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## **Quantitative Hydrogeomorphology Study for Watershed of Wadi Al-Meleh, North-Iraq**

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### **ABSTRACT**

The hydrogeomorphology of Wadi Al-Meleh basin studied quantitatively using remote sensing data .The studied area is located at northern part of Iraq.

The stages of the study included a preparation of geomorphological maps, followed by morphometric analysis of twenty-two variables.

These variables represent climatical, hydrogeological and geomorphological factors for five major sub basins that form Wadi Al-Meleh.

The statistical analysis of correlation and regression of these variables applied where amount of runoff from these basins as dependent variable and the other variables as independent.

Results shown models, which can be used for the prediction of the rate of flow of this basin from other selected variables.

.(Woo and Young, 2003)

(Philip et al., 1992)

.(Bothale et al., 2003)

$(36^{\circ}45'35'' - 36^{\circ}27'35'')$   $) 43^{\circ}09'35'' - 42^{\circ}53'36'' ($

.(1)

(5)

(1)

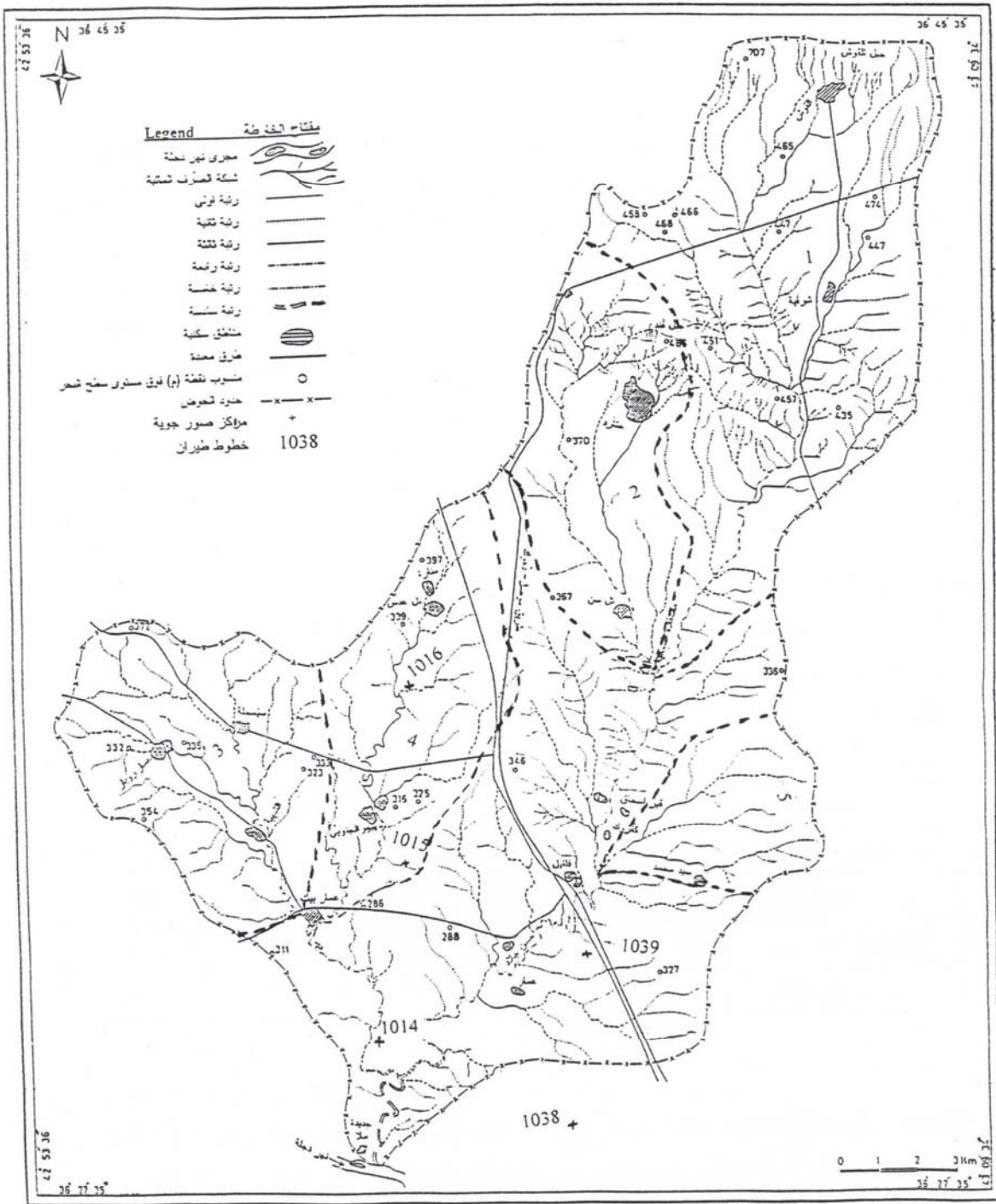
(2 1)

(1:50000)

:1

1014/1015/1016	4	1
1038/1039	3	2

.....



:1

(2003)

(1:50000)

(2)

.(GIS,2004)

:2

1992	j-38-T-03	50000:1	-
1992	j-38-T-04	50000:1	-
1992	j-38-T-05	50000:1	-
1992	j-38-T-06	50000:1	-

(1)

(7)

(22)

(S trahler, 1954)

(3)

:3

NDD		RNX	
C		LRNX	
L		BRX	
ACR		MBRX	
CCR		LR	
BFF		A	
P		RR	
I		TLV	
W		TV	
S		DR	
R		LDD	

.....

.(Chapman and Monroe, 1993)

( R )

.(Naiman et al., 1983)

$$r = \frac{n \sum y \times - (\sum x)(\sum y)}{\sqrt{n \sum x^2 - (\sum x)^2} \sqrt{n \sum y^2 - (\sum y)^2}}$$

:

=x

=y

=n

=r

(3)

( r<-0.8    r>0.8)

(I)

(RR)

.(Mosley, 1979)

(BFF)

(LR)

(3)

:(1982 )

=

:3

(r)	
0.918	A R
0.842	C R
0.913	L R
-.860	LR R
-.852	BFF R
0.918	I R
0.802	RR R

(Wilson, 1983)

:(Chorley, 1975)

=

(2003 )

$$Y = F (X)$$

:(Anton , et al., 2002)

.....

$$Y = a + b_1 X_1 + b_2 X_2 + \dots + b_n x_n$$

$$= Y$$

$$= X_1, X_2, X_n$$

$$= a, b_1, b_2, b_n$$

.(4 )

:4

( <sup>3</sup> )				( )	( )	( )	
19400	0.42	0.14	18.33	18.26	45.0	47.25	1
10538	0.57	0.26	7.7	12	23.5	37.75	2
11980	0.73	0.42	6.77	9.15	26	36.0	3
16047	0.52	0.21	5.72	12.75	24	35.5	4
3224	0.76	0.45	2.02	6.25	16	17.87	5

:

$$10^{-3} + 5 \times R = -6.20 \cdot 287 \cdot 10^{-4} \times A \tag{1}$$

$$R = -5.80 \times 10^{-3} + 4 \cdot 325 \cdot 10^{-4} \times A + 1.097 \cdot 10^{-4} \times C \tag{2}$$

:

$$R = -5.23 \cdot 10^{-3} \times + 2.996 \cdot 10^{-4} A \times - 12 \cdot 10^{-5} \times C + 6.730 \cdot 10^{-4} L : \times (3)$$

:(4 )

$$R = -2.27 \times 10^{-2} + 3.043 \times 10^{-4} A + 1.152 \times 10^{-3} C + 1.106 \times 10^{-3} RR - 2.42 \times 10^{-3} L$$

:

: (5)

$$R = 0.426 + 1.729 \times 10^{-3} A - 4.75 \times 10^{-3} RR + 1.434 BFF - 1.434 LR$$

(5)

:5

$5.6221 \times 10^{-3}$	1	1
$5.6539 \times 10^{-3}$	2	2
$5.7468 \times 10^{-3}$	3	3
$6.1240 \times 10^{-3}$	4	4
$7.4350 \times 10^{-3}$	4	5

.(6 )

.(5)

:6

	)	)	
	(	(	
$1.53 \times 10^{-15}$	$1.940 \times 10^{-2}$	$0.94 \times 10^{-2}$	1
$-1.3 \times 10^{-14}$	$1.054 \times 10^{-2}$	$1.054 \times 10^{-2}$	2
$4.22 \times 10^{-15}$	$1.198 \times 10^{-2}$	$1.198 \times 10^{-2}$	3
$7.73 \times 10^{-15}$	$1.605 \times 10^{-2}$	$1.605 \times 10^{-2}$	4
$-3.9 \times 10^{-16}$	$3.224 \times 10^{-3}$	$3.224 \times 10^{-3}$	5

( 22)



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.2003

.1982

.43

Anton, H., Bivens, I. and Davis, S., 2002. Calculus. Seventh edition, John Wiley and Sons, Inc. New York, 1166p.

Bothale, R., Bothale, V. and Sharma, JR., 2003. Delineation of Eco watersheds by in integration of remote sensing and GIS techniques for management of water and land resources. commission IV, working Group IV , pp1-6.

- Chapman, M.J. and Monroe, C.B., 1993. An introduction of statistical problem solving in geography, McGraw Hill B99k Com., 305p.
- Chorley, R., J., 1975. Introduction to fluvial processes. Methuen Coltd, 218p .
- GIS.,2004. [www.maharashtra.gov.in/english/gis/gis/-ch5-tab.php](http://www.maharashtra.gov.in/english/gis/gis/-ch5-tab.php) .
- Mosley, M.P., 1979. Prediction of hydrologic variables from channel. Morphology, south Island rivers. Journal of hydrology, Vol. 18, No.2, pp.109–120.
- Naiman, A., Rosenfeld, R. and Zirkel, A., 1983. Understanding statistics. McGraw-Hill Book Com., 355p.
- Philip, G., Eweida, E and Al-Gamal, S., 1992. Quantitative Geomorphology of some watersheds in wadi QENA in relation to basin hydrogeology. Geology of Arab world, Cairo university. Pp.159-164.
- Strahler, A.N., 1954. Quantitative analysis of watershed geomorphology. Trans. Amer. Geophys. Union, vol. 38, pp.912-920.
- Wilson, E.M., 1983. Engineering hydrology, Third edition, Macm. Llan publishers LTD. 309 p.
- Woo, Ming-Ko. and Young, Kathy, L., 2003. Hydrogeomorphology of patchy wetlands in the high Arctic, polar desert environment. Wetland, Vol.23, No.2.