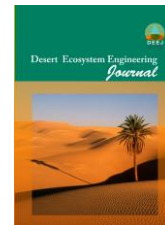




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Identification of Dust Source Areas and its Characteristics in Eastern Iran

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Extended Abstract

Introduction: Dust storms are natural hazards that effects on weather conditions, human health and ecosystem. Atmospheric processes are directly affected by the absorption and diffusion of radiation by dust, and dust in the cloud acts as a nucleus of congestion. The main dust regions in the world are arid topographies that have soil that is vulnerable to erosion and poor vegetation, easily eroded by wind. Due to its presence in the dry and semiarid belt of the world, Iran is exposed to multiple local and transboundary dust and dust systems. Iran and especially eastern Iran are exposed to severe environmental challenges such as storm dust. Land use change and soil erosion-sensitive soils are one of the most important factors affecting the creation of dust source areas.

Material and Methods: The purpose of this study is to identify and determine the characteristics of dust source areas in eastern Iran. The study area is in the eastern part of Iran with an area of about 3711854.1704 km². The altitude in the study area is 107 to 3527 meters above sea level. This area includes 7 provinces including North and South Khorasan, Khorasan Razavi, Semnan, Kerman, Yazd, Sistan and Baluchestan. In this research, MODIS data was used to identify the dust source area. To identify dust source area from MODIS satellite imagery for the period of 2004 to 2017 and using dust detection indicators including BTD_{3132} , BTD_{2931} , NDDI and D, were used. After determining the areas for dust source and preparing the distribution map of these points in the study area, the surface properties of dust source areas were investigated. In this study, landslide, geology, slope and normalized vegetation index (NDVI), which are effective in creating dust source area, were studied. Finally, to determine the characteristics of dust source areas, the mapping of the distribution map of dust source areas with land use maps, slope, NDVI and lithology in ArcGIS software environment was performed. After covering the layers, land use characteristics, slope, NDVI and lithology of dust source areas were extracted.

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Results: Using the four parameters and the method of false color combination and applying it to the MODIS image, the dust mass was detected on the images and then, by their visual interpretation, the starting point of the dust was determined. 147 dust points were identified in the study area. The results show that the highest dust points in land use, rangeland and agricultural land with 54, 45 and 18 points, which is about 36.73%, 30.61% and 24.24% The total points of the study area are located. The distribution results show the dust points on different slopes. As you can see, most of the dust points are two slopes of 0-2 and 2-5 with 104 and 27 points, with 90% of the source points in these two slopes. The results indicate that clay-loamy soils with the 61 point of dust, accounting for about 41.5% of the total points, have the highest point. This soil contains 38.084 percent of the total area of the region. The Vegetation Indicator Map (NDVI) in the region indicates that most of the area has no vegetation or vegetation, and only a very small part of the area (less than 1%) has a vegetation that indicates the land Far East of Iran. The results also indicate that all dust points are located on the 0 to -0.394673 class, and the rest of the classes have no point of view. The results showed that the highest and lowest dust points were in the geological units of chemical-sedimentary formations and intrusive rocks with a number of 43 and 0 source of dust.

Discussion and Conclusions: The results show that most of the dust source areas in land use and rangeland uses 54 and 45 points, which is about 37% and 31% of the total source points of the study area. The results also showed that among different soils, the highest point of dust with clay-loamy soil texture with 61 points was observed (about 41.5% of total source points). Also, most dust source area are visible in areas with low slope and no vegetation cover. From the perspective of geology, the highest and lowest dust points in the region are located in the geological units of the sedimentary chemical formations and intrusive rocks of the player.

Keywords: Dust source, Land Use, Lithology, Soil, East of Iran.