Geophysical Research Abstracts
Vol. 14, EGU2012-14016, 2012
EGU General Assembly 2012

Exploring relationships between soil spectral and chemical properties along a climatic gradient in the Judean Desert

M.S Shoshany and T.J Jarmer
Faculty of Civil & Environmental Engineering, Technion, Israel, shoshanymaxim@gmail.com

Regions of rainfall gradients at desert margins are areas where eco-geomorphic changes and desertification in response to global warming and grazing are most intensive. Assessment and understanding consequences of global warming and human disturbance of these vulnerable ecosystems requires detailed information regarding spatial variation of soil and vegetation properties and their dependence on rainfall. Such detailed information is still of limited availability. This study aimed to rectify this shortcoming by analyzing data on chemical and spectral properties of soil samples collected along the Judean Desert climatic gradient. Six clusters of typical chemical soil properties were identified. Dependencies of the clusters' chemical properties of total iron, organic and inorganic carbon on annual rainfall amounts were found to be significant. Two spectral band ratios for Landsat TM bands were introduced to assess soil conditions and found to be significantly correlated with these chemical properties. While relationships between chemical properties and rainfall were relatively weak, spectral ratios were found higher correlated with average rainfall suggesting that spectral data may represent a broader range of chemical, physical and biological site properties. Examining the three-way relationships between soil chemical properties, their spectral reflectance characteristics and rainfall, facilitates better understanding of the generalized trends along the climatic gradient and more specifically modes of transition from semi-arid to arid zones.