Identification of the dominant factors in groundwater recharge process, using Multivariate Statistical Approaches in a semi-arid region

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Table S1. Thornthwaite method for the PET estimation [1]

First step, monthly heat index calculation

$$i = (t/5)^{1.514}$$

Obtaining the annual heat index (I) as the sum of the 12 values from the monthly heat index for theoretical months with 30 days and 12 hours sun
From these data he proposes the following formula

$$PET_0 = 16 \bullet (10 \bullet t / I)^a$$

where
PET_0= Uncorrected monthly potential evapotranspiration
t = average monthly temperature
I = annual heat index

$$a = 675x10^{-9} \bullet I^3 - 771x10^{-7} \bullet I^2 + 1792x10^{-5} \bullet I + 0.49239$$

The ETP values obtained have to be corrected according to the duration of the month and the number of hours of theoretical sunshine, variable in relation to the latitude of the meteorological station that supplied the data:

$$PET = PET_0 \bullet N/12 \bullet d/30$$

where

PET= monthly potential evapotranspiration
PET_0 = Uncorrected monthly potential evapotranspiration
N = number of sunshine hours for a specific day
d = number of days per month

Table S2. Runoff coefficient of Prevert (1984) [2]

Land use	Slope (%)	Texture		
		Coarse	Medium	Fine
Forest	0-5	0.10	0.30	0.40
	5-10	0.25	0.36	0.50
	10-30	0.30	0.40	0.60
	>30	0.32	0.42	0.63
Grassland	0-5	0.15	0.35	0.45
	5-10	0.30	0.40	0.55
	10-30	0.35	0.45	0.65
	>30	0.37	0.47	0.68
Agriculture	0-5	0.30	0.50	0.60
	5-10	0.40	0.66	0.70
	10-30	0.50	0.70	0.80
	>30	0.53	0.74	0.84

Table S3. Runoff coefficient of Chow (1993) [3]

Land use	Slope (%)	Texture		
		Coarse	Medium	Fine
Urban area	0-5	0.70	0.81	0.92
	5-10	0.76	0.85	0.93
	10-30	0.88	0.91	0.94
	>30	0.95	0.95	0.95

Table S4. Results of the KMO test [4–6]

Variables	KMO
	MSA
Altitude	0.60
Slope	0.74
Temperature	0.82
Soil	0.69
Vegetation	0.38
Rainfall	0.71
Relative humidity	0.84
PET	0.81
Land use	0.83
Runoff coefficient	0.38
K	0.79
Geology	0.84
Overall	**0.77**

Table S5. Results of the Shapiro-Wilk test [7]

Variable	Shapiro-Wilk	
	W	*p-value*
Altitude	0.814	1.1×10^{-7}
Slope	0.611	6.22×10^{-12}
Temperature	0.861	2.79×10^{-6}
Soil	0.850	1.22×10^{-6}
Vegetation	0.666	5.83×10^{-11}
Rainfall	0.665	5.52×10^{-11}
Relative humidity	0.803	5.78×10^{-8}
PET	0.904	9.09×10^{-5}
Land use	0.614	6.99×10^{-12}
Runoff coefficient	0.824	2.09×10^{-7}
K	0.701	2.76×10^{-10}
Geology	0.805	6.52×10^{-8}

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