TABLE S1: *Seasonality indices used in intercomparison. The variable name "B" can refer to either the annual total of either precipitation (P) or potential evapotranspiration (E), b_m is the amount in month m of either P or E.*

Abbreviation	Name in original publication	Equation & brief description	Reference
ASI	Asynchronicity index, ASI	$ASI = \sqrt{JS_{obs} - JS_{min}}$ Difference between the observed Jensen-Shannon distance of P and PET at a location and its minimized Jensen-Shannon distance. Ranges [0,1].	This paper, equation (2)
SI	Seasonality index, S	$S = D \cdot \frac{P}{P_{max}}, \qquad D = \sum_{m=1}^{12} p_m \log_2\left(\frac{p_m}{1/12}\right)$ Product of relative entropy D (of monthly rainfall with respect to the uniform distribution) and mean annual rainfall normalized with respect to observed maximum within the stations. Ranges [0,∞].	Feng et al. (2013), equation (1)
Imr	Moisture index seasonality, $I_{m,r}$	$I_{m,r} = \max\big(MI(t)\big) - \min\big(MI(t)\big), \qquad MI(t) = \begin{cases} 1 - \frac{E(t)}{P(t)} & , P(t) > E(t) \\ 0 & , P(t) = E(t) \\ \frac{E(t)}{P(t)} - 1 & , P(t) < E(t) \end{cases}$ Range [0, 2]. 0 indicates no intra-annual changes in the water/energy budget, and 2 indicates the climate switches between fully arid and fully saturated within a single year	Knoben et al. (2018), equations (1) and (3)
*dP**	Seasonality of precipitation in relation to seasonality of temperature, δ_P^*	$\delta_P^* = \delta_P cos(2\,\pi\,(s_P - s_E)/\tau)$ δ_P is the normalized amplitude of the seasonal precipitation signal, approximated here by $\delta_P = \frac{\max(p_m) - \min(p_m)}{2P}$ to avoid assuming sinusoidality. s_P and s_E are the phases of the precipitation and PET, approximated by $s_B = \mathrm{argmax}(b_m)$. Value of δ_P^* ranges from -1 (winter dominant P) through 0 (uniform P) to 1 (summer dominant P).	Woods (2009), equation (14)
WalshS	Seasonality index (for relative seasonality), SI	$SI = \frac{1}{P}\sum_{m=1}^{12}\left\lvert r_m - \frac{P}{12}\right\rvert$ Sum of the absolute deviations of mean monthly rainfalls from the overall monthly mean, divided by the mean annual rainfall. Ranges [0,∞].	Walsh & Lawler (1981)
dCentroid	Difference of centroids, $\Delta\tau$	$\Delta\tau = \tau_P - \tau_E, \qquad \tau_B = \frac{1}{B}\sum_{m=1}^{12} m\, b_m$ Difference in the first moments of monthly precipitation and PET distributions. Ranges [0,6]	This paper
MillyS	Seasonality index, S	$S = \lvert\delta_P - \delta_E R\rvert$ R is the dryness index, δ are amplitudes of sinusoidal climatologies for precipitation and PET. The amplitudes are approximated in this paper using $\delta_B = \frac{\max(b_m) - \min(b_m)}{2B}$ to avoid assuming sinusoidality. Ranges [0,∞].	Milly (1994), equation (23)