

# SID



ابزارهای پژوهش



سرویس ترجمه تخصصی



کارگاه‌های آموزشی



بلاگ مرکز اطلاعات علمی



سامانه ویراستاری STES



فیلم‌های آموزشی

سامانه ویراستاری (ویرایش متون فارسی، انگلیسی، عربی)

کارگاه‌ها و فیلم‌های آموزشی مرکز اطلاعات علمی



روش تحقیق کمی

روش تحقیق کمی



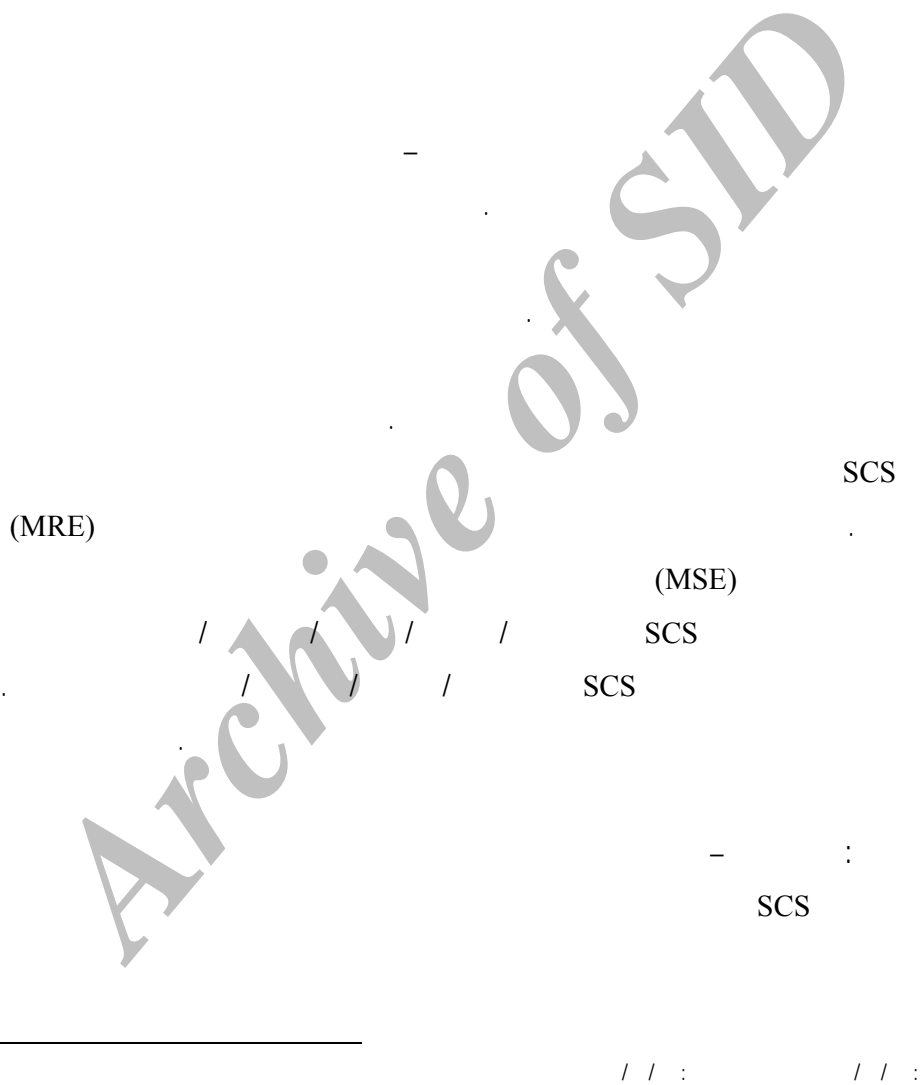
آموزش مهارت‌های کاربردی در تدوین و چاپ مقالات ISI

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آموزش نرم افزار Word برای پژوهشگران

آموزش نرم افزار Word برای پژوهشگران



Soil Conservation Service -<sup>٦</sup>  
Mean Relative Error -<sup>٧</sup>  
Mean Square Error -<sup>٨</sup>

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<sup>γ</sup> - Gupta  
<sup>ϒ</sup> - Illinois  
<sup>ε</sup> - Vermilon  
<sup>ο</sup> - Kaskaskia  
<sup>ϒ</sup> - Sagamon  
<sup>ν</sup> - Mamon

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<sup>λ</sup> - Rodriguez-Iturbe & Valders

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- <sup>1</sup> - Diaz-Grandos
  - <sup>2</sup> - Allam
  - <sup>3</sup> - Khat
  - <sup>4</sup> - Jawf
  - <sup>5</sup> - Midhnab
  - <sup>6</sup> - Sorman

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۶۷/۷۸	A	(Km <sup>2</sup> )
۴۴/۵	P	(Km)
۰/۳۷۱۹	FF	
۱/۵۱۳۴	CC	
۰/۴۳۰۱	R <sub>c</sub>	
۰/۶۸۷۹	R <sub>e</sub>	
۲/۲۷۲۰	D <sub>d</sub>	(Km/Km <sup>2</sup> )
۱۵/۸	S	( )
۱۶/۵	L	(Km)
۱۰	L <sub>Ω</sub>	(Km)
۶/۵	L <sub>ca</sub>	(Km)
۱۱۲۰	H <sub>m</sub>	(m)
۳۳۵۰	H <sub>M</sub>	(m)
۱۳/۳	SW	( )
۴/۳۴۲۶	R <sub>B</sub>	
۲/۰۳۴۸	R <sub>L</sub>	
۵/۲۲۵۳	R <sub>A</sub>	
۱۳/۵	L	(Km)
۱۶۷۲/۴۵	H	(m)

$$GIUH_{(t)} = \theta_1(o) \frac{d\phi_{16}(t)}{dt} + \theta_2(o) \frac{d\phi_{26}(t)}{dt} +$$

$$\theta_3(o) \frac{d\phi_{36}(t)}{dt} + \theta_4(o) \frac{d\phi_{46}(t)}{dt}$$

$$[GIUH_{(t)}] ( )$$

t

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$$[\theta_1(o)]$$

$$[\phi_{(t)}]$$



$$E(\gamma, \omega, \Omega) \omega = N \omega \prod_{a=2}^{\omega} \frac{N_{a-1} - 1}{2N_a - 1} \quad [E] \quad [P_{jj}]$$

$$\lambda_1 = \frac{V}{L_1} \quad \lambda_2 = \lambda_1 R_L^{-1} \quad \lambda_3 = \lambda_1 R_L^{-2} \quad \lambda_4 = \lambda_1 R_L^{-3}$$

$$\begin{pmatrix} \lambda_i \\ \lambda_i \\ \lambda_i \\ \lambda_i \end{pmatrix} \quad V \quad \bar{L}_1$$

$$\theta_i = \frac{\dots}{\dots} \quad (i) \quad i=1,2,3,4$$

$$P_{ji} = \frac{\dots}{\dots} \quad (j) \quad (i) \quad j=2,3,4$$

$$(\lambda_i^{-1})$$

		/	/		$P = / \quad , P = /$ $P = / \quad , P = /$ $P = / \quad , P = /$
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	$\Sigma$	/	-	-	

$$(\dots)$$

$$:(\dots)$$

$$q_p = 1.31 R_L^{0.43} (L_{\Omega})^{-1} V$$

$$t_p = 0.44 L_{\Omega} (R_B)^{0.55} (R_A)^{-0.55} (R_L)^{-0.38} (V)^{-1}$$

$$q_p \cdot t_p = 2$$

$$t_p (\dots)$$

$$L_{\Omega} (\dots)$$

$$R_A \quad R_b (\dots)$$

$$V \quad R_L$$

$$t_b (\dots)$$

$$(\dots)$$

$$q_p = 1.971 (\Pi)^{0.4}$$

$$t_p = 0.2587 (\Pi)^{0.4}$$

$$\Pi_j = \frac{(L_{\Omega})^{2.5}}{i_r A_{\Omega} R_L (\alpha_{\Omega})^{1.5}}$$

$$q_p \cdot t_p = 2$$

$$a = 3.29 \left( \frac{R_B}{R_A} \right)^{0.78} R_L^{0.07}$$

$$K = 0.7 \left( \frac{R_A}{R_B R_L} \right)^{0.48} L_{\Omega} (V)^{-1}$$

$$\begin{aligned} & h(t) \\ & K \quad a \quad ( ) \\ & R_B \quad R_A \quad ( ) \\ & V \quad R_L \\ & L_{\Omega} \quad ( ) \end{aligned}$$

$$Q_p = 5.475 \left( \frac{A_{\Omega} i_r t_r}{(\Pi_i)^{0.4}} \right) \left( 1 - \frac{0.4927 t_r}{(\Pi_i)^{0.4}} \right)$$

$$T_p = 0.2587 (\Pi_i)^{0.4} + 0.75 t_r$$

$$\Gamma(a+1) = a\Gamma(a)$$

$$\begin{aligned} & ( ) \\ & S \quad n \\ & K \end{aligned}$$

$$h(t) = \frac{1}{K\Gamma(n)} \left( \frac{t}{K} \right)^{n-1} (e)^{-\frac{t}{K}}$$

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K n

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$$MDRH_1 - MERH_1 = nK$$

$$MDRH_2 - MERH_2 = n(n+1)K^2 + nK(MERH_1)$$

$$= MDRH_1$$

$$= MDRH_2$$

$$= MERH_1$$

$$= MERH_2$$

$$V_{\Omega} = (\alpha_{\Omega}^{1/m_s}) (Q)^{(m_s-1)/m_s} \quad m_s = \frac{5}{3}$$

( ) K

$$V_{\Omega} = (\alpha_{\Omega})^{0.6} (A_{\Omega} i_r)^{0.4}$$

n

$$V = mQ^n$$

( ) t

$$\alpha_{\Omega} = \frac{\sqrt{S}}{n^3 \sqrt{P^2}}$$

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$$\begin{aligned} & ( ) \quad V_{\Omega} \quad Q \quad ( ) \\ & i_r \quad ( ) \quad A_{\Omega} \end{aligned}$$

$$\begin{aligned} & ( ) \quad \alpha_{\Omega} \quad ( ) \\ & S, (1/S^3 \sqrt{m}) \end{aligned}$$

$$\begin{aligned} & ( ) \quad P \quad n \\ & ( ) \end{aligned}$$

$$h(t) = \left( \frac{t}{K} \right)^{a-1} \left( \frac{e}{K\Gamma(a)} \right)^{-\frac{t}{K}}$$

m n

' - Flood routing

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$R_A$	$R_B$	$R_L$	$a$	$\Gamma(a)$
/	/	/	/	/

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	$Q_p$	$V = (0.61)^{0.6} Q^{0.4}$	$V = (0.61)^{0.6} (A.Lr)^{0.4}$	$V = 0.71Q^{0.46}$
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$IUH_{(t)}$

$t$

$A\Omega$

$P_e$

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$V = mQ^n \rightarrow V = 0.71(Q)^{0.46} \quad R^2 = 0.9746$

SCS  $Q = \alpha_\Omega A^m \rightarrow Q = 0.61(A)^{1.6} \quad R^2 = 0.9989$

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$\Delta_D = /$  ( )

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$P_e$

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$u_{(t)} = (IUH_{(t)})(P_e)(A\Omega)$

$$MRE = 1/n \sum_{i=1}^n RE_i$$

$$\%RE_{TP} = \left| \frac{Q_{Po} - Q_{Oc}}{Q_{Po}} \right| * 100$$

$$\%RE_{OP} = \left| \frac{T_{Po} - T_{Pc}}{T_{Po}} \right| * 100$$

$RE_i$   
 $\%RE_{OP}$   
 $\%RE_{TP}$   
 $Q_{Po}$   
 $T_{Po}$   
 $Q_{Pc}$   
 $T_{Pc}$   
 $[P]_{m,n}[U]_m = [Q]_m$   
 SCS

(MSE)

$$MSE = 1/n \sum_{i=1}^n SE_i$$

$$SE_i = (Q_{oi} - Q_{ci})^2$$

(MRE)  
 (MSE)  
 MRE  
 MSE  
 $SE_i$   
 $Q_{oi}$   
 $Q_{ci}$   
 $n$   
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MSE MRE  
 (MRE)

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$$= \left( \frac{MSE_2}{MSE_1} \right) * 100$$

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(MRE)

			//	//	//	//	//	//	//	//	MRE	
	<b>(GCIUH)</b>	Qp	/	/	/	/	/	/	/	/		
		%REQp	/	/	/	/	/	/	/	/	/	
		Qp										
		%RETp			/		/					/
	<b>(GCIUH)</b>	Qp	/	/	/	/	/	/	/	/	/	
		%REQp	/	/		/	/	/	/	/	/	/
		Qp										
		%RETp		/								/
		Qp	/	/	/	/	/	/	/	/	/	
		%REQp	/	/	/	/	/	/	/	/	/	/
		Qp										
		%RETp	/	/	/	/	/					/
		Qp	/	/	/	/	/	/	/	/	/	
		%RETp	/	/	/	/	/	/	/	/	/	/
		Qp										
		%RETp			/	/	/					/
	<b>SCS</b>	Qp	/	/	/	/	/	/	/	/	/	
		%RETp	/	/	/	/	/	/	/	/	/	/
		Qp										
		%RETp	/	/	/		/					/
Qp				/	/	/	/	/	/	/		
	Tp											

(MSE)

		<b>(SE<sub>i</sub>)</b>								
		//	//	//	//	//	//	//	//	MRE
<b>GCIUH</b>		/	/	/	/	/	/	/	/	/
<b>GCIUH</b>		/	/	/	/	/	/	/	/	/
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# The Efficiency of Geomorphologic and Geomorphoclimatic Instantaneous Unit Hydrograph Models in Estimating Flood Discharge

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## Abstract

Among the main objectives in hydrology are to quantitatively forecast the process of rainfall–runoff, and to determine flood discharge at the outlet of a watershed. Flood discharge can be estimated using rainfall-runoff models which explain hydrological phenomena for ungaged watersheds. If the dimensions of flood hydrograph (which is the result of the watershed response to rainfall) are known, then the importance of models which are based on geomorphology of a basin will be very clear. The purpose of this study is to investigate the consistency, accuracy and reliability of geomorphological and geomorphoclimatic models in estimating the shape and discharge of flood resulting from a rainfall with certain intensity and duration. The results of these two models were compared with Nash, Rosso and SCS models. The results showed that the efficiency of geomorphologic model ratio to geomorphoclimatic, Nash, Rosso and SCS are 106.56, 171.12, 106.79 and 112.64 percent respectively, and that geomorphoclimatic model ratio to Nash, Rosso and SCS is 106.57, 100.21 and 105.69 percent, respectively. Therefore, the result of geomorphologic model compared to other models (based on this study) is the most efficient model to estimate flood discharge.

**Keywords:** Rainfall–runoff model, Unit hydrograph of geomorphologic and geomorphoclimatic model, Nash, Rosso and SCS models

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