



## Supplement of

## **Global-scale evaluation of 22 precipitation datasets using gauge observations and hydrological modeling**

H. E. Beck et al.

*Correspondence to:* Hylke E. Beck (hylkeb@princeton.edu)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S1: For a selection of the evaluated non-gauge-corrected *P* datasets, temporal correlations between 3-day mean gauge- and dataset-based *P* time series ( $R_{3 day}$ ). Each data point represents a gauge.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S2: For a selection of the evaluated non-gauge-corrected P datasets, temporal correlations between monthly mean gauge- and dataset-based P time series ( $R_{monthly}$ ). Each data point represents a gauge.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S3: For a selection of the evaluated non-gauge-corrected P datasets, temporal correlations between gauge- and dataset-based SPI-6 time series ( $R_{SPI-6}$ ). Each data point represents a gauge.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S4: For a selection of the evaluated non-gauge-corrected P datasets, the MAE calculated between monthly mean gauge- and dataset-based P time series. Each data point represents a gauge.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S5: For a selection of the evaluated non-gauge-corrected *P* datasets, the error between gauge- and and dataset-based mean annual *P* trends (%  $yr^{-1}$ ). Each data point represents a gauge.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S6: Bias values for a selection of the evaluated non-gauge-corrected *P* datasets. The bias was calculated as  $[\overline{s} - \overline{o}] / [\overline{s} + \overline{o}]$ , where  $\overline{s}$  and  $\overline{o}$  represent the dataset- and gauge-based long-term means, respectively. Each data point represents a gauge.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S7: For a selection of the evaluated non-gauge-corrected P datasets, the error in the annual number of dry days. Each data point represents a gauge.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S8: For a selection of the evaluated non-gauge-corrected *P* datasets, the error in the 99th percentile daily *P* magnitude (mm d<sup>-1</sup>). Each data point represents a gauge.



(c) ERA-Interim



(e) NCEP-CFSR

(f) PERSIANN-CCS



(g) SM2RAIN-ASCAT



Figure S9: For a selection of the evaluated non-gauge-corrected *P* datasets, the error in the 99.9th percentile daily *P* magnitude (mm  $d^{-1}$ ). Each data point represents a gauge.