
Supplementary material for “Evaluation of Climatological Precipitation Datasets and their Hydrological Application in Hablehroud Watershed, Iran”.

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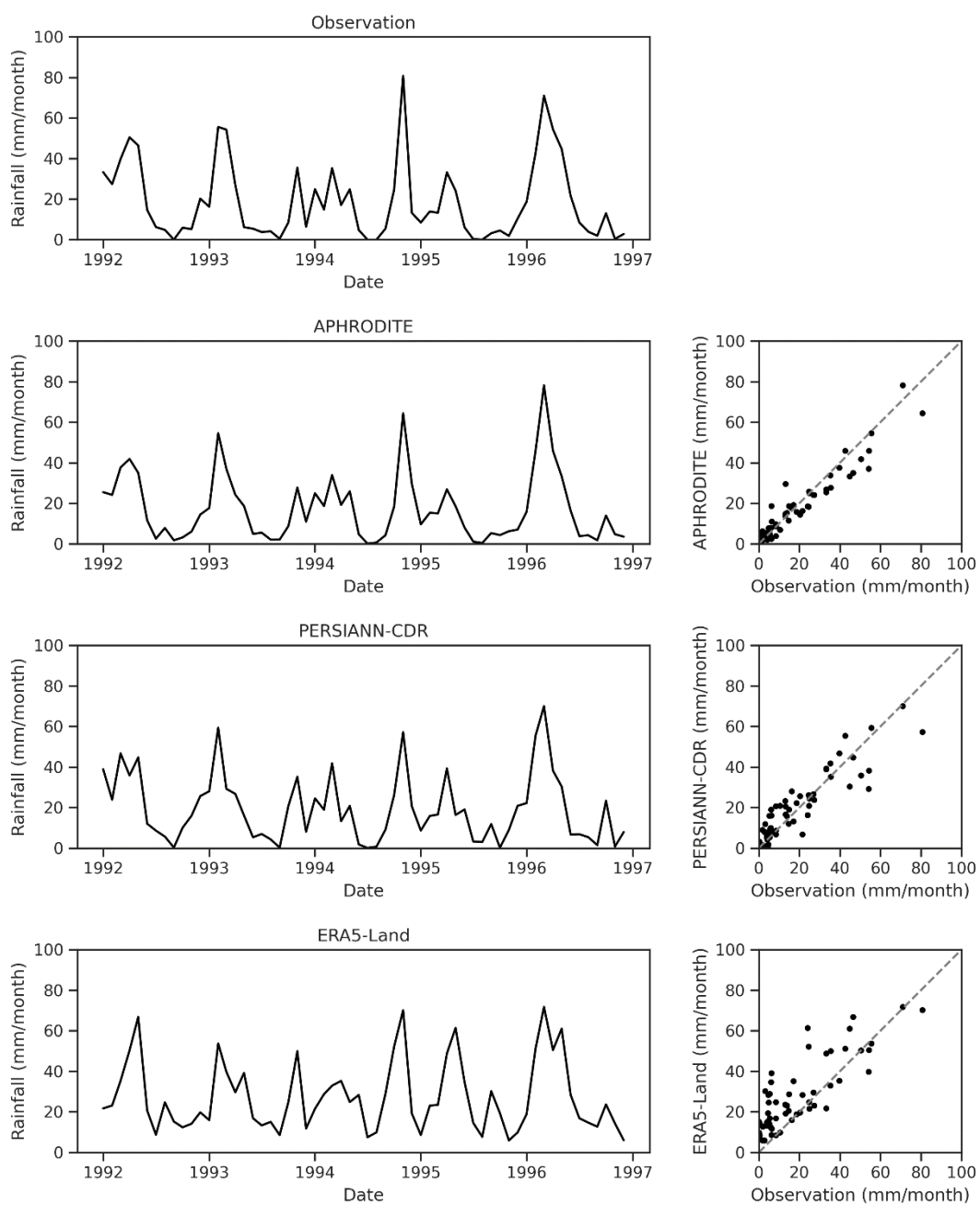


Figure S1. Monthly average rainfall during 1992-1996 over the Hablehroud basin.

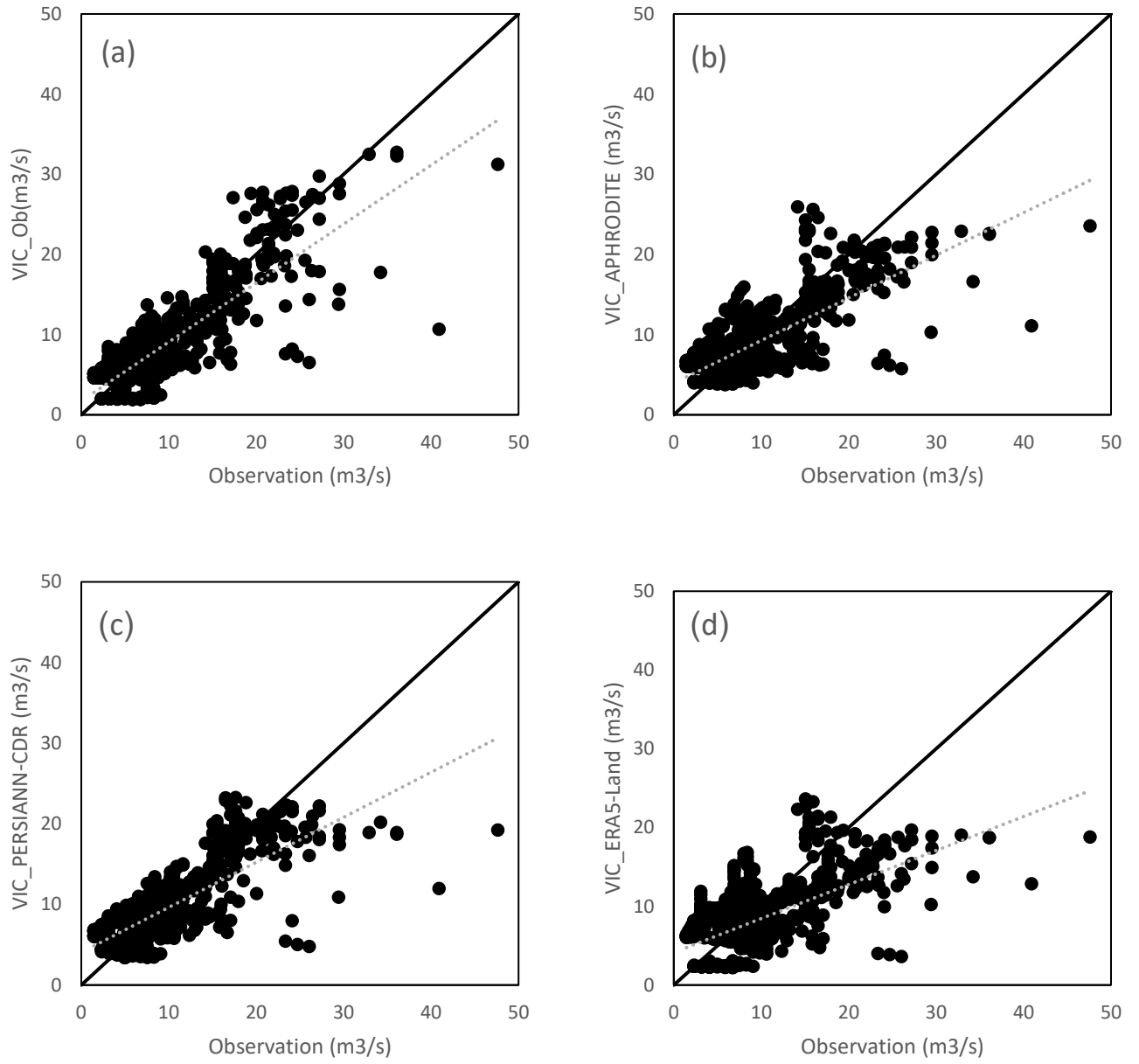


Figure S2. Scatter plot of monthly observation streamflow (horizontal axis) and simulated daily streamflow using: (a) Observed rain gauge stations (vertical axis); (b) APHRODITE dataset (vertical axis); (c) PERSIANN-CDR dataset (vertical axis); (d) ERA5-Land (vertical axis) in calibration period.

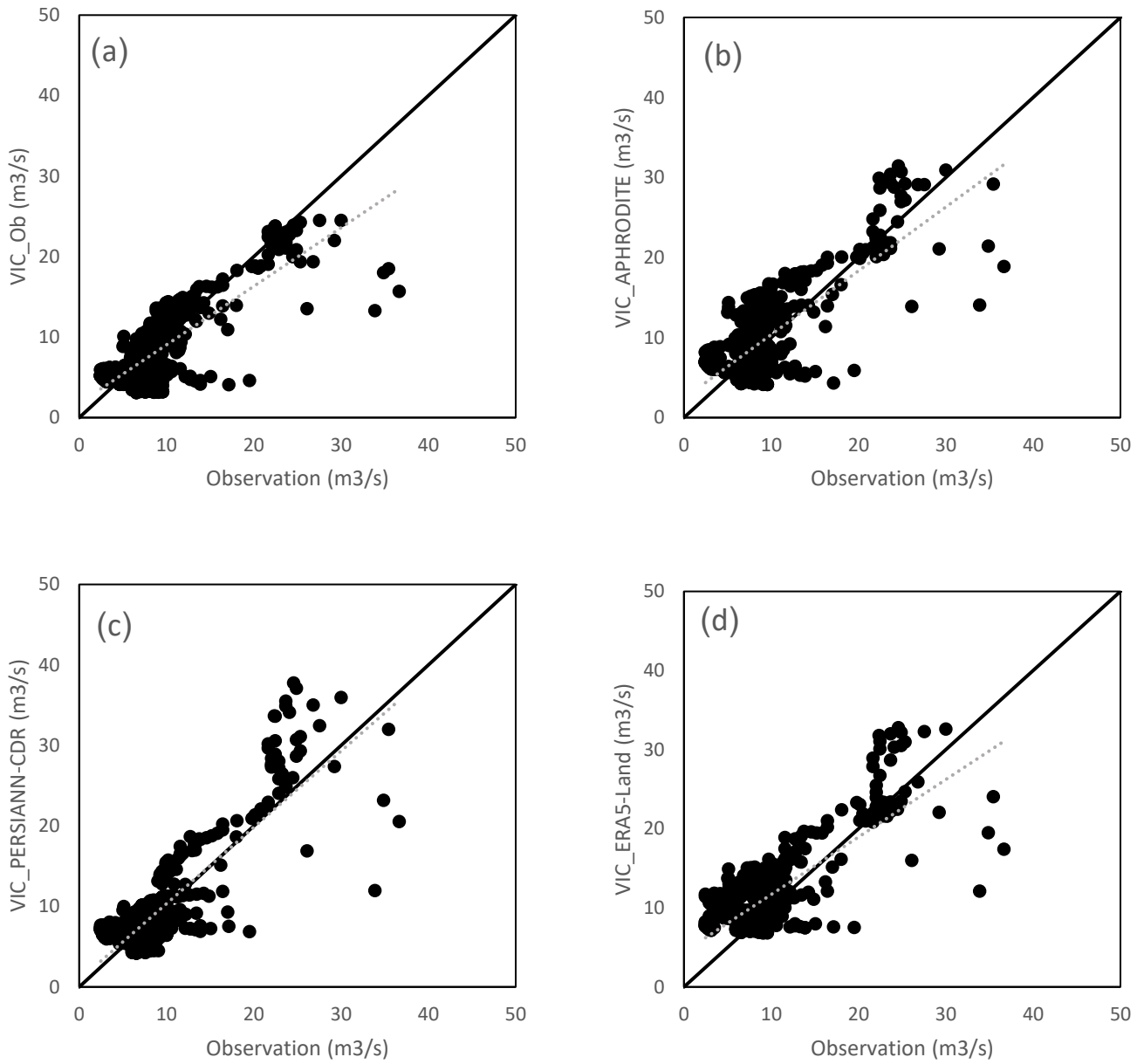


Figure S3. Scatter plot of monthly observation streamflow (horizontal axis) and simulated daily streamflow using: (a) Observed rain gauge stations (vertical axis); (b) APHRODITE dataset (vertical axis); (c) PERSIANN-CDR dataset (vertical axis); (d) ERA5-Land (vertical axis) in validation period.

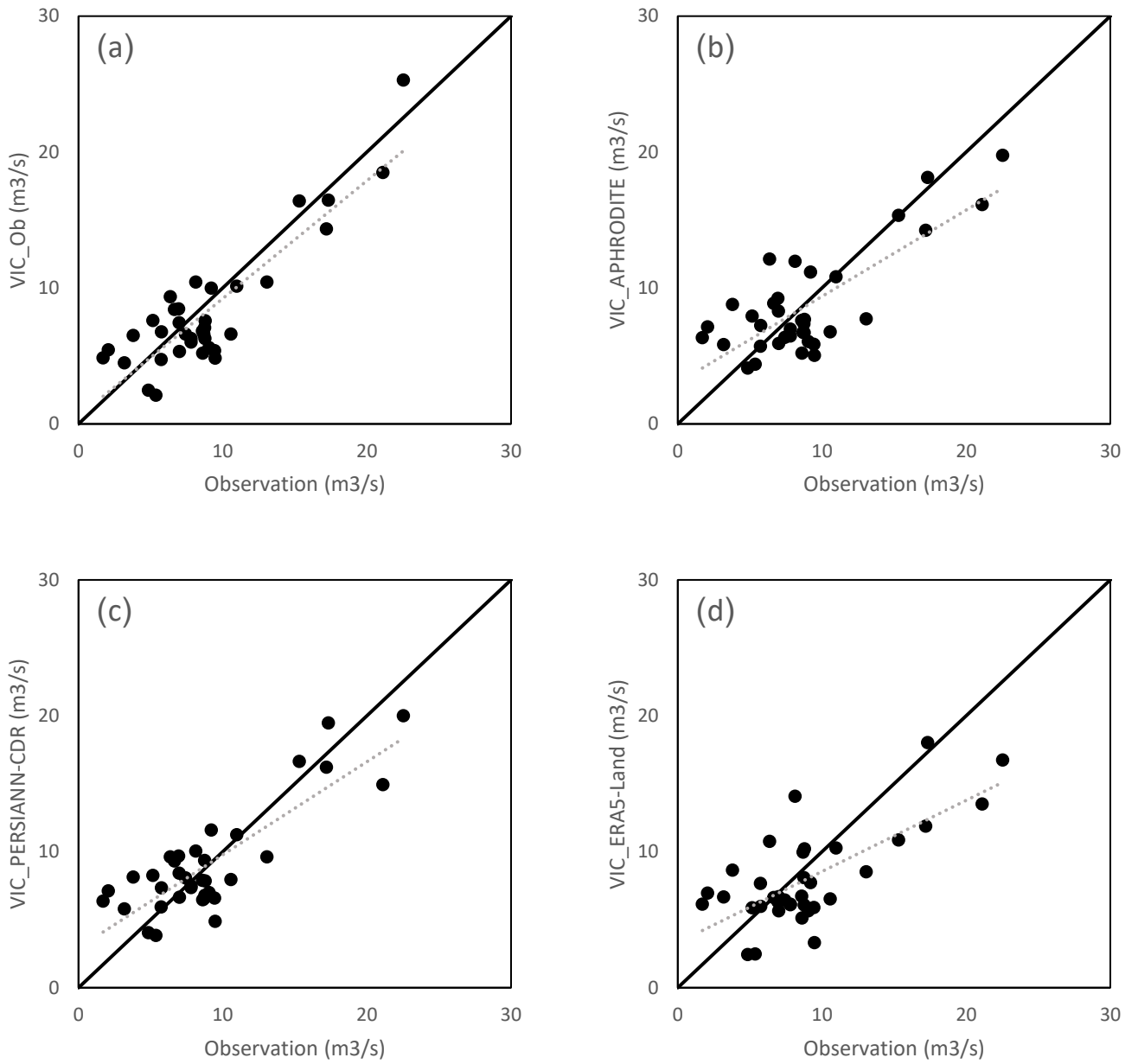


Figure S4. Scatter plot of monthly observation streamflow (horizontal axis) and simulated monthly streamflow using: (a) Observed rain gauge stations (vertical axis); (b) APHRODITE dataset (vertical axis); (c) PERSIANN-CDR dataset (vertical axis); (d) ERA5-Land (vertical axis) in calibration period.

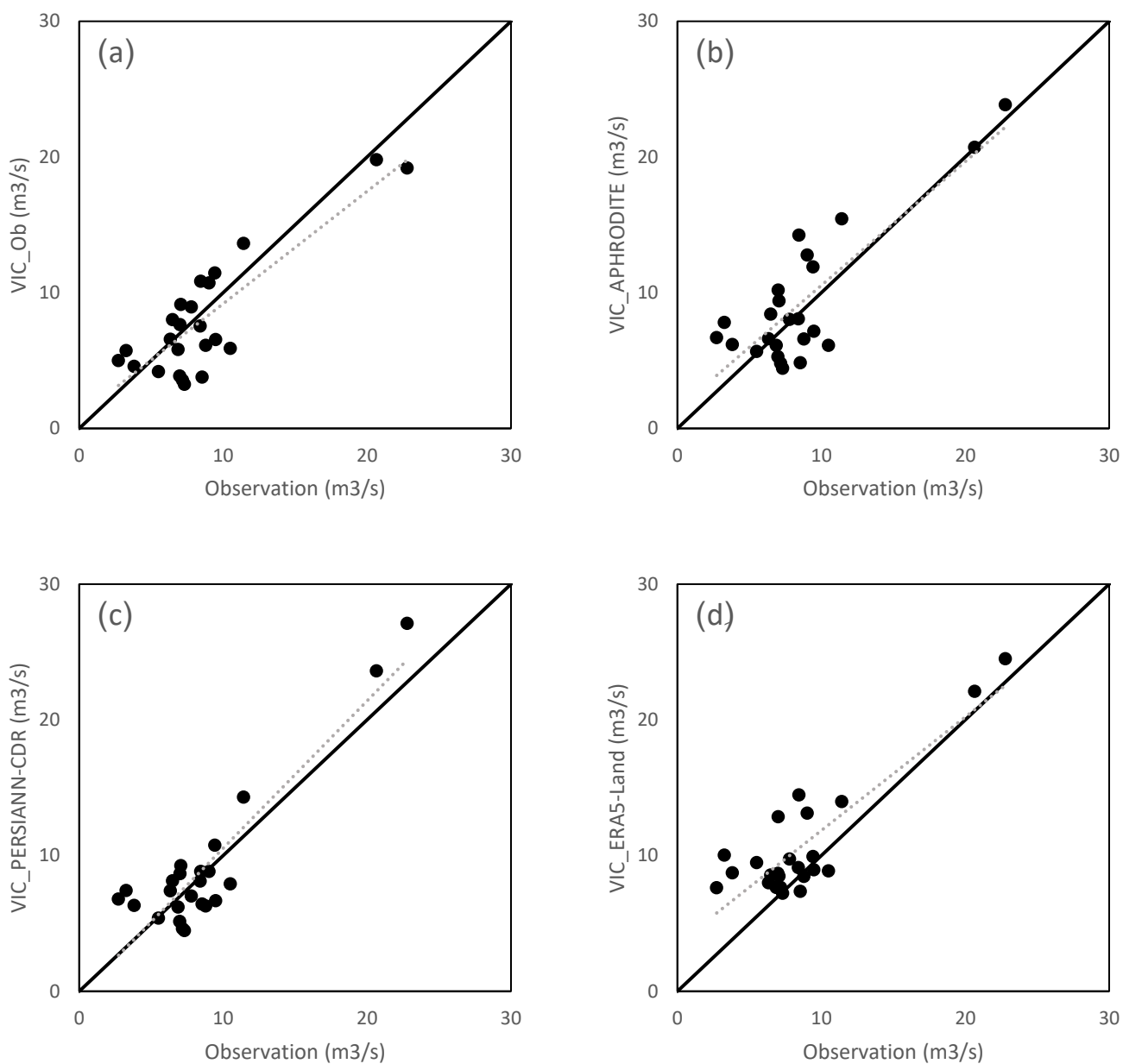
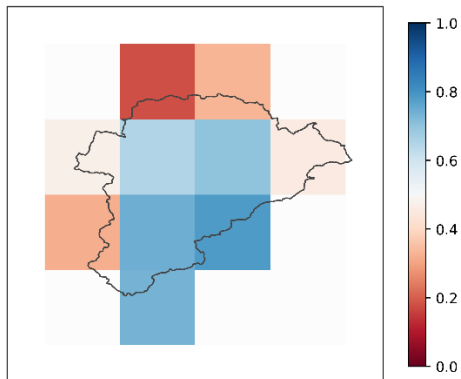
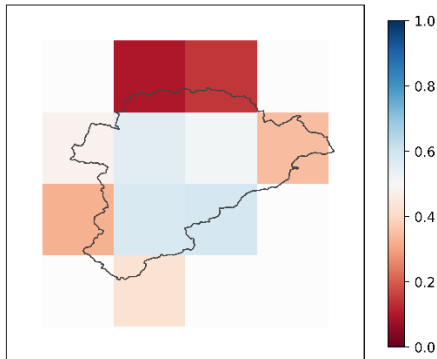


Figure S5. Scatter plot of monthly observation streamflow (horizontal axis) and simulated monthly streamflow using: (a) Observed rain gauge station (vertical axis); (b) APHRODITE dataset (vertical axis); (c) PERSIANN-CDR dataset (vertical axis); (d) ERA5-Land (vertical axis) in validation period.

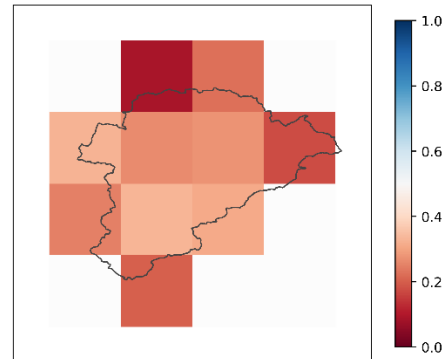
Correlation Coefficient of APHRODITE dataset



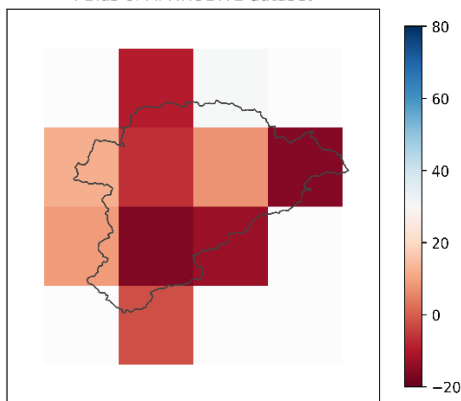
Correlation Coefficient of ERA5-Land dataset



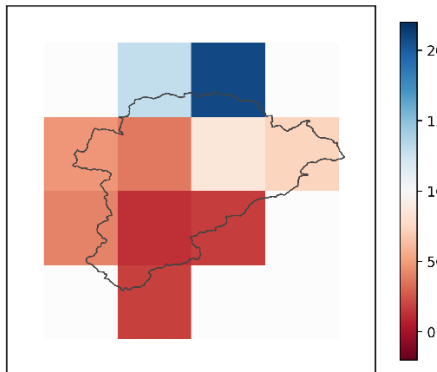
Correlation Coefficient of PERSIANN-CDR dataset



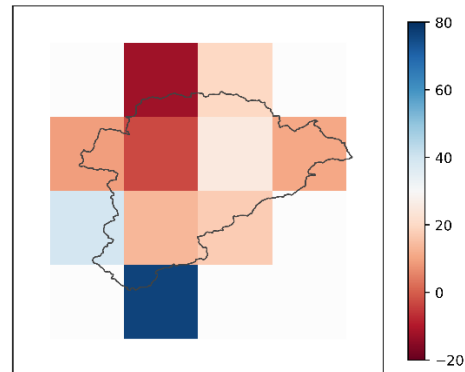
PBias of APHRODITE dataset



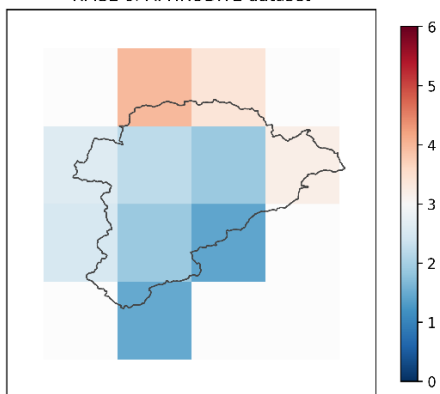
PBias of ERA5-Land dataset



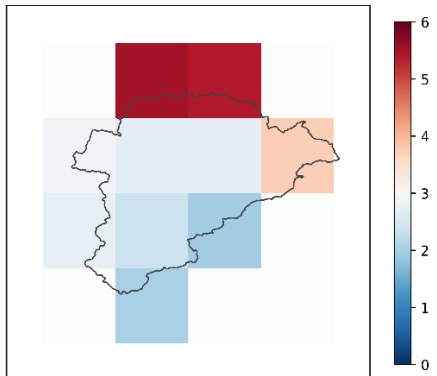
PBias of PERSIANN-CDR dataset



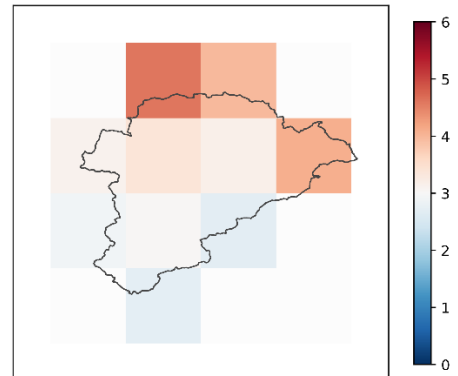
RMSE of APHRODITE dataset



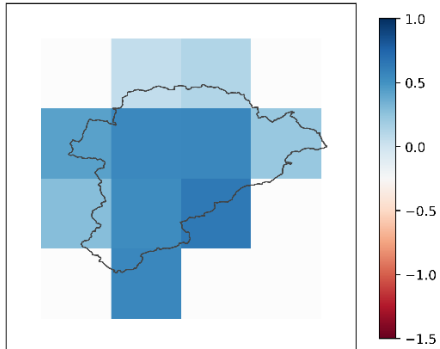
RMSE of ERA5-Land dataset



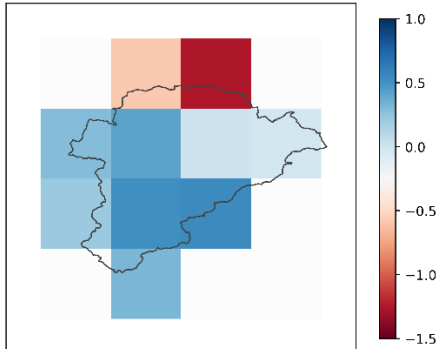
RMSE of PERSIANN-CDR dataset



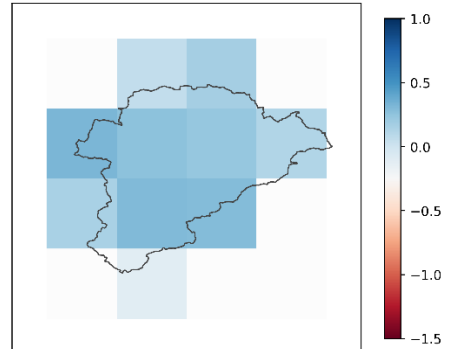
KGE of APHRODITE dataset

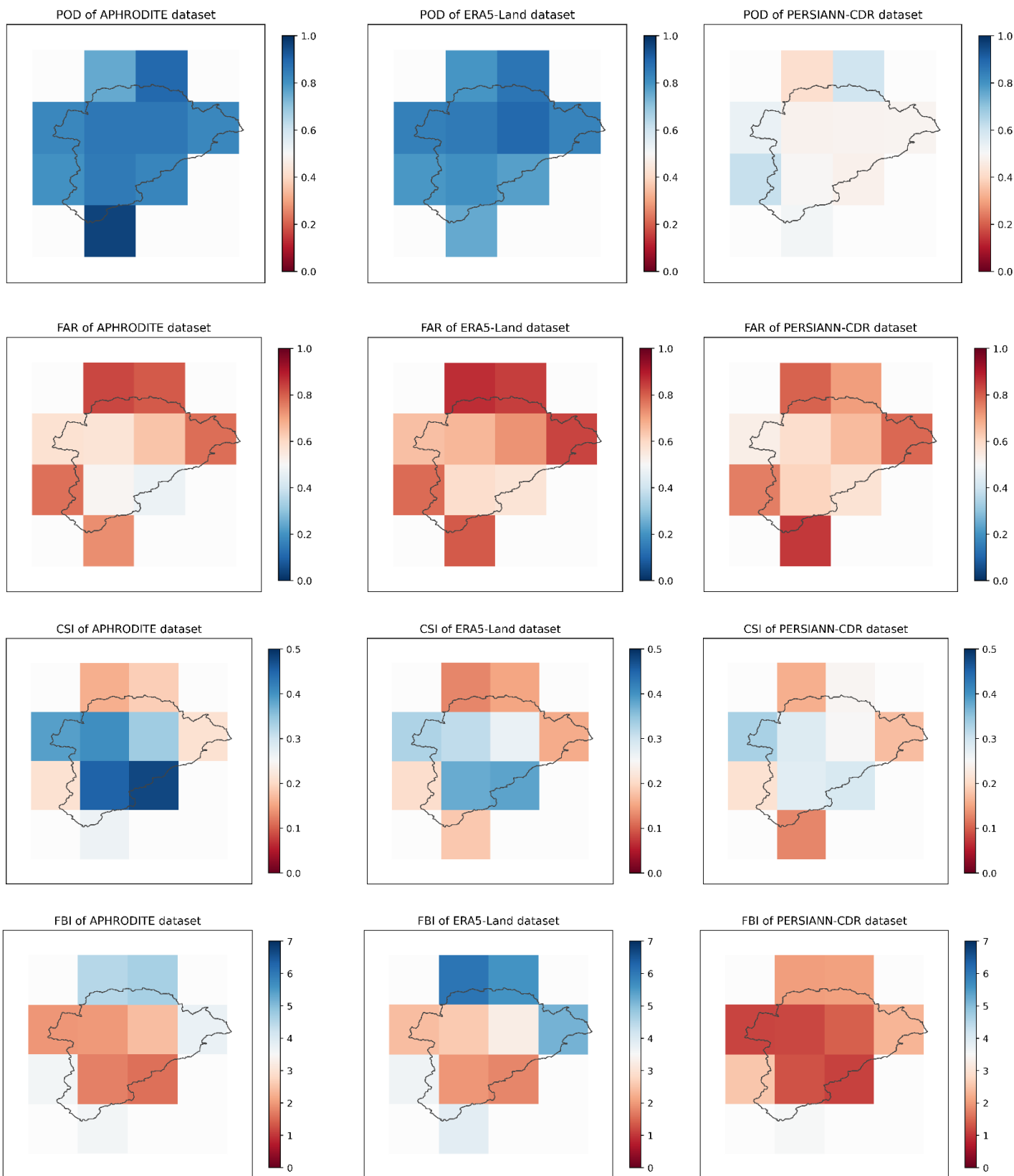


KGE of ERA5-Land dataset



KGE of PERSIANN-CDR dataset





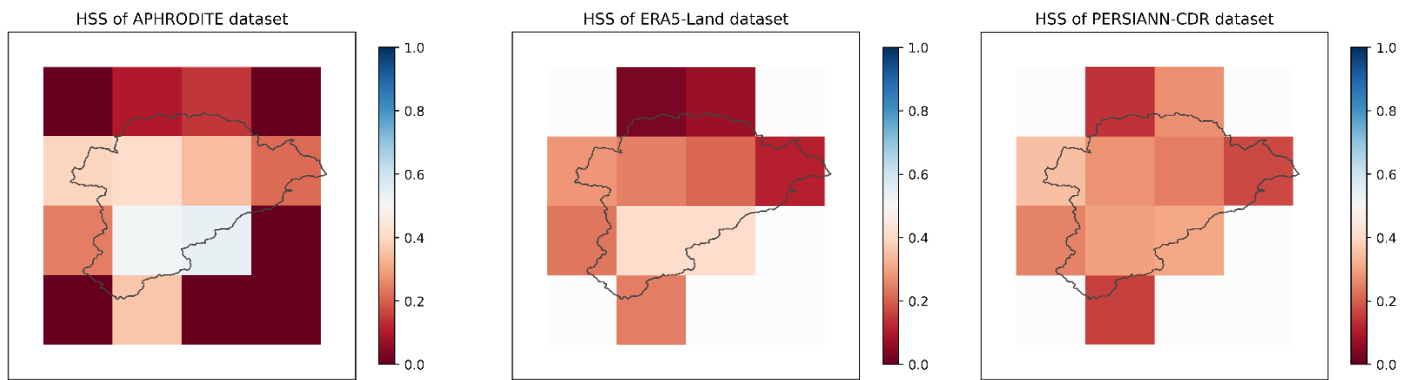


Figure S6. Distribution of CC, PBias, RMSE, KGE, POD, FAR, and CSI of APHRPDATE (column 1), ERA5-Land (column 2), and PERSIANN-CDR (column 3) datasets over the Hablehroud watershed.

Table s1. Statistical metrics used for evaluating of precipitation datasets and simulated runoff

	Index	Unit	Description
1	$CC = \frac{\sum_{t=1}^n (P_{o,t} - \overline{P_o})(P_{s,t} - \overline{P_s})}{\sqrt{\sum_{t=1}^n (P_{o,t} - \overline{P_o})^2} \sqrt{\sum_{t=1}^n (P_{s,t} - \overline{P_s})^2}}$	/	$P_{s,t}$ is the climatological precipitation in time step t $P_{o,t}$ is the Observation precipitation in time step t
2	$PBias = \frac{\sum_{t=1}^n (P_{s,t} - P_{o,t})}{\sum_{t=1}^n P_{o,t}} * 100$	%	$\overline{P_s} = \frac{1}{n} \sum_{t=1}^n P_{s,t}$, $\overline{P_o} = \frac{1}{n} \sum_{t=1}^n P_{o,t}$
3	$POD = H / (H + M)$	/	H is the observed precipitation correctly detected.
4	$FAR = F / (F + H)$	/	M is the observed precipitation not detected.
5	$CSI = H / (F + H + M)$	/.	F is the precipitation detected but not observed
6	$FBI = (H + F) / (M + H)$	/	Z is the precipitation not detected correctly
7	$HSS = \frac{2(ZH - FM)}{(Z + F)(F + H) + (M + H)(Z + M)}$		
8	$KGE = \sqrt{(1 - CC)^2 + (\alpha - 1)^2 + (\beta - 1)^2}$ $\beta = \frac{\sigma_s}{\sigma_o}, \alpha = \frac{\mu_s}{\mu_o}$	/	σ_s simulation time series variance, σ_o observation time series variance μ_s simulation time series average, μ_o observation time series average
9	$RMSE = \sqrt{\frac{\sum_{t=1}^n (P_{s,t} - P_{o,t})^2}{n}}$	mm/day	
10	$NSE = 1 - \frac{\sum_{t=1}^n (P_{s,t} - P_{o,t})^2}{\sum_{t=1}^n (P_{o,t} - \overline{P_o})^2}$	/	