

Figure 1–71 soil classes derived under the IMPETUS project used as input to the SWAT model

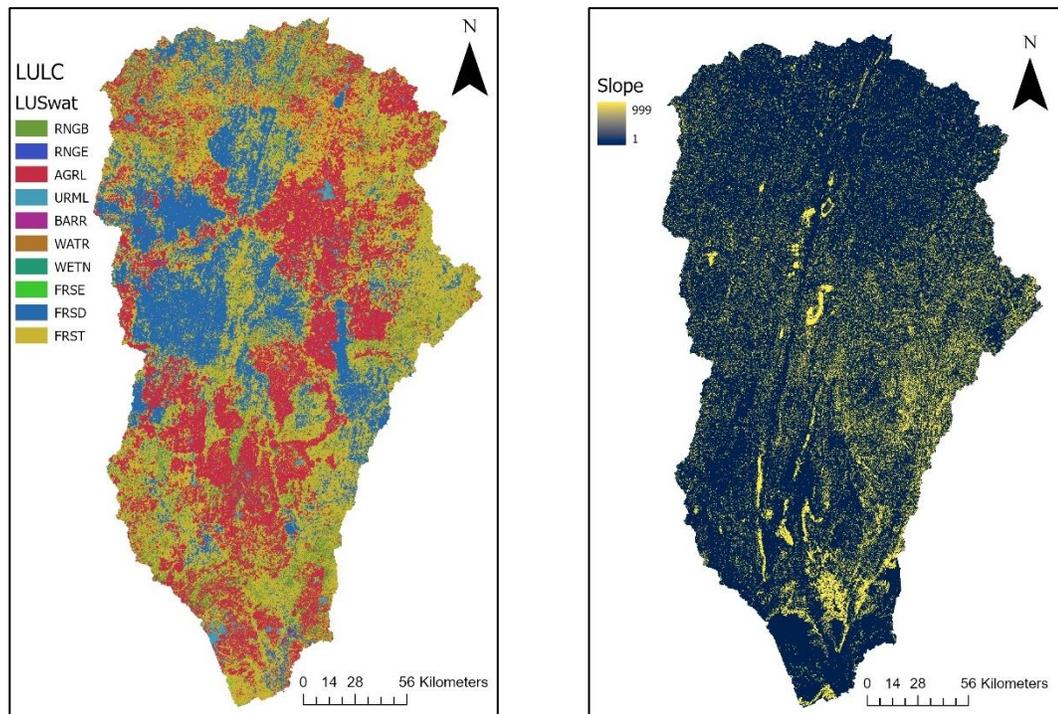


Figure 2–Landuse Landcover classes (left) and Slope (right) in the Ouémé River Basin

Table 1–Percentage area occupied by different Landuse and Landcover classes (adapted from SWAT classification) for the Ouémé River basin

LULC Category	Name	Percentage
AGRL	Agricultural Land-Generic	28.26
BARR	Barren	0
FRSD	Forest-deciduous	21.49
FRSE	Forest-evergreen	0.04
FRST	Forest-mixed	40.17
RNGB	Range-brush	8.17
RNGE	Range-grasses	0.75
URML	Residential-Medium/Low density	1.04
WATR	Water	0.01
WETN	Wetlands-non-forested	0.08

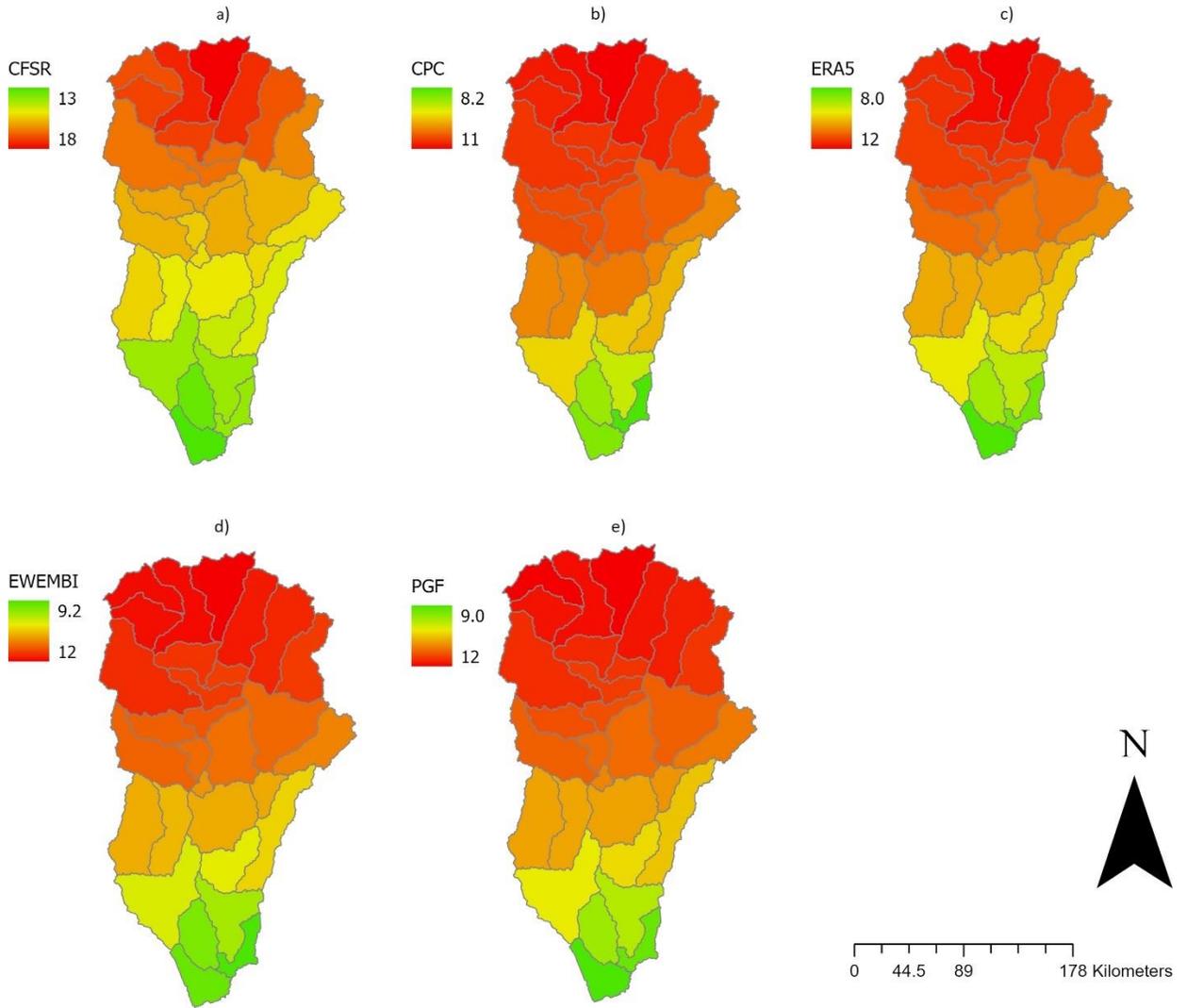


Figure 3- 11-year average (°C) of the difference between maximum and minimum temperature for each subbasin

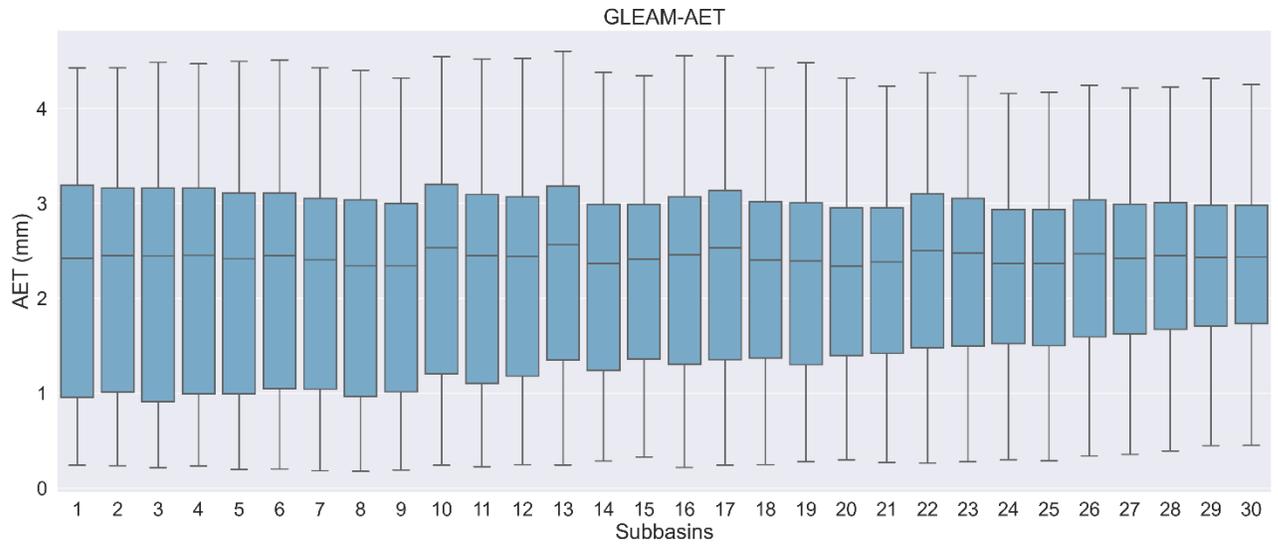


Figure 4-Boxplot visualization of daily values of GLEAM AET data from 2005-2009 discretized at the subbasin level

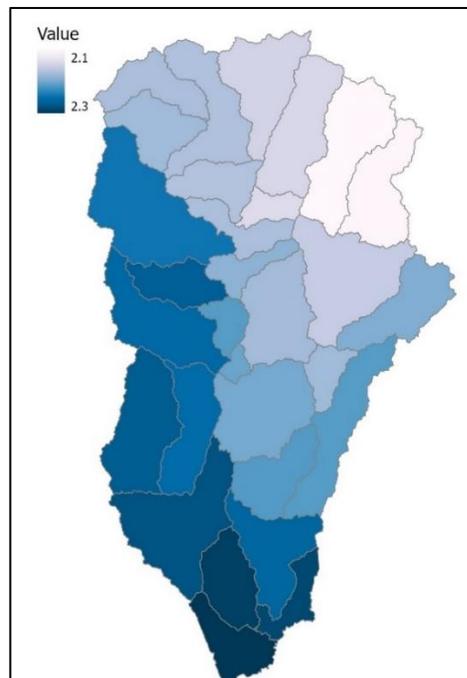


Figure 5-Average daily GLEAM AET data from 2005-2009 at the subbasin level

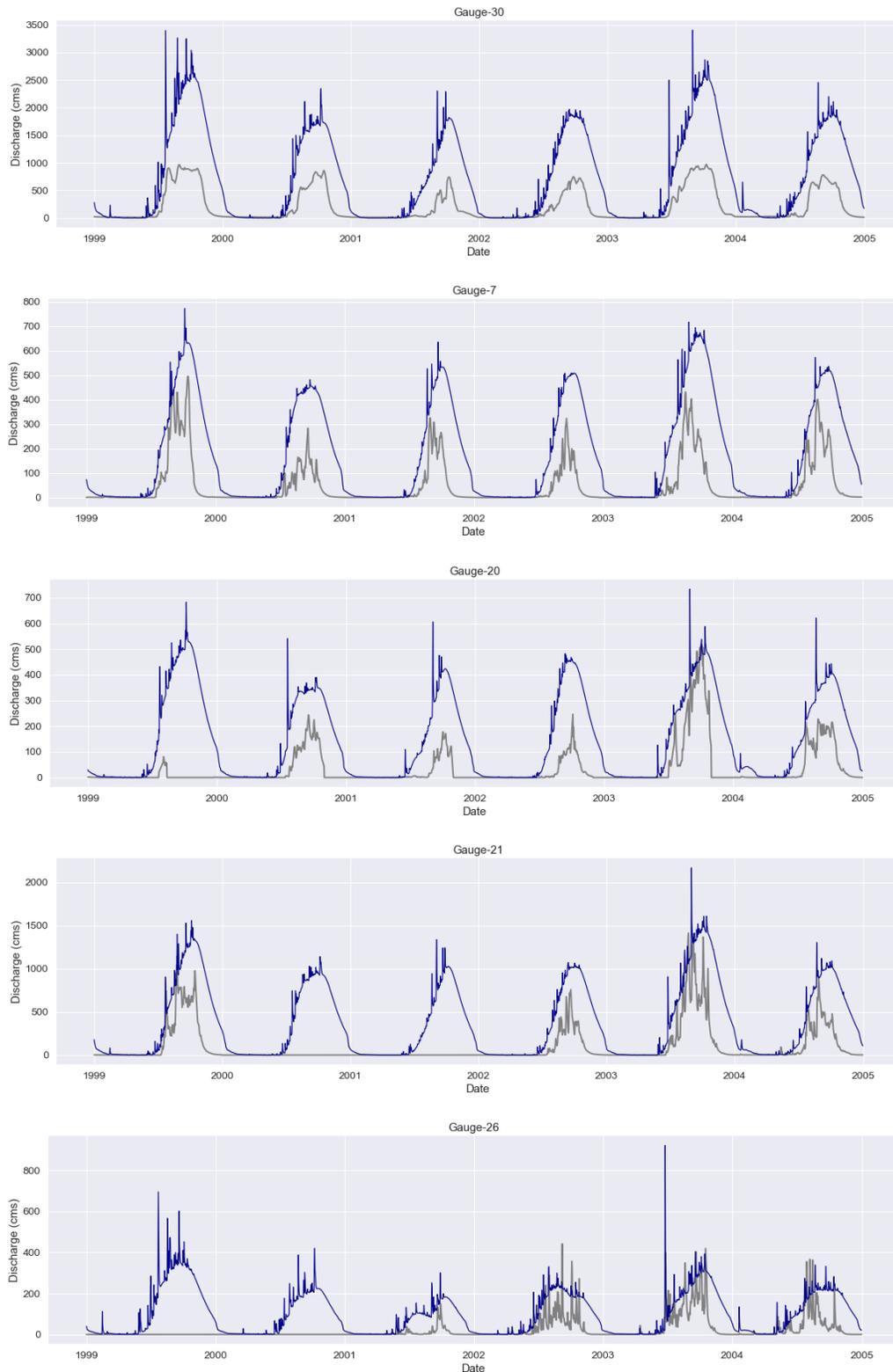
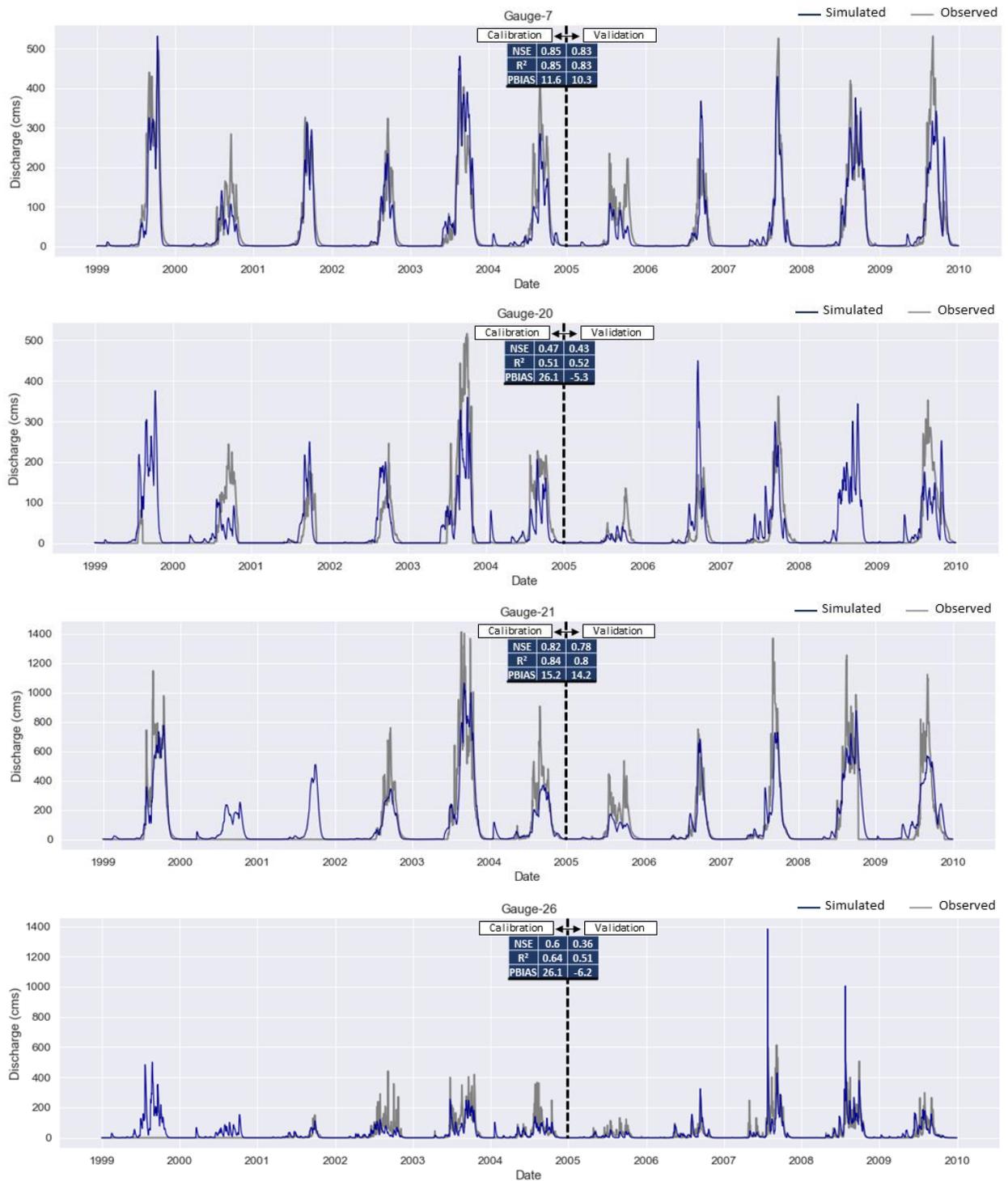


Figure 6-Uncalibrated streamflow output for the five gauge stations simulated by the SWAT model for ERA5 input data



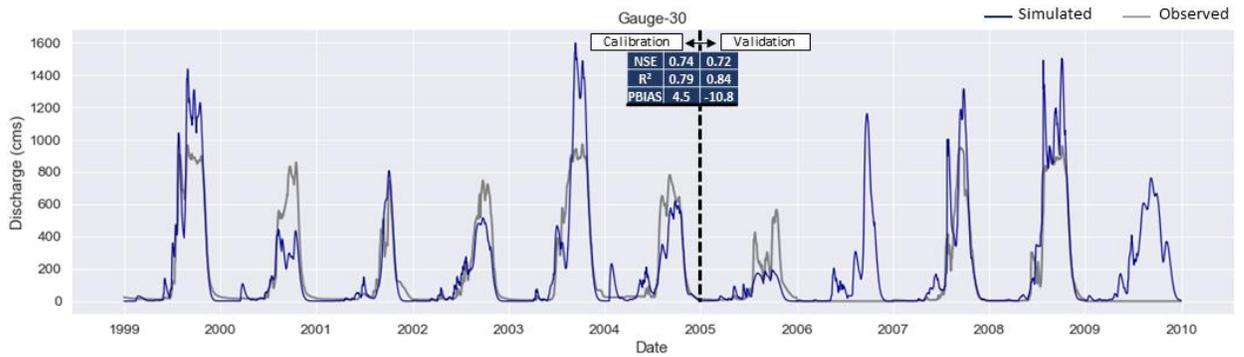
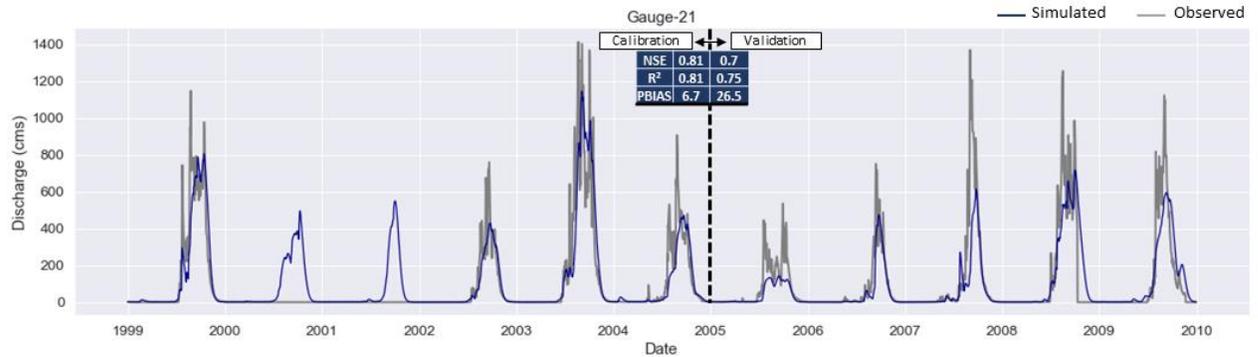
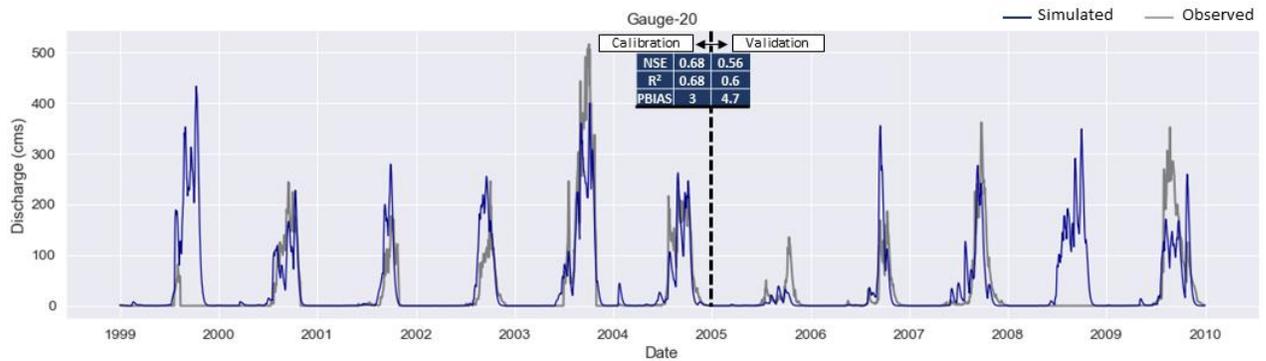
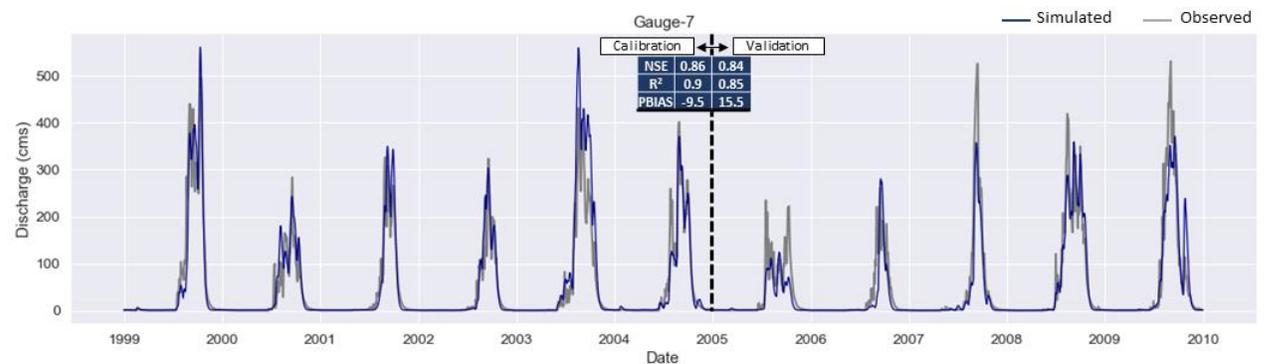


Figure 7-Hydrographs for calibrated and validated SWAT model for CFSR



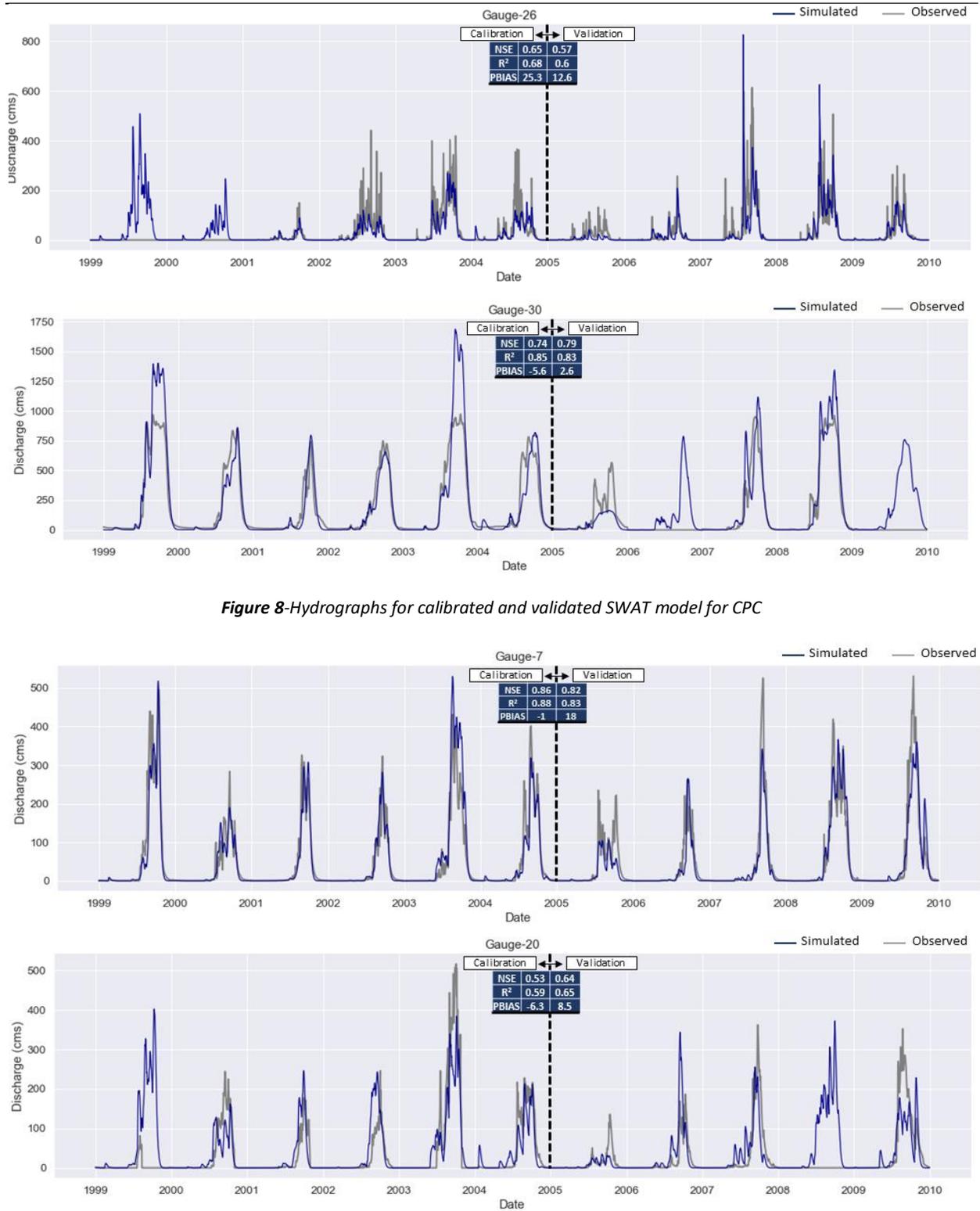


Figure 8-Hydrographs for calibrated and validated SWAT model for CPC

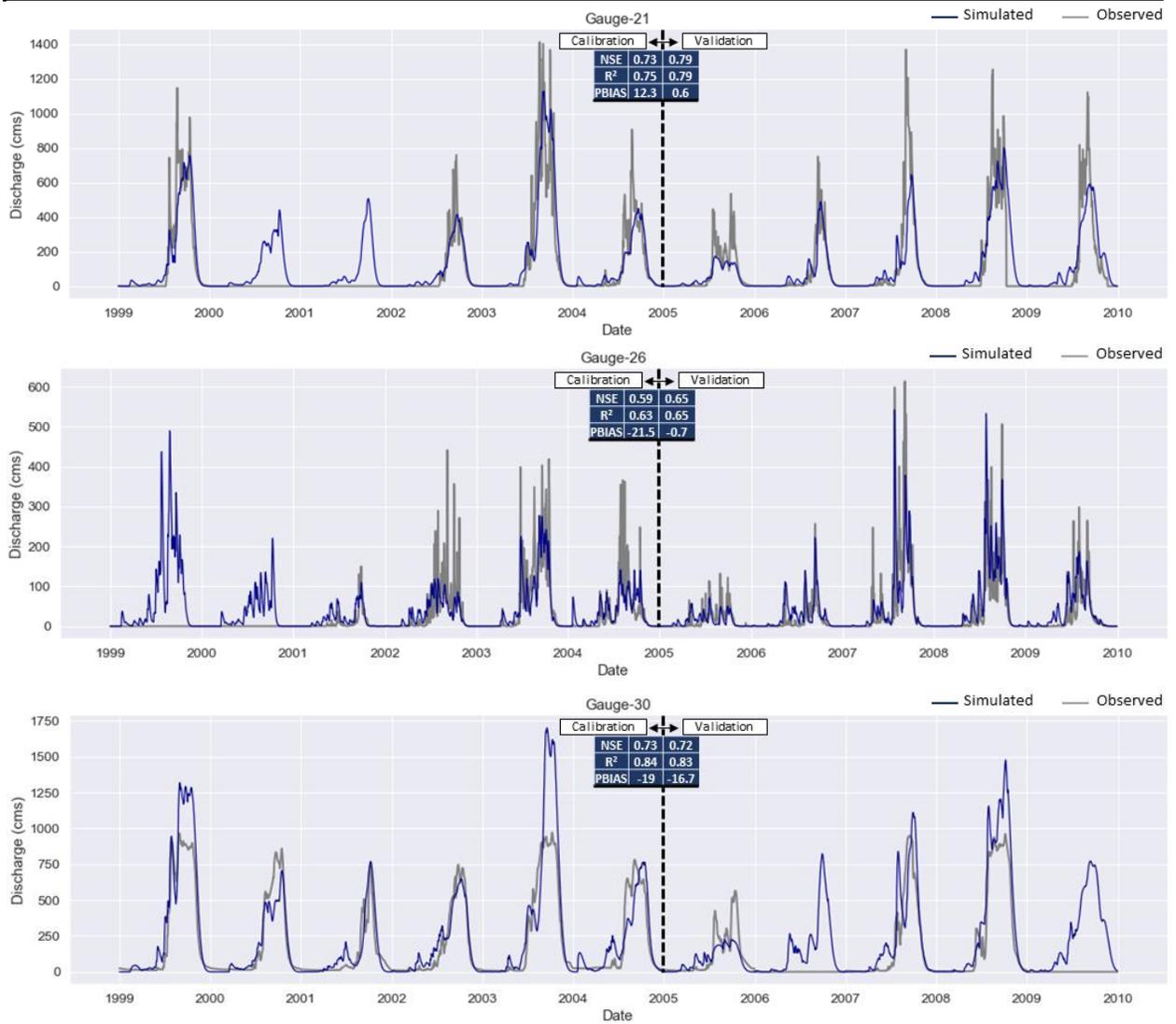
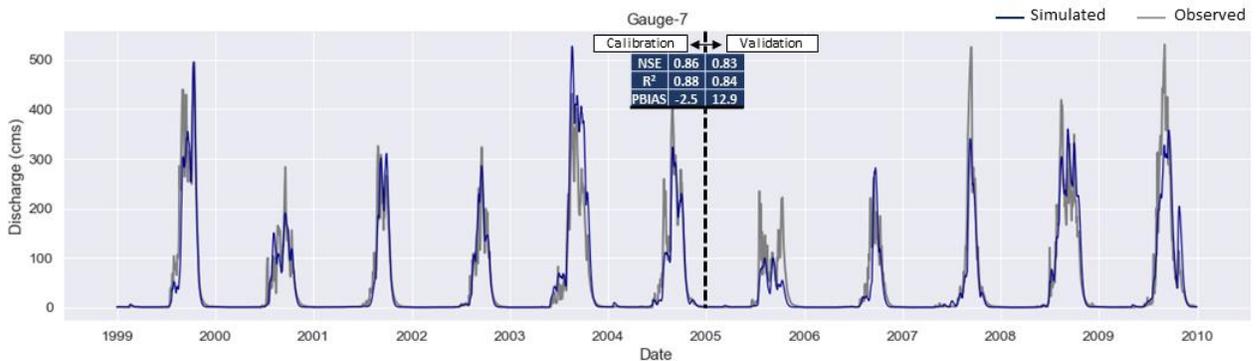


Figure 9-Hydrographs for calibrated and validated SWAT model for EWEMBI



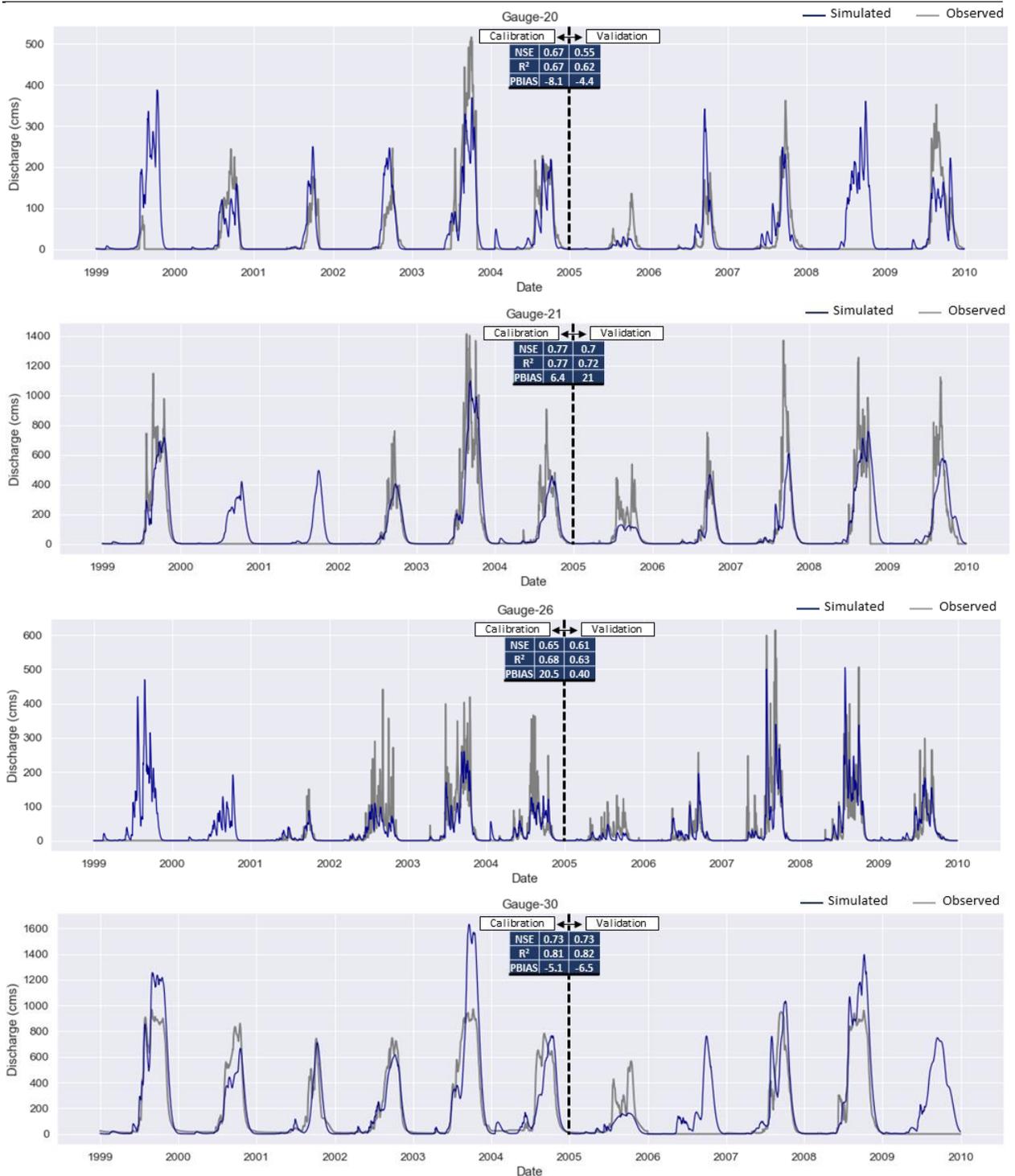


Figure 10-Hydrographs for calibrated and validated SWAT model for PGF

Table 1-Top 10 calibrations and validations for CFSR

Stations	FLOW_OUT_7		FLOW_OUT_20		FLOW_OUT_21		FLOW_OUT_26		FLOW_OUT_30		Average NSE
	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	
Vali1	0.85	1.50	0.42	-13.40	0.79	5.30	0.14	-22.40	0.70	-23.80	0.580
Vali2	0.86	-5.20	0.42	-21.20	0.77	-0.30	0.36	-28.80	0.67	-31.00	0.616
Vali3	0.85	-2.80	0.37	-16.40	0.79	2.70	0.20	-23.90	0.70	-25.20	0.582
Vali4	0.85	-7.70	0.31	-38.50	0.78	-7.70	0.20	-42.90	0.60	-43.80	0.548
Vali5	0.84	-1.40	0.47	-22.70	0.75	3.60	0.07	-31.20	0.63	-29.30	0.552
Vali6	0.83	10.30	0.43	-5.30	0.78	14.20	0.36	-6.20	0.72	-10.80	0.624
Vali7	0.84	9.90	0.42	-11.70	0.77	11.30	0.34	-24.60	0.71	-18.70	0.616
Vali8	0.83	9.00	0.45	-19.90	0.74	9.40	0.35	-24.30	0.71	-23.40	0.616
Vali9	0.82	5.30	0.33	-23.60	0.79	8.70	0.14	-18.40	0.60	-21.50	0.536
Vali10	0.85	-5.60	0.41	-25.60	0.76	0.30	0.09	-22.00	0.69	-29.50	0.560

Table 2-Top 10 calibrations and validations for CPC

Stations	FLOW_OUT_7		FLOW_OUT_20		FLOW_OUT_21		FLOW_OUT_26		FLOW_OUT_30		Average NSE
	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	
Vali1	0.80	25.90	0.51	13.30	0.69	32.90	0.53	18.30	0.79	9.70	0.664
Vali2	0.84	15.50	0.56	4.70	0.70	26.50	0.57	12.60	0.79	2.60	0.692
Vali3	0.81	17.80	0.49	1.00	0.71	25.90	0.55	5.10	0.79	-1.30	0.670
Vali4	0.81	21.10	0.50	13.30	0.71	29.20	0.56	12.50	0.79	6.00	0.674
Vali5	0.82	16.60	0.50	3.30	0.72	24.20	0.55	0.90	0.79	-3.30	0.676
Vali6	0.82	18.20	0.56	13.30	0.69	28.50	0.43	9.20	0.80	4.20	0.660
Vali7	0.82	18.10	0.51	6.10	0.70	27.40	0.51	10.50	0.80	2.80	0.668
Vali8	0.81	21.50	0.52	10.00	0.69	29.70	0.58	8.50	0.80	4.40	0.680
Vali9	0.84	15.50	0.44	-6.30	0.75	21.90	0.57	5.70	0.76	-4.90	0.672
Vali10	0.82	17.90	0.54	6.10	0.69	25.80	0.41	6.10	0.83	0.00	0.658

Table 3-Top 10 calibrations and validations for ERA5

Stations	FLOW_OUT_7		FLOW_OUT_20		FLOW_OUT_21		FLOW_OUT_26		FLOW_OUT_30		Average NSE
	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	
Vali1	0.84	15.60	0.41	-6.00	0.76	18.80	0.53	2.10	0.75	-7.40	0.658
Vali2	0.81	14.80	0.45	-5.60	0.73	21.60	0.57	-6.10	0.75	-8.20	0.662
Vali3	0.82	18.00	0.51	4.60	0.69	27.80	0.58	14.70	0.78	3.80	0.676
Vali4	0.81	18.00	0.44	-1.90	0.73	23.30	0.56	-6.50	0.76	-5.50	0.660
Vali5	0.82	17.60	0.46	1.40	0.72	28.40	0.57	18.10	0.76	4.60	0.666
Vali6	0.83	15.40	0.45	-5.80	0.73	20.00	0.57	-8.70	0.77	-8.80	0.670
Vali7	0.82	13.10	0.40	-7.40	0.76	20.20	0.57	-1.10	0.72	-7.20	0.654
Vali8	0.85	9.60	0.43	-13.70	0.74	19.70	0.57	4.50	0.75	-8.10	0.668
Vali9	0.82	18.20	0.47	-1.00	0.73	22.00	0.58	-9.10	0.77	-7.00	0.674
Vali10	0.78	29.50	0.44	8.40	0.71	33.40	0.59	14.00	0.75	8.90	0.654

Table 4-Top 10 calibrations and validations for EWEMBI

Stations	FLOW_OUT_7		FLOW_OUT_20		FLOW_OUT_21		FLOW_OUT_26		FLOW_OUT_30		Average NSE
	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	
Vali1	0.84	13.90	0.53	-6.30	0.73	12.30	0.59	-21.50	0.73	-19.00	0.684
Vali2	0.79	28.40	0.52	14.10	0.70	30.40	0.60	0.00	0.78	5.40	0.678
Vali3	0.79	22.90	0.52	4.70	0.70	21.60	0.59	-11.00	0.77	-8.30	0.674
Vali4	0.82	20.40	0.49	2.70	0.74	17.20	0.56	-20.60	0.77	-13.10	0.676
Vali5	0.82	11.50	0.55	-11.00	0.70	9.80	0.57	-29.40	0.72	-25.50	0.672
Vali6	0.86	9.30	0.47	-10.50	0.76	8.50	0.52	-29.00	0.73	-24.10	0.668
Vali7	0.81	22.30	0.53	13.10	0.73	26.00	0.60	-8.20	0.74	-0.50	0.682
Vali8	0.85	15.00	0.44	-0.90	0.78	15.00	0.51	-22.00	0.73	-14.40	0.662
Vali9	0.77	27.60	0.56	13.90	0.67	26.20	0.61	-10.80	0.80	-2.80	0.682
Vali10	0.82	13.90	0.49	-16.50	0.72	12.20	0.54	-34.80	0.73	-28.30	0.660

Table 5-Top 10 calibrations and validations for PGF

Stations	FLOW_OUT_7		FLOW_OUT_20		FLOW_OUT_21		FLOW_OUT_26		FLOW_OUT_30		Average NSE
	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	NSE	PBIAS	
Vali1	0.84	11.9	0.42	-7.7	0.77	15	0.53	-17.8	0.69	-14.5	0.650
Vali2	0.81	21.2	0.44	1.9	0.75	24.6	0.56	4.2	0.73	-0.6	0.658
Vali3	0.84	8.8	0.45	-4.1	0.76	18.8	0.52	5	0.73	-5.9	0.660
Vali4	0.84	5.6	0.47	-6.8	0.75	15	0.55	-9	0.72	-13	0.666
Vali5	0.85	4.4	0.45	-11.3	0.75	13.3	0.52	-10.1	0.71	-15.5	0.656
Vali6	0.84	7	0.49	-13	0.73	15.4	0.57	-2.9	0.71	-13	0.668
Vali7	0.83	12.9	0.55	-4.4	0.7	21	0.61	0.4	0.73	-6.5	0.684
Vali8	0.81	19	0.47	3.5	0.73	25.3	0.56	3	0.74	-0.6	0.662
Vali9	0.83	17.3	0.48	0.7	0.74	21.4	0.56	-8.2	0.76	-6.9	0.674
Vali10	0.85	12.6	0.52	7.7	0.75	20.3	0.58	1.6	0.75	-3.6	0.690

Table 6-Final values for calibrated parameters for each temperature reanalysis dataset

Parameters	Method	Temperature datasets				
		CFSR	CPC	ERA5	EWEMBI	PGF
CN2	Relative	0.08	-0.09	0.01	0.21	0.05
GWQMN	Replace	3445.11	1438.29	1900.68	1028.66	2005.65
GW_DELAY	Replace	263.40	229.42	234.03	436.43	186.33
ALPHA_BF	Replace	0.35	0.30	0.31	0.28	0.26
GW_REVAP	Replace	0.14	0.13	0.16	0.19	0.09
CH_K2	Replace	233.08	286.82	479.27	382.60	386.81
ESCO	Replace	0.84	0.33	0.70	0.18	0.39
EPCO	Replace	0.22	0.50	0.76	0.93	0.89
SOL_AWC	Relative	-0.50	-0.42	-0.36	-0.13	-0.40
SOL_K	Relative	-0.96	-1.00	-1.00	-1.00	-1.00
SOL_BD	Relative	-0.38	-0.20	-0.25	-0.22	-0.19

Table 8-Annual average of water balance components (2005-2009) for the five temperature data inputs

Water Balance component	Description	CFSR	CPC	ERA5	EWEMBI	PCP
Precipitation	Average precipitation in the watershed (mm)	1136.8	1136.8	1136.8	1136.8	1136.8
Surface runoff (SURQ)	Surface runoff in the watershed for the simulation (mm)	130.49	111.44	112.13	139.84	122.88
Lateral flow (LATQ)	Lateral flow contribution to the streamflow in watershed for simulation (mm)	0.11	0.16	0.12	0.09	0.13
Groundwater (SHAL AQ) Q	Contribution of groundwater to stream in watershed for simulation (mm)	0	0	0	0	0
Groundwater (DEEP AQ) Q		3.13	1.73	1.01	0.66	1.05
Total water yield	Average annual water yield in watershed during month, WYLD = LATQ + SURQ + GWQ - TRMSN (mm)	133.73	113.33	113.26	140.6	124.06
Total AQ Recharge	Total amount of water entering both aquifers in watershed during simulation (mm)	63.27	34.33	20.16	13.27	21.15
ET	Actual evapotranspiration in the watershed during simulation (mm)	938.6	992	1005.2	982.3	991.7
TRANSMISSION LOSSES	Amount of transmission losses in the tributary channel in watershed during simulation (mm)	0	0	0	0	0

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