

Table S1. Water balance and constitutive equations used in FLEX model

Reservoirs	Water balance equations	Constructive equations
Snow	$\frac{dS_{sn}}{dt} = P_s - M$ (1)	$P_s = \begin{cases} P; & T < T_t \\ 0; & T \geq T_t \end{cases}$ (2)
		$M = \begin{cases} 0, & T < T_t \\ \min\left(F_{dd}(T - T_t), \frac{S_{sn}}{dt}\right), & T \geq T_t \end{cases}$ (3)
Interception	$\frac{dS_i}{dt} = P_r + M - P_e - E_i$ (4)	$P_r = \begin{cases} 0; & T < T_t \\ P; & T \geq T_t \end{cases}$ (5)
		$P_e = \max\left(0, \frac{S_i - I_{max}}{dt}\right)$ (6)
		$E_i = \max\left(E_p, \frac{S_i - P_e}{dt}\right)$ (7)
Unsaturated reservoir	$\frac{dS_u}{dt} = P_e(1 - C_r) - R_s - E_T$ (8)	$C_r = 1 - \left(1 - \frac{S_u}{S_{u,max}(1+\beta)}\right)^\beta$ (9)
		$R_s = \min\left(P_{max} \left(\frac{S_u}{S_{u,max}}\right), \frac{S_u}{dt}\right)$ (10)
		$E_T = \min\left((E_0 - E_i) \min\left(\frac{S_u}{S_{u,max}C_e}, 1\right), \frac{S_u}{dt}\right)$ (11)
		$R_f = P_e C_r$ (12)
Fast reservoir	$\frac{dS_f}{dt} = R_f - Q_f$ (13)	$Q_f = S_f K_f$ (14)
Slow reservoir	$\frac{dS_s}{dt} = R_s - Q_s$ (15)	$Q_s = S_s K_s$ (16)
		$Q = (1 - K_L)(Q_f + Q_s)$ (17)

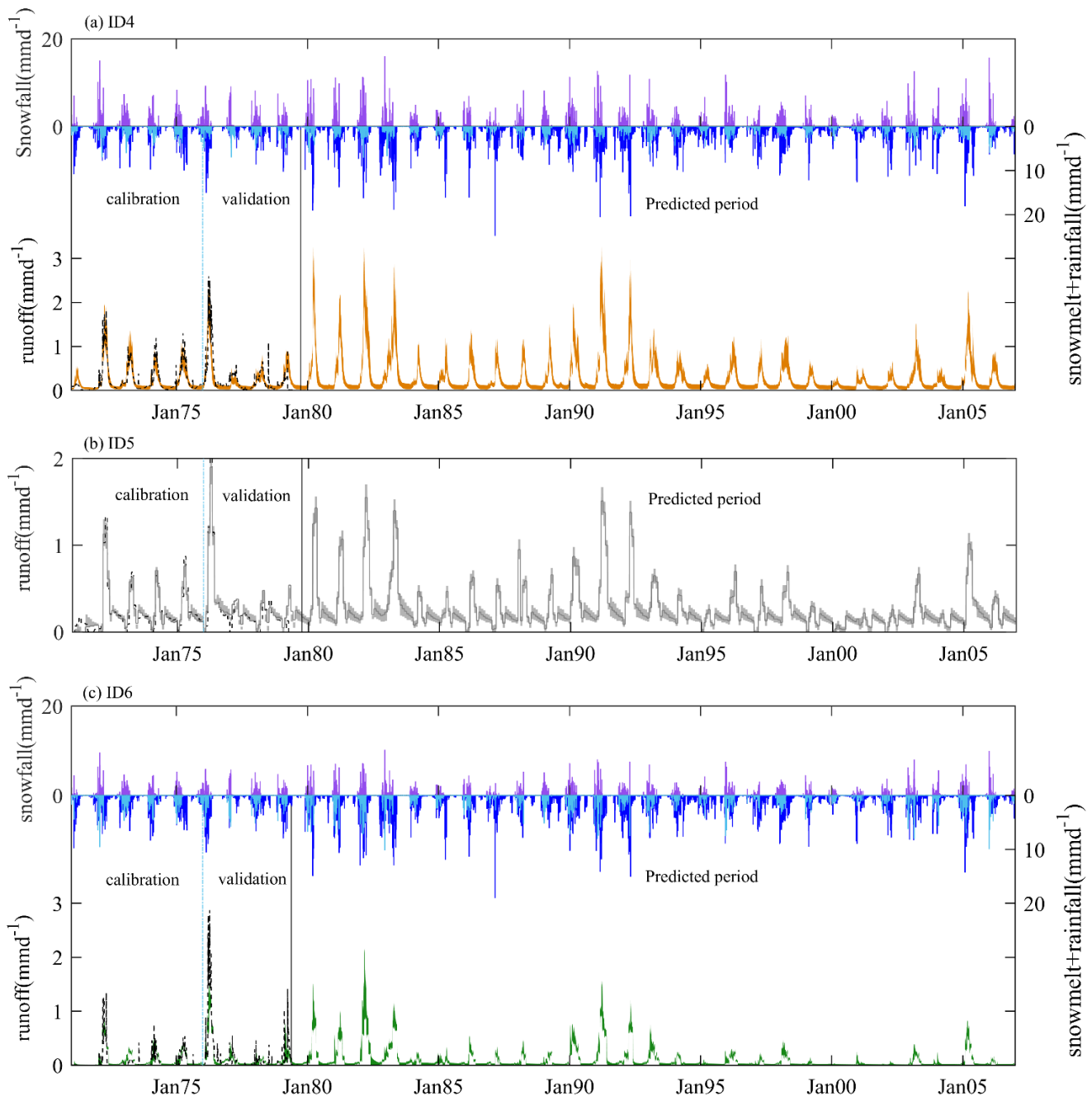


Figure S1. Precipitation and streamflow in UARB_U (ID4), UARB_D (ID5) and LARB (ID6). The purple bars show the modelled snowfall P_S [mm d⁻¹], the dark blue bars the modelled snowmelt M [mm d⁻¹] and the light blue bars the modelled rainfall P_R [mm d⁻¹]. The dashed black lines indicate the observed runoff and the shaded areas the uncertainty ranges of modelled runoff during calibration, validation and prediction periods.