

Analysis of Ripple Mark Forms and Nebkha Barriers in Sirjan Playa

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Extended Abstract

Introduction

Study about quality and characteristics of wind erosion forms and also relationship between these forms with other environmental landforms is an important criterion in the assessment of natural resources. When wind blows on sandy beds, sand grains hop and roll into downwind shaping sand ripples. Morphometry is quantitative analysis of geomorphic characteristics of a region of landforms (Bayati Khatibi, 2010, 2). Study of surface sand grain size shows that larger ripples wavelength are created in the sands and coarse wavelength ripples in finer grain sands (Chorley et al 1985: 434). Ripples are common forms of roughness in desert areas. Ripples are created when the wind blows on the sand beds and sands move in the wind direction. In the fact ripples are gathering sand flows into waves on different landforms surface. Ripple marks are also the smallest and the most common forms of deserts, which are perpendicular to the direction of the storm winds and their cross-section is asymmetric (Mehrshahy and Nekounam, 2010, 8). Ripple scale is proportional to the wind speed (Tian-De Miao et al, 2001, 1). The wind velocity decrease in leeward of nebkha and this decrease in the wind velocity affect morphometric characteristics of current ripple marks in leeward of nebkha (Danin, 1996, 7). This research tries to survey effects of nebkha morphometric characteristics on morphometric properties of ripple marks in Sirjan salt desert.

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The study area

Sirjan salt desert is in the south west of Sirjan City (located geographical coordinates $28^{\circ} 46'$ and $29^{\circ} 59'$ north latitude and $54^{\circ} 57'$ and $56^{\circ} 27'$ east longitude). Sirjan salt desert is one of the most important deserts in Kerman. This wilderness area with 1,625 square kilometers of the basin is largest basin in deserts of Isfahan. The basin has a triangular shape of fovea in the southwestern city of Sirjan. The study area is elongated from south western Sirjan to west of the city in green belt (Klinsli D, 2002, 220).

Wind characteristics in the study area

Dominant wind in the area during the year is mainly from south west and its average occurrence is two times per year and its average speed is 5 meters per second. The weakest wind is east wind with occurrence of 8.8 times, that its average speeds is 3.8 meters per second. Another important wind flow in the study area is tropical winds

Methodology

The study was designed by randomly tested for 60 samples of five species of nebkhas in Sirjan salt desert. At first, morphometry characterization of the five species of nebkhas including *tamarixmascatensis*, *Seidlitzia Florida* and *Reaumeriaturcestanica*, plant height, plant canopy cover, nebkha height, nebkha diameter, height barrier (total nebkha height and plant height) and also height and wave length of ripple marks and were measured. Then, regression analysis used to examine the correlation between morphometric parameters of nebkha and ripple marks.

Results and Discussion

The results about different nebkhas showed that barrier height has the most impact in length parameter of the area affected and plant canopy cover diameter has the most impact on a wide parameter of the area. There is also a strong correlation between the morphometric parameters of ripple marks and distance of barrier. These results indicate that the effect of distance of barrier on the ripple wavelength is stronger than the effect of that on the ripple wave height parameter.

Conclusion

Ripple wavelength and height is strongly related to the distance barrier. As the distance is slight and near to the barrier, the wind speed has dropped, and the height and the ripple wavelength is increased. But with increase in distance of barrier, the height and the ripple wavelength decreases. Moreover, nebkhas affect the ripples in a domain. The domain is more dependants upon the plant canopy cover diameter and height of barrier. Almost length of the area is triple than height barrier and its width depends on canopy cover diameter and further more on nebkha diameter.

Keywords: *Morphometry, Nebkha, Ripple Mark, Sirjan Desert, Wave Height, Wave Length.*