Quantifying selected morphometric characteristics for Jordanian side of the Jordan river basin

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The Jordanian part of the Jordan river basin is almost 3679.692 km^2. The river flows within the Jordan Rift Valley, a structurally complicated region which is cover almost by Upper Cretaceous chalky marls, bituminous limestone and nodular limestone, while the Quaternary sediments are mainly fluvitile deposits and Lisan marls. Other deposits are Tertiary and Jurassic. The present study includes the selected drainage basin characteristics, part of these characteristics refer as primary characteristics measurements and the others are found and concluded from the primary drainage basin characteristics and name as calculated basin characteristics. The drainage pattern is mainly dendritic but in some part is shows parallel pattern but not very mature. To simplify the study more and based on the detailed analysis of the drainage selected characteristics of the study area using various techniques and both topographic and geologic maps, the Jordan river basin is furtherly divided into 10 sub basin.

Keywords: Jordan side of Jordan River Basin, Drainage Basin Morphology (Primary Basin Characteristics measurements, Calculated Basin Characteristics), Jordan.

Table (1): Combined (Primary + Calculated) Basin Characteristics, Based on Toposheets 1:50,000 and Equations.

Code	Name of Catchment Area	TDA (km^2) 1	NCDA (km^2) 2	BL (km^2) 3	BP (km^2) Total 4	BS (m) area 5	BR (m) 6	CDA (km^2) 7	BW (km^2)
A	Wadi Arab	413.905	302.02	239.3	27.8	34.4	636	◇111.	0.467
B	Wadi Zeglab	130.039	95.23	95	°15.7	°25	966	32.81	0.37
C	Wadi Jurum	°84.62	°50.28	°61.6	22.4	36.36	400	34.34	◇1.7
D	Wadi Yabis	208.02	150.930	122.1	25.2	46.29	400	57.09	0.47
E	Wadi Kufanga	214.564	189.953	120.9	19.3	41.66	°123	°26.61	0.22
F	Wadi Rajib	405.6	374.23	118.5	29.5	37.33	1285	31.37	0.27
G	Wadi Siel Ez-zarqa	476.293	394.83	258.1	29	28.56	1277	81.46	0.32
H	Wadi el Mal-laha	554.251	485.1	◇385	◇35	◇48.25	◇1435	69.25	°0.18
I	Wadi Nimrin	◇601.9	◇520.3	282.5	30	32.75	1032	81.6	0.29
J	Wadi el Tarfa	590.5	507.40	277.9	27.9	40.33	1050	75.52	0.27

Continue to Table (1), Legend of Combined (Primary + Calculated) Basin Characteristics ˚ Lowest value . ◇ Highest value.

Primary drainage Basin Characteristics

TDA Total drainage Area

NCDA Non-contributing drainage area

BL Basin length

Code	Name of Catchment area	ER 10	RB 11	CR 12	RR *m/km* 13	MCL *(km)* 14	TSL *(km)* 15	MCS *(m/km)* 16
A	Wadi Arab	0.0499	402.25	°0.742	22.88	33.4	157.8	52.78
B	Wadi Zeglab	0.071	201.55	0.751	◇61.53	25.1	°15.9	31.87
C	Wadi Jurum	◇0.193	°27.00	1.078	17.86	°15.3	61.6	26.14
D	Wadi Yabis	0.070	203.92	0.941	15.87	23.7	122.1	39.38
E	Wadi Kufanga	0.048	431.42	1.055	°6.37	24.8	120.9	64.52
F	Wadi Rajib	0.054	344.52	◇1.486	43.53	27.35	118.5	°16.09
G	Wadi Siel Ezzarqa	0.0398	633.15	0.906	44.35	◇43.7	258.1	26.64
H	Wadi el Mallaha	°0.024	◇1681.	1.186	41	23.5	◇285.7	◇68.48
I	Wadi Nimrin	0.036	764.69	0.937	34.4	31.5	282.5	25.82
J	Wadi el Tarfa	0.031	807.96	1.38	37.63	26.2	277.9	48.35

Code	Name of Catchment Area	SD km^2 18	CCM km^2/km 19	MCSP 20	SR 21	RN m/km 22	FOS 23
A	Wadi Arab	1.411	0.71	4.59	1.53	897.4	57
B	Wadi Zeglab	°0.457	◇2.188	4.45	1.27	°441.46	25
C	Wadi Jurum	1.793	0.558	°2.99	0.72	717.2	23
D	Wadi Yabis	2.139	0.468	3.78	0.58	855.6	21
E	Wadi Kufanga	4.543	0.220	3.09	◇1.55	558.8	°20
F	Wadi Rajib	3.778	0.265	6.85	°0.43	4850.95	42
G	Wadi Siel Ezzarqa	3.168	0.316	◇8.47	0.93	4045.53	73
H	Wadi el Mallaha	◇5.569	°0.179	2.84	1.42	◇7991.51	◇159
I	Wadi Nimrin	3.462	0.289	6.20	0.79	3572.8	60
J	Wadi el Tarfa	3.679	0.271	3.77	1.2	3862.95	72

BP Basin perimeter

BS Average basin slope

BR Basin relief

MCL Main channel length

TSL Total stream length

MCS Main channel slope

FOS No. of first order stream

Calculated Basin Characteristics

CDA Contributing drainage area

BW Effective basin width

SF Slope Factor

ER Elongation ratio

RB Rotundity of basin

CR Compactness ratio

RR Relative Relief

MCSR Main Channel sinuosity ratio

SD Stream density

CCM Constants of channel maintenance

MSCP Main channel slope proportion

SR Slope ratio

RN Raggedness number

DF Drainage frequency

A Study of the Heavy Metals Distribution and Fractionation in Sediments of the Yarmouk River - Jordan

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Abstract:

Heavy metals distribution in core sediments for different grain size fraction clay fraction ($<2\mu$m), silt fraction (2-63μm), and non - dtrial fraction ($>63\mu$m) have been discussed. Pb, Cd, Zn, Co, and Ni have a higher concentration in the clay fraction ($<2\mu$m). Pb and Cd have higher concentration for silt fraction (2-63μm) and for the Non-detrial fraction ($>63\mu$m) only Cd, shows higher concentration. The correlation matrix of heavy metals in the clay fraction suggests the importance of Cd, Cr, and Mn in their accumulation Cr, and Mn for silt fraction and Co, for the Non-detrial fraction. The enrichment factor is $\leq$ 1for all of the metals, specially gor the metals Pb, and Cd. The non-detrial fraction shows almost reseanable concentration for all the elements which shows concentration within the permissable limits except for Cd, the range is between 0.3-1 ppm.

Key word: Heavy metals, River sediments, Yarmouk river, Jordan.