Supplementary Materials: Investigating Parameter Transferability across Models and Events for a Semiarid Mediterranean Catchment

Enrica Perra [1,*], Monica Piras [1], Roberto Deidda [1], Giuseppe Mascaro [2] and Claudio Paniconi [3]

Table S1. Routing parameters for the tRIBS model.

Parameter	Value
Discharge-velocity coefficient	0.6
Kinematic routing velocity coefficient	25
Stream to hillslope velocity coefficient	70
Nonlinear discharge coefficient	0.4
Manning channel roughness (s/m$^{1/3}$)	**0.04**
Channel width (m)	**10**
Coefficient in width-area relationship	2.3
Exponent in width-area relationship	0.5

Table S2. Routing parameters for the TOPKAPI model.

Parameter	Value
Threshold area (km^2)	0.1
Minimum channel width (m)	0.3
Maximum channel width (m)	**10**
Slope threshold for Muskingum-Cunge-Todini	0.001
Manning coefficient Strahler order 1 (s/m$^{1/3}$)	**0.04**
Maximum discharge Strahler order 1 (m^3/s)	1000
Manning coefficient Strahler order 2 (s/m$^{1/3}$)	0.035
Maximum discharge Strahler order 2 (m^3/s)	1000
Manning coefficient Strahler order 3 (s/m$^{1/3}$)	0.03
Maximum discharge Strahler order 3 (m^3/s)	1000

Table S3. Hydraulic geometry parameters for the surface routing module of the CATHY model.

Parameter	Hillslope Cells	Channel Cells
Reference drainage area A_s (m^2)	0.1×10^6	48.5×10^6
Reference discharge Q_f (m^3/s)	0.007	2
Water surface width $W(A_s,Q_f)$ (m)	0.3	**10**
Gauckler–Strickler conductance coefficient k_s ($m^{1/3}/s$)	0.5	**25** (From tRIBS)
"At a station" scaling exponents [a], [b], b' and y'	0.26, 0	0.26, 0
"Downstream" scaling exponents [a], [b], b'' and y''	0.5, 0	0.5, 0

$$\text{For[a]}W(A,Q) = W(A_s,Q_f)Q_f(A/A_s)^{(b''-b')}Q^{b'};\ \text{For[b]}k_s(A,Q) = (A_s,Q_f)Q_f(A_s)^{-y'}(A/A_s)^{(y''-y')}Q^{y'}$$