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Improving hydrological projection performance under contrasting climatic conditions using spatial coherence through a hierarchical Bayesian regression framework

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Table S1 The prior ranges of all unknown quantities in different scenarios

(1) Calibration in non-dry period and verification in dry period:

Scenario 1**:**

θ_{2-1}	θ_{2-1}	θ_{2-3}	μ_2	σ_3	θ_{3-1}	θ_{4-1}	α_{1-1}	ω_{1-1}	θ_{3-2}	θ_{4-2}	α_{1-2}	ω_{1-2}	θ_{3-3}	θ_{4-3}	α_{1-3}	ω_{1-3}
-10	-10	-10	-100	0	0.1	1	1	0.0001	0.1	0.5	100	0.0001	0.1	0.1	1	0.0001
10	10	10	100	6	200	10	600	0.4	300	20	1000	0.4	300	20	500	0.4

Scenario 2:

θ_{2-1}	θ_{2-1}	θ_{2-3}	μ_3	σ_3	θ_{3-1}	θ_{4-1}	α_{1-1}	β_{1-1}	θ_{3-2}	θ_{4-2}	α_{1-2}	β_{1-2}	θ_{3-3}	θ_{4-3}	α_{1-3}	β_{1-3}
-6	-6	-6	-0.4	0	1	0.5	1	-300	1	0.1	100	-300	0.1	2	1	-200
-6	-6	-6	0.4	0.1	500	10	600	300	300	20	600	500	400	20	800	300

Scenario 3:

θ_{2-1}	θ_{2-1}	θ_{2-3}	μ_2	σ_2	μ_3	σ_3	θ_{3-1}	θ_{4-1}	α_{1-1}	θ_{3-2}	θ_{4-2}	α_{1-2}	θ_{3-3}	θ_{4-3}	α_{1-3}
-5	-5	-5	-200	0	-0	0	1	0.5	1	1	0.1	100	1	0.5	100
5	5	5	100	8	0.4	0.1	120	10	500	300	20	500	250	20	600

Scenario 4:

θ_{2-1}	θ_{3-1}	θ_{4-1}	α_{1-1}	β_{1-1}	ω_{1-1}	θ_{2-2}	θ_{3-2}	θ_{4-2}	α_{1-2}	β_{1-2}	ω_{1-2}	θ_{2-3}	θ_{3-3}	θ_{4-3}	α_{1-3}	β_{1-3}	ω_{1-3}
-10	1	0.1	1	-300	0.0001	-10	1	0.1	0	-300	0	-10	1	0.1	0	-300	0.0001
10	500	10	800	300	0.4	10	500	10	800	300	0.4	10	500	10	800	300	0.4

(2) Calibration in dry period and verification in dry period:

Scenario 1**:**

θ_{2-1}	θ_{2-2}	θ_{2-3}	μ_2	σ_2	θ_{3-1}	θ_{4-1}	α_{1-1}	ω_{1-1}	θ_{3-2}	θ_{4-2}	α_{1-2}	ω_{1-2}	θ_{3-3}	θ_{4-3}	α_{1-3}	ω_{1-3}
-10	-10	-10	-60	0	1	0.5	1	0	1	0.5	1	0	1	0.1	1	0
10	10	10	60	6	300	10	600	0.4	300	20	600	0.4	300	15	600	0.4

Scenario 2:

θ_{2-1}	θ_{2-2}	θ_{2-3}	μ_3	σ_3	θ_{3-1}	θ_{4-1}	α_{1-1}	β_{1-1}	θ_{3-2}	θ_{4-2}	α_{1-2}	β_{1-2}	θ_{3-3}	θ_{4-3}	α_{1-3}	β_{1-3}
-10	-10	-10	0.0001	0	1	0.5	1	-300	1	0.1	1	-400	0.1	0.5	1	-400
10	10	10	0.4	0.1	200	15	500	400	300	20	600	500	140	20	600	400

Scenario 3:

θ_{2-1}	θ_{2-2}	θ_{2-3}	μ_2	σ_2	μ_3	σ_3	θ_{3-1}	θ_{4-1}	α_{1-1}	θ_{3-2}	θ_{4-2}	α_{1-2}	θ_{3-3}	θ_{4-3}	α_{1-3}
-10	-10	-10	-80	0	0	0	1	0.5	1	1	0.1	1	1	0.1	1
10	10	10	80	6	0	0.1	200	10	500	400	20	600	400	20	600

Scenario 4:

θ_{2-1}	θ_{3-1}	θ_{4-1}	α_{1-1}	β_{1-1}	ω_{1-1}	θ_{2-2}	θ_{3-2}	θ_{4-2}	α_{1-2}	β_{1-2}	ω_{1-2}	θ_{2-3}	θ_{3-3}	θ_{4-3}	α_{1-3}	β_{1-3}	ω_{1-3}
-10	1	0.1	1	-300	0.0001	-10	1	0.1	1	-300	0	-10	1	0.1	1	-300	0
10	500	10	800	300	0.4	10	500	10	800	300	0.4	10	500	10	800	300	0.4

Notes:

θ_{2-1}, θ_{2-2} and θ_{2-3} refers to model parameter θ_2 in catchment 225219, 405219 and 405264, respectively; θ_{3-1}, θ_{3-2} and θ_{3-3} refer to model parameter θ_3 in catchment 225219, 405219 and 405264, respectively; θ_{4-1}, θ_{4-2} and θ_{4-3} refers to model parameter θ_4 in catchment 225219, 405219 and 405264, respectively; μ_2, σ_2, μ_3 and σ_3 represent four hyper-parameters; α_{1-1}, α_{1-2} and α_{1-3} refer to regression parameter α in catchment 225219, 405219 and

405264, respectively; β_{1-1}, β_{1-2} and β_{1-3} refer to regression parameter β in catchment 225219, 405219 and 405264, respectively; ω_{1-1}, ω_{1-2} and ω_{1-3} refer to regression parameter ω in catchment 225219, 405219 and 405264, respectively.