Supplementary material

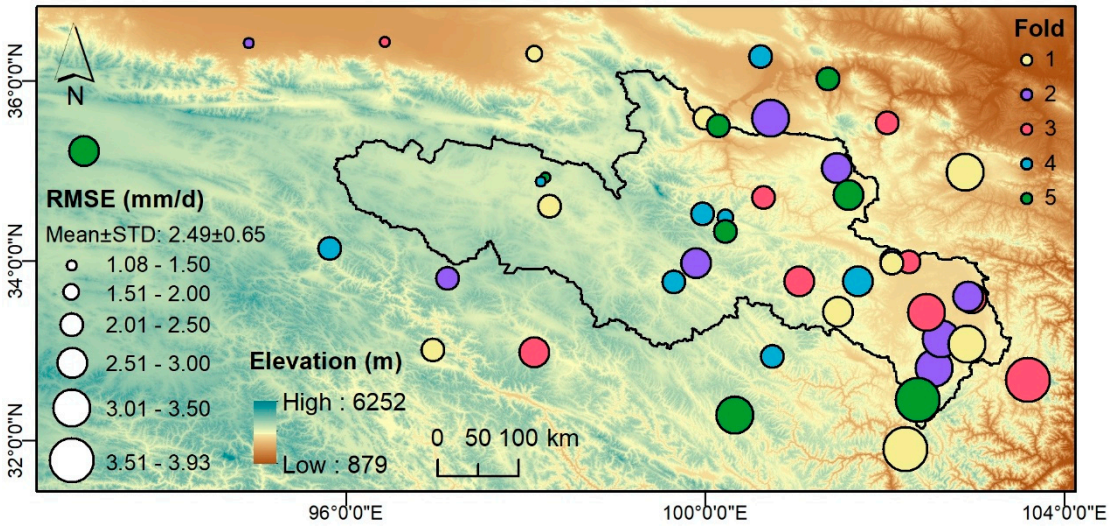


Figure S1. *RMSE* of ANUSPLIN interpolation method in estimating daily precipitation with five-fold cross validation.

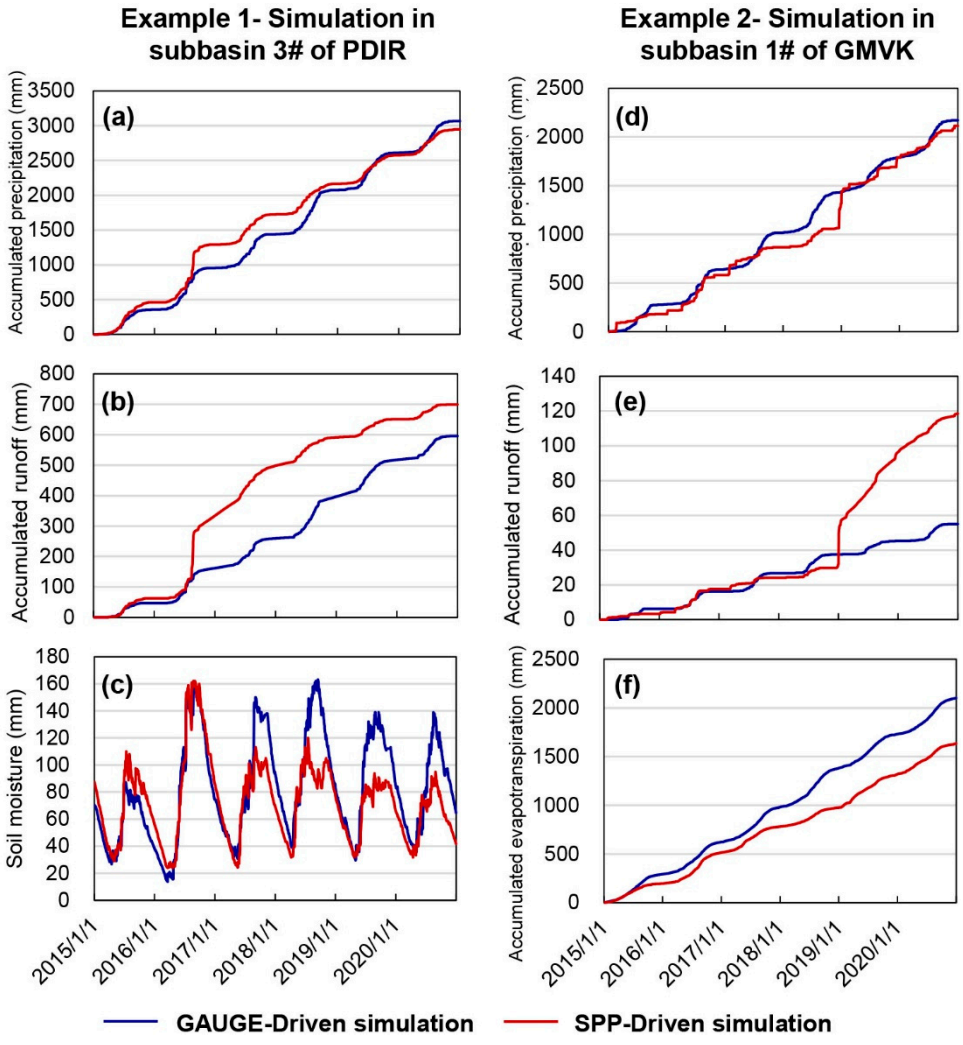


Figure S2. Hydrological elements in the sub-basins with negative γ_{RB}.

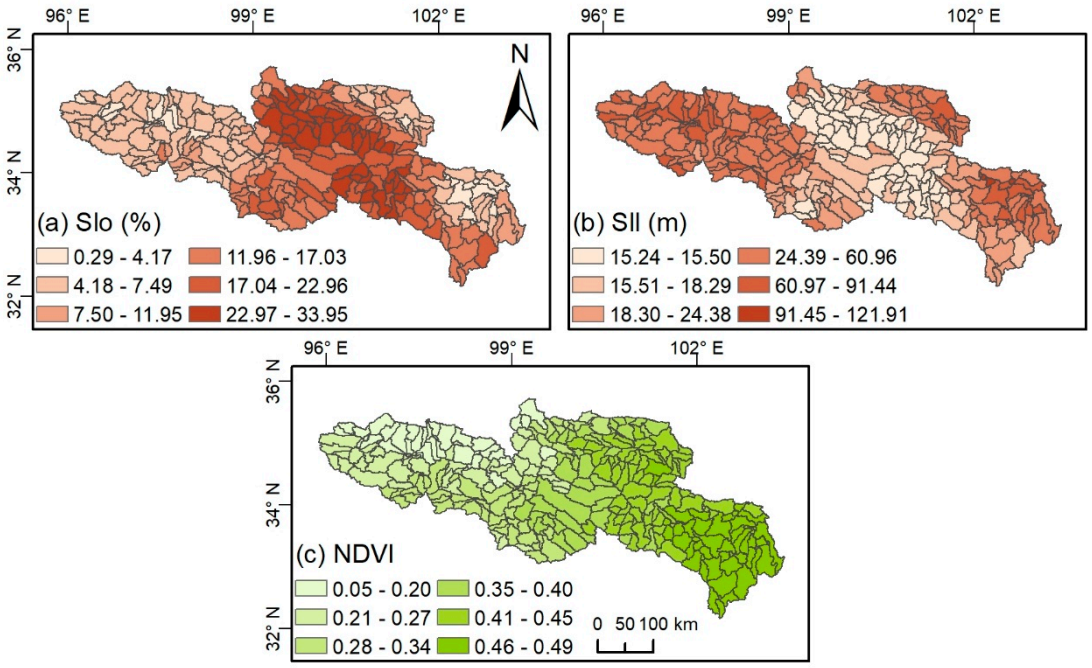


Figure S3. Spatial distribution of sub-basin slope (Slo), field slope length (Sll) and NDVI in YRSR and its linear relationship with γ_{ubRMSE}.

Table S1. Abbreviation and definition of surface factors.

Type	Factor	Definition
Terrain factor	Lat	Latitude of the sub-basin centroid
	Long	Longitude of the sub-basin centroid
	Area	Sub-basin area (hectares)
	Sol	Sub-basin slope (%)
	Len	Longest path within the sub-basin (m)
	Sll	Field slope length (m)
	Csl	Sub-basin tributary reach slope (%)
	Wid1	Sub-basin tributary reach width (%)
	Dep1	Sub-basin tributary reach depth (%)
	Elev	Elevation of the sub-basin centroid (m)
Soil attribute	sol_BD	Moist bulk density of first soil layer (Mg/m3)
	sol_K	Saturated hydraulic conductivity of first soil layer (mm/hr)
	FC	Field capacity (mm/mm)
Vegetation Condition	NDVI	Annual mean value of Normalized Difference Vegetation Index

Table S2. Spearman correlation coefficients between γ_{RB} and surface factors.

Factors	GNRT	GMVK	GGauge	IMERG-E	IMERG-L	IMERG-F	PDIR	PCCSCDR
Lat	-.239**	-.238**	.317**	-.583**	-.583**	-0.058	0.07	.305**
Long	.688**	.594**	-.193**	.436**	.426**	.387**	-.306**	-.572**
Area	-0.061	-0.068	-0.004	-0.004	0.008	-0.079	0.082	-0.068
Slo	0.069	-0.095	-.196**	-.396**	-.365**	0.005	-.540**	-.701**
Len	-0.024	-0.033	0.015	0.045	0.056	-0.094	.138*	-0.001
Sll	-0.049	0.105	.146*	.400**	.368**	0.003	.491**	.657**
Csl	0.064	-0.023	-.162**	-.402**	-.377**	0.063	-.518**	-.503**
Wid	-0.061	-0.068	-0.004	-0.004	0.008	-0.079	0.082	-0.068
Dep	-0.061	-0.068	-0.004	-0.004	0.009	-0.079	0.083	-0.068
Elev	-.701**	-.568**	0.013	-.307**	-.286**	-.402**	.244**	.328**
sol_BD	-.328**	-.360**	-0.079	-.337**	-.322**	-.265**	-.133*	0.046
sol_K	-.488**	-.448**	-.134*	-.359**	-.343**	-.278**	-0.112	0.028
FC	.566**	.529**	0.043	.437**	.433**	.317**	0.009	-.189**
NDVI	.683**	.626**	-.208**	.511**	.505**	.289**	-.239**	-.561**

Note: ** represents p <0.01; * represents p <0.5.

Table S3. Spearman correlation coefficients between γ_{ubRMSE} and surface factors.

Factors	GNRT	GMVK	GGauge	IMERG-E	IMERG-L	IMERG-F	PDIR	PCCSCDR
Lat	-.354**	-.239**	-.241**	-.296**	-.300**	-.424**	0.109	-.460**
Long	.635**	.678**	.397**	.474**	.487**	.431**	.121*	.400**
Area	0.046	0.021	0.073	0.079	0.065	0.059	0.084	0.087
Slo	.826**	.763**	.866**	.833**	.811**	.813**	.903**	.815**
Len	-0.029	-0.039	-0.022	-0.011	-0.021	-0.037	-0.020	0.003
Sll	-.808**	-.734**	-.855**	-.812**	-.786**	-.790**	-.890**	-.801**
Csl	.611**	.588**	.617**	.587**	.573**	.568**	.727**	.529**
Wid	0.046	0.021	0.073	0.079	0.065	0.059	0.084	0.087
Dep	0.046	0.020	0.073	0.079	0.065	0.059	0.084	0.087
Elev	-.389**	-.475**	-.120*	-.190**	-.207**	-.149**	0.011	-.121*
sol_BD	-0.106	-.131*	.130*	0.089	0.071	0.091	.255**	0.089
sol_K	-0.048	-0.112	.223**	.182**	.162**	.180**	.327**	.200**
FC	.222**	.265**	-0.068	-0.016	0.002	-0.006	-.218**	-0.038
NDVI	.627**	.660**	.393**	.452**	.464**	.458**	.114*	.407**

Note: ** represents p <0.01; * represents p <0.5.