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Extended Abstract

Relationship between Flow Discharge and Organic Matter in Suspended Sediment in Koujor Educational Forest Watershed

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Introduction

Organic matter is a vital element in consolidating the soil against erosion. However, mechanism on its movement and controlling factors has not yet been properly documented. Most parts of the soil organic matter is dissolved and consequently transported by water (Brent et al., 2007). The relationship between the flow discharge and the loss of organic matter has just recently been taken into account (Towsend-Small et al., 2008). Therefore more attempts are required to fully understand and formulate the mechanism of the organic matter loss in different watersheds.

Objective

The present research is focused on studying the relationship between the flow discharge and the organic matter carried off the Koujor Forest Watershed by suspended sediments. The Watershed is located in the north of Iran. The relationship is studied on daily and storm bases considering sand mining activities.

Methodology

The measurement of the flow discharge, the suspended sediments and the organic matter was made through applying current meters, sampling using the integration method, and the loss on ignition method, respectively. The relationship between the organic matter and the flow discharge was then assessed by applying the bivariate regression method supported by different statistical criteria. The visual assessment was also made for studying the trends of the variables under study.

Results and Discussion

Some six months of data was collected in order to investigate the daily and storm wise variations of the flow discharge and the organic matter with respect to the human interferes through sand mining activities. The collected data and the best performing models have been respectively summarized in Tables 1 and 2.

As seen in Table 2, the significant relationship could be established between the two study variables; the organic matter and the flow discharge. It is also understood from the results that the reliability and the type of relations varied from period to period and were seriously controlled by the governing situations. These findings agreed with those reported by Brent et al. (2007) and Towsend-Small et al. (2008).

Conclusion

The controlling effects of the flow discharge and the human interference on the organic matter loss was proved during the present study conducted in Koujor Forest Watershed, northern Iran.

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It is concluded that any human interference can affect the organic matter washouts. Despite the field evidence, more extensive studies are advised in the same watershed and other parts of the country to draw the final conclusion on interaction between the flow discharge and the suspended sediment and the organic matter transportation.

Keywords: Koujor Watershed, Discharge, Bivariate Regression, Organic Matter

Table 1- Descriptive statistics for the study variables in Koujor Educational Forest Watershed, Iran

Descriptive Statistics / Variable	Number of Data	Minimum	Maximum	Mean	Standard Deviation	Skewness		Kurtosis	
						Statistics	Standard Error	Statistics	Standard Error
Discharge	189	0.600	1.620	0.662	0.446	0.177	0.534	0.352	-0.625
Organic Matter	192	0.030	0.660	0.125	0.084	3.402	0.175	0.349	15.083

Table 2- Best performing bivariate regression models between the study variables in different periods in Koujor Educational Forest Watershed, Iran

Study Period	Model	Correlation Coefficient	P-Value	Std. Error	Relative Error (%)		Root Mean Square of Error	Coeff. of Efficiency	Akaike's Information Criterion
					Estimation	Validation			
Entire Period	$Y = 0.0188Ln(X) + 0.1372$	0.178	0.046	0.88	39.42	41.30	0.08	0.32	147.95
Without Sand Mining	$Y = 0.0342X + 0.0584$	0.424	0.000	0.03	24.21	31.26	0.03	0.18	-412.31
	$Y = 0.085e^{0.2722X}$	0.386	0.000	0.30	22.77	28.99	0.03	0.14	46.75
Before Sand Mining	Non-Significant Relationship								
During Sand Mining	Non-Significant Relationship								
After Sand mining	$Y = 0.0345X + 0.0904$	0.531	0.000	0.03	18.44	13.53	0.03	0.26	-349.61
	$Y = 0.1243X^{0.1588}$	0.584	0.000	0.21	17.68	14.36	0.03	0.31	-8.56
	$Y = 0.0902e^{0.2856X}$	0.544	0.000	0.23	17.75	13.53	0.03	0.26	-4.33

Note: Y is the organic matter weight (g) and X is the flow discharge (m^3/s)

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