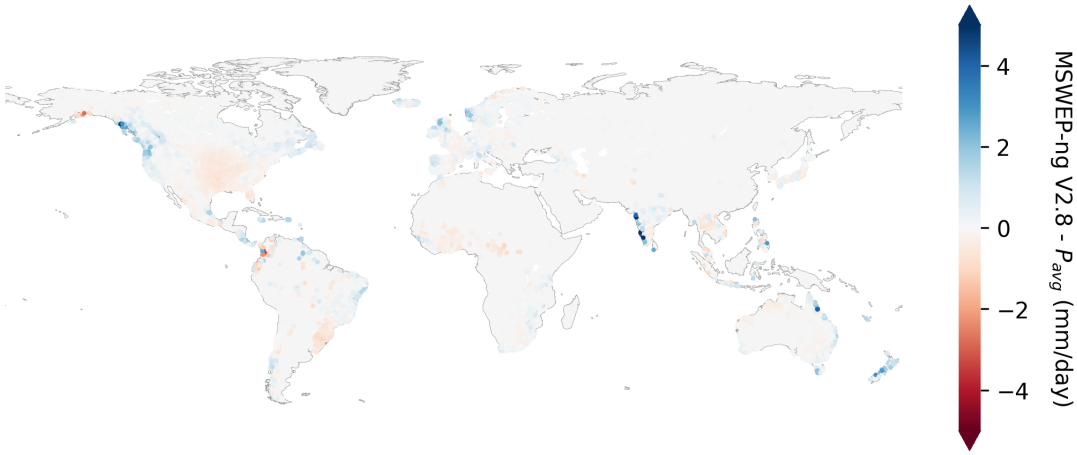

Figure S50: Difference between mean annual precipitation of MSWEP-ng V2.8 and average of mean annual precipitation of all datasets (P_{avg}).

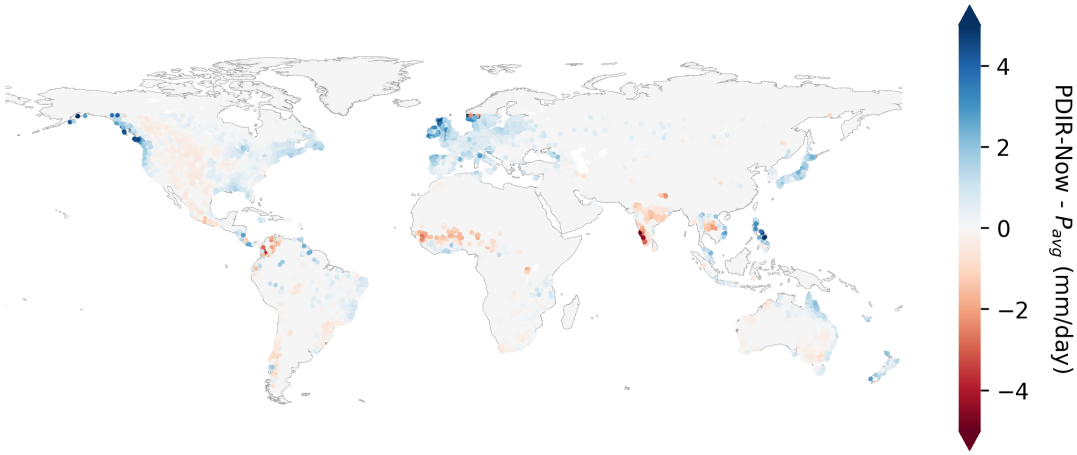

Figure S51: Difference between mean annual precipitation of PDIR-Now and average of mean annual precipitation of all datasets (P_{avg}).

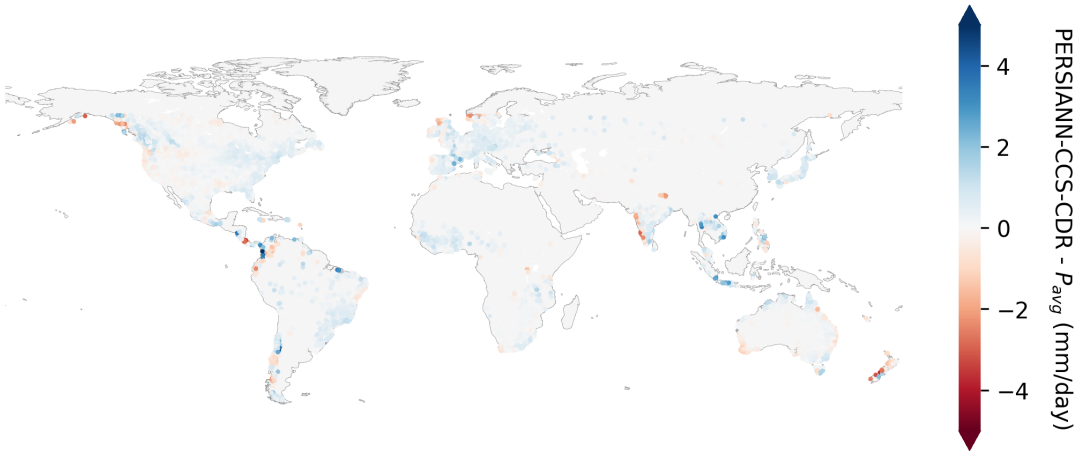

Figure S52: Difference between mean annual precipitation of PERSIANN-CCS-CDR and average of mean annual precipitation of all datasets (P_{avg}).

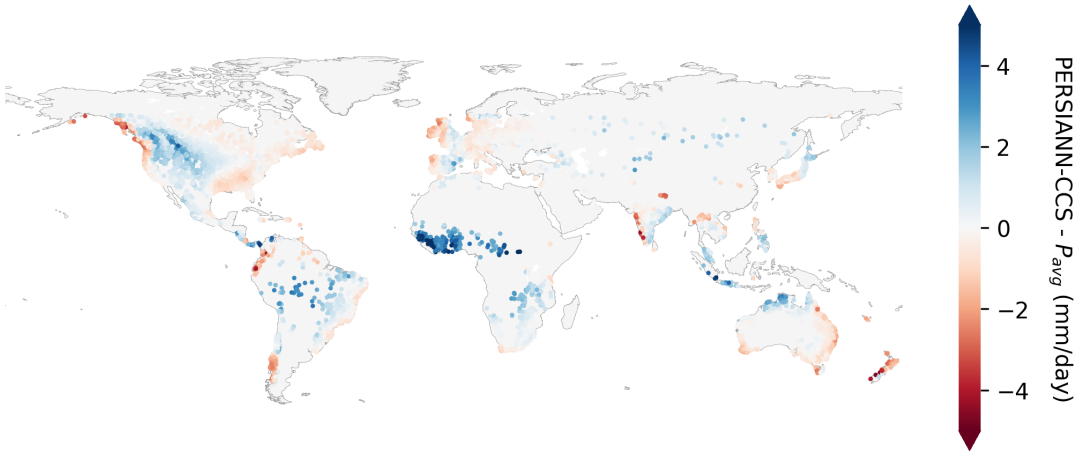

Figure S53: Difference between mean annual precipitation of PERSIANN-CCS and average of mean annual precipitation of all datasets (P_{avg}).

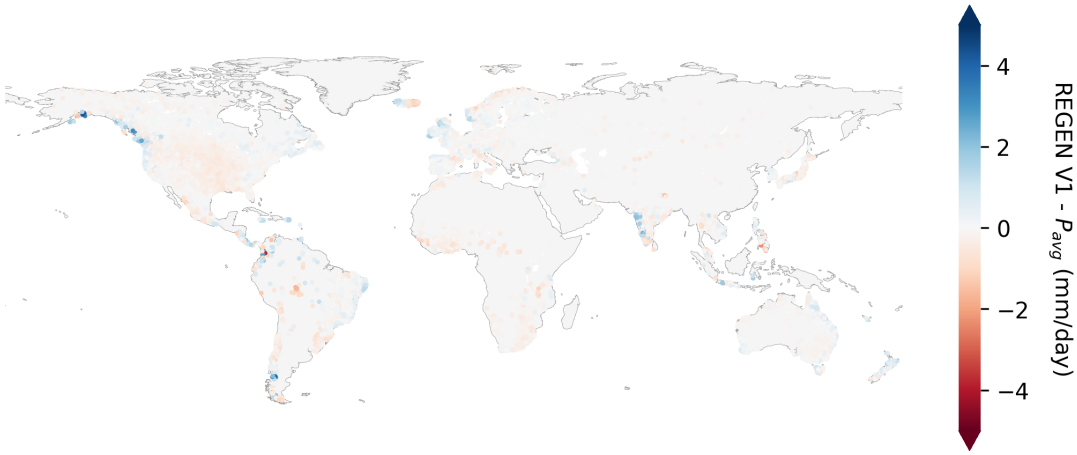

Figure S54: Difference between mean annual precipitation of PERSIANN-CCS and average of mean annual precipitation of all datasets (P_{avg}).

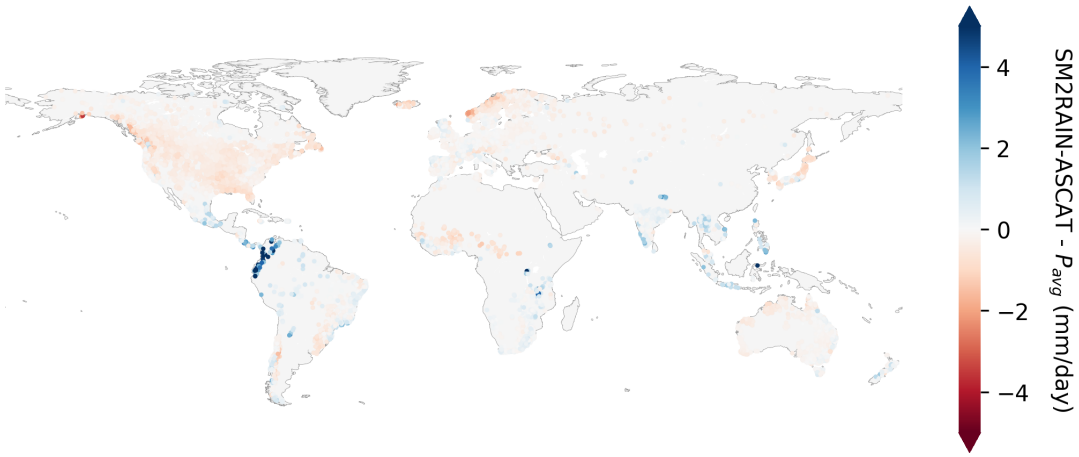

Figure S55: Difference between mean annual precipitation of SM2RAIN-ASCAT and average of mean annual precipitation of all datasets (P_{avg}).

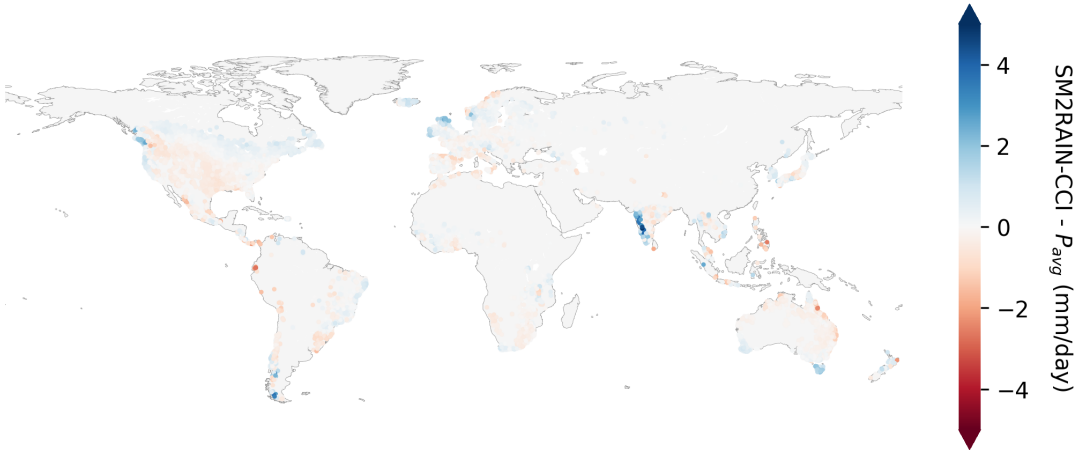

Figure S56: Difference between mean annual precipitation of SM2RAIN-CCI and average of mean annual precipitation of all datasets (P_{avg}).

S7 Performance Variation with Altitude

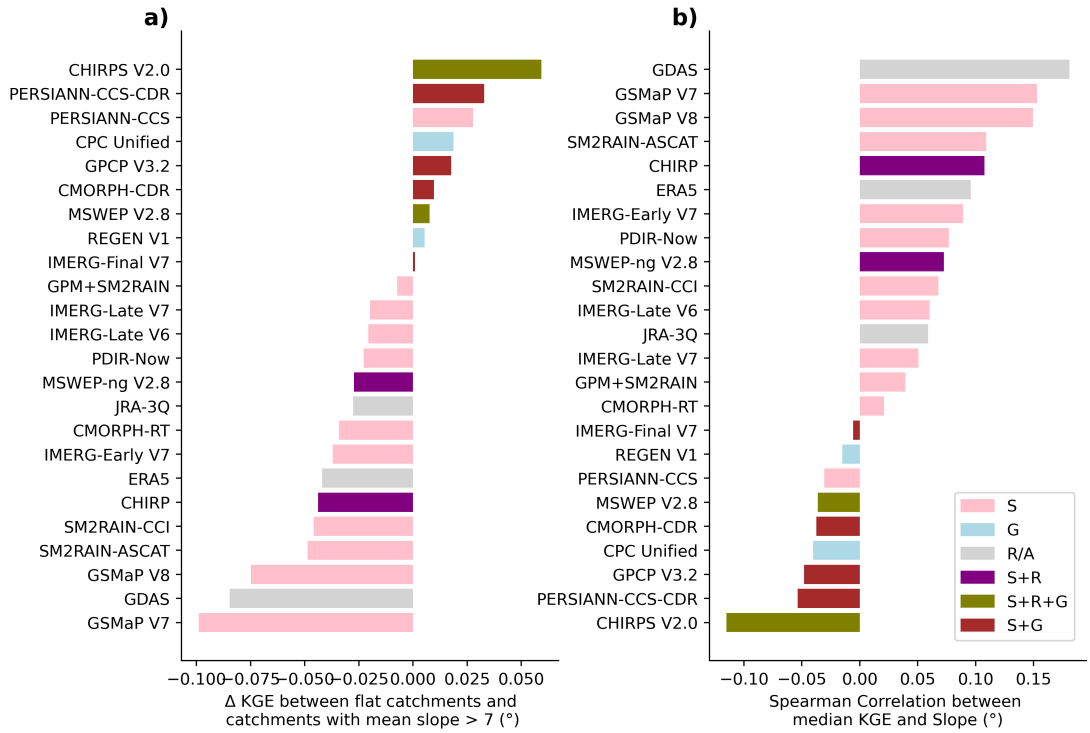

Figure S57: Variation in HBV performance (KGE) with increase in slope.