

The role of vegetation in Nebkhas formation and evolution in Anar desert

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Extended Abstracts

Introduction

Wind erosion is considered as the most important factor in degradation of Iran desert areas in Quaternary period and at the present time, 30 million hectares of surfaces are affected by the wind (Ahmadi and Feiznia, 1999: 429). Plains vast space, inadequacy or lack of vegetation, abundance of fine particles, looseness or detachedness of particles are some of the factors that have provided necessities for the wind to form interior plains (Alaei Taleghani, 2005: 295). Vegetation limits transportation of sediments by reducing wind speed. This action causes accumulation of wind sediments around vegetation and formation of Nebkha landscapes in result. In other words, Nebkha is the result of interaction between wind erosion and vegetation. Khalaf (1995: 275) argues that morphology of Nebkha is controlled by growth patterns of plant species to a large extent. Stallins (2006, 4) states that understanding of ecogeomorphological landscapes takes place by considering ecology and geomorphology processes and feedback between them. Therefore, the type of plant species forming the Nebkha and the connection among characteristics of plant ecology and Nebkha cones morphometry are the most important topics in Nebkha sediments morphology and systematic analyzes. This study tries to rely on quantitative characteristics in geomorphology. Also, relationships among factors of Nebkhas landscape will determine yielding Nebkhas. Since several factors are involved in Nebkha morphology, this study tries to investigate the importance of vegetation in the Nebkha morphology without changing some of the other factors. In other words, by selecting a limited area of study, climatic factors (wind, rain and ...), sedimentary factors (size, grading and ...) and time is assumed constant. Therefore, changes and communications made by performances of plant species forming Nebkha have investigated. The main purpose of the research is to investigate relationship between vegetation morphology and Nebkha morphometry characteristics based on statistical analyzes.

Materials and Methods

First, by using aerial region images, then by using field study, the study area and then the Nebkhas territory were determined. Sampling took place along transects that cover the entire area then the morphometric characteristics of Nebkha were measured along each transect. Sample size determined by Nebkhas locations along the deployed transects locations. Totally, 60 species of *Capparis Spinosa* were evaluated. In order to study characteristics of Nebkha, the morphological factors like attributes, height, slope (North, South, East and West mean slopes) and base diameter were measured and in order to evaluate the vegetation forming Nebkha, plant morphology factors such as mean length of the branches and number of branches were measured. The technique for measuring the relationship between plant traits and morphological traits has been stabilized by simple and multiple regression analysis using SPSS software. Regression equations such as linear, quadratic and cubic are tested for optimizing the results.

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Results and Discussion

Pearson linear correlation analysis results between Nebkha morphometric characteristics and plant morphology characteristics suggest that the most correlation is between the branch numbers and Nebkhas height, to the extent level of 0.94 degree. Also, the correlation between the mean length of branches and Nebkha height is to the extent level of 88.0 degree. And also, the regression analysis results of comparison between Nebkha morphometric characteristics and plant morphology characteristics suggest that the largest relationship for linear, quadratic and cubic equations with probable error level of less than 0.01 is between the mean length of branches and Nebkha height to the extent level of 77 percent.

Results of multiple regression analysis have used to investigate the amount of all plant variables effect on the morphometric Nebkhas. Model 1 justifies multiple correlation analysis, between components of Nebkha height and the mean length of branches and the branch numbers with the mean coefficient of 0.89. Model 2 has designed for the relationship between two variables the mean length of branches and the branch numbers with Nebkha base diameter and the model coefficient is 0.743. Model 3 stated the relationship between the mean length of branches and the branch numbers with the mean slope cone. In this model, the regression coefficient is equal to 0.722.

Conclusions

In geomorphological studies, figures of the earth are reflections of surface processes and their systematic structure. Investigating structure and function of these systems would cause access to their past and also ability to draw their future evolutionary path. Research results show that a strong correlation between the components of Nebkha morphometry and plant morphology can be seen in the study area. Results indicate that the numbers of Capparis Spinosa species branches have the greatest impact on sedimentation of wind deposits.

Keywords: Anar desert, modeling, morphology, morphometry, Nebkha.