Deanship of Graduate Studies

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Assessment of Sediment Transport along Wadi Al-Gar

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Assessment of Sediment Transport along Wadi Al-Gar

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Dedication

I dedicate this thesis to my family for their endless support

To who pushed me to science, to my first supporter in life and with them increased pride (my father and my husband).

To who weaves my happiness with strings from her merciful heart (my mother)

Declaration

I certify that this thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged and that this thesis or any part of the same has not been submitted for a higher degree to any other University or institution.

Name: Salam Talal Abdel Al Fatah Dodeen

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Acknowledgment:

As we take our last steps in this stage of education, I must express my thanks and gratitude to those who encouraged me and supported me in completing this thesis.

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تقييم انتقال الرواسب على طول واد الغار

اعداد: سلام طلال عبد الفتاح دودين

اشراف: د. جواد شقير

الملخص:

يعتبر تآكل التربة مشكلة عالمية بسبب تداعياته البيئية بما في ذلك الترسبات والتلوث في العديد من مناطق العالم. يمكن تقسيم آثار تآكل التربة إلى فئتين في الموقع وخارج الموقع . تعتبر التأثيرات في الموقع مهمة للحقل الزراعي وتسبب في انهيار بنية التربة وفقدان التربة الخصبة وفقدان الشتلات وتقليل عمق التربة. تشمل الآثار خارج الموقع الترسبات في اتجاه مجرى النهر ،وتلوث إمدادات مياه الشرب. تتضمن عملية تآكل التربة الناجم عن الماء فصل جزيئات التربة ثم نقلها عن طريق التدفق البري. هناك العديد من العوامل التي تؤثر على كمية جريان المياه السطحية مثل كثافة الأمطار وتدرج الميل وطول المنحدر. أجريت الدراسة على وادي الجار وهو أحد الروافد الكبيرة في الجانب الغربي من حوض البحر الميت. تستند هذه الدراسة البحثية إلى فهم انتقال الرواسب وترسبها في وادي الجار في اتجاه مجرى البحر فيما يتعلق بمصدر الرواسب . وتقديرات حجم الجريان السطحي لمنطقة الدراسة بواسطة التحكم الهندسي الهيدرولوجي - نظام الطراز الهيدرولوجي. أظهرت النتائج أن إجمالي كمية الأمطار في منطقة الدراسة لموسم الأمطار 2018/2017 كان 37 مليون متر مكعب ، 30 متر مكعب الجريان السطحي وكانت الخسارة الإجمالية 7 مليون متر مكعب. الجريان السطحي لوادي المصيده هو 21568300 متر مكعب و 8480100 متر مكعب في وادي المعزة.

تشير نسبة Na / Cl الأيونية لعينات وادي الجار في اعلى الواد واسفل الواد عام 2017 أقل من 0.7 إلى فقدان الصوديوم خلال هطول أملاح التبخر. وتتباين النسب في عينات اسفل الواد لعام 2018 ، حيث تجاوزت الواحد في بعض العينات . وتقع معظم العينات لنسبة المغنيسيوم / الكالسيوم > 0.9 المرتبطة بالطبقات الجوفية بالدولوميت وعادة ما تكون مصحوبة بمصادر إضافية لأيونات المغنيسيوم.

Abstract:

Soil erosion considered as a global problem because of its environmental consequences including sedimentation and pollution in many areas of the world. Effects of soil erosion may be divided into two categories on – site and out- site (off-site). On-site effects are important for agricultural field and cause breakdown of soil structure, loss of fertile soil, loss of seedling and reduction of soil depth. Off-site effects include sedimentation downstream, the salutation of a reservoir, and contamination of drinking water supplies. The process of water-induced soil erosion includes the detachment of soil particles and then transports it by overland flow. Many factors affect the amount of surface water runoff such as rainfall intensity, slope gradient, and slop length. The study was conducted on the Wadi Al-Gar is one of the large tributaries in the western side of the Dead Sea basin. This research study is based on understand the sediment transport and deposition at Wadi Al-Gar downstream in correlation to sediment source upstream. Study the slope variability and it's the influence of transmission of sediment along the Wadi Al-Gar. Study soil texture changes at upstream and downstream of the wadi to correlate its source of deposition. and Study the differences in the sediment profiles. and Estimations of the surface runoff volume for the study area by Hydrologic Engineering Control – Hydrologic Model System. Results showed the total precipitation volume on the study area for the rainy season 2017/2018 was 37 MCM, 30 MCM runoff and the total loss was 7 MCM. The runoff of Wadi Al-Mesyada is 21568300 m3 and 8480100 m3 in Wadi Al-Maaza.

Na/Cl ionic ratio of upstream and downstream 2017 samples of Wadi Al-Gar less than 0.7 indicate loss of Na through precipitation of evaporitce salts. and variability ratios in downstream samples 2018, Where it exceeded one in some samples there are characteristic of groundwater flowing through crystalline and are dependent on the nature of the feldspars and most of samples fail in the Mg/Ca ratio rang > 0.9 associated with dolomite or dolomitic aquifers and usually accompanied with additional sources of Mg ions. Aragonite precipitation also is favored, whereas the Mg/Ca ratio rise due to dolomite dissolution.

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Abbreviations

%	Percentage
Ca^{2}	Calcium
CEC	Cation Exchange Capacity
Cl^{-}	Chloride
EC	Electrical Conductivity
EDTA	Ethylenediaminetetraacetic Acid
HCO_3	Bicarbonate
HEC-HMS	Hydrologic Engineering Center - Hydrologic Modeling System
K^{+}	Potassium
MCM	Million Cubic Meter
Meq/l	Milliequivalents per litre
Mg/l	Milligram/liter
Mg^{2+}	Magnesium
mm	Millimeter
Na^{+}	Sodium
OM	Organic Matter
PO_4^{3-}	Phosphate
SAR	Sodium Adsorption Ratio
SO^{2-}	Sulfate
SOP	Standard operating procedure
TNb	Total Nitrogen bound

TOC	Total Organic Carbon
μS/cm	Microsiemens/Centimetre