The phenomenon of dust, the most important environmental crisis in the dry lands

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Abstract
Semnan and Kashan province, including areas prone of the country are to dust storm occurrence in the North East and center. In this paper, in order to detect hurricane winds and corrosive agents, the two anemometers, Semnan and Kashan station was analyzed during a period of 44 years (1967-2010). The results of this study indicate that during the period under study, the occurrence of days with dust storms and Kashan province had decreased. The most common is occurrence of dust storms in spring (April-May). Using a soft ware WRPlot, annual wind Semnan and Kashan was drawn up. The analysis results depicted those winds up prevailing wind direction in Semnan, north and north east of Kashan. Also, using the soft ware, flower annual hurricane season in both provinces were drawn. The results of calculation and drawing Storm, which is based on wind erosion threshold velocity standard (6.5 meters per second), were prepared, Shows that in most of the northern Semnan and Kashan wind storms causing further blow to the North East. According to the annual flood flowers determined frequency, wind speed is less than the threshold velocity of wind erosion are, is equal to 73 percent. This indicates that the winds of Hurricane causing dust and manufacturers, 30% of all winds, these areas are comprised.

Keywords: dust storms, Rose, Storm, Semnan, Kashan

Introduction
Dust haz is a few microns, and clay particles suspended in the air, scattered to the wind means to move large distances to [5].

Haze is a phenomenon that the composition of fine particulate dust with urban pollution arises [5].

Tiny particles of soil and dust storms are possible in certain cases to a height of several kilometers above the Earth's surface are scattered. Strong winds and lots of dust and dirt on the floor of a dry hole and covered with soil up to the State of suspended animation and air are dark. Saturated air from being drawn into such being driven earth materials, which makes up the cloud covered the sun, or it represents the pill melted and light brown. Phenomenon are widely used in arid and semiarid regions of the world, especially in areas between subtropical occur.

The most unstable weather conditions make dust along with the presence or absence of moisture, so that if the air is unstable enough moisture, rain and thunder storms, and if it is lacking moisture, dust storms can cause. Abundance dust particles in the atmosphere, vegetation may play a role in the incidence of dust. Anglsta believe the density and structure of a major controlling factor in the occurrence and abundance of plants, two dust storms are Concerning the role of human activity along natural geographical environment should be considered.

Synoptic view of a damaging storm on synoptic maps are unique in that a combination of pressure phenomena, clouds, rain, wind and ... Adapted by storm detected on radar. One of the types of natural disasters every year, causing huge losses to the dry desert areas of the world and Iran. Dust storms, sand is accompanied by strong winds.

In this paper, in order to detect hurricane winds and corrosive agents, the anemometer, Semnan, Kashan during a 44-year statistical analysis to justify.

Literature
In relation to the frequency of dust storms in the world on the lake bed and emphasize Sahara dust is a major manufacturer and Sahara desert in northern Africa more than anywhere else in the dust storm effective in the world knows. He vegetation density and structure of the two major controlling factors in the occurrence and frequency of dust storms that knows [2]. Possibilities of intercontinental dust transport from North Africa and the Middle East to East Asia were investigated [8].

In a study published in the dust in terms of statistical and synoptic displacement in East Asian studies and Synoptic systems are found in the deserts of northern Asia blow, if the surface wind speed of 6 meters per second can cause spreading of dust storms are [9]. Hurricane is located in the South West region of Iran in the region knows that the flow of atmospheric dust from arid regions of the country to the West in Iran, Iraq and the transfer [10]. The main cause of formation of sand storms
Yazd - duck passage of a low pressure system dynamics, along with a cold front and dry as that a crossing or approaching trough levels 500 and 850 hPa, especially in intense mixed with the cold air advection the pressure gradient along the surface [6].

The dust province of the main reasons for this phenomenon occurs, such as the conversion of agricultural land into desert, dry vegetation in affected areas, reduced soil moisture and increased wind erosion threatens villages and towns, movement of sand flowing, reducing the productivity of farms and orchards and rural to urban migration and pollution of the big cities, noting that they all directly affect the lives and health of the population [3].

Materials and methods

1 - Location of the studied areas

1-1 - Semnan province in the center of the country and the southern slopes of the Alborz Mountains is elevated between 51 degrees and 57 degrees, 51 minutes, 3 minutes and 34 degrees 13 minutes to 37 ° and 20 'meridian of Greenwich is located .Semnan Province of geographical conditions of each part of the climate varies, so that the cold mountainous regions, the mountains, the weather is mild and warm desert along. Summers are hot and winters are mild climate in Semnan. Based on 44 years of meteorological stations, the average precipitation is 144 mm.

1-2 - Kashan area of approximately 2100 acres on the North Branch Salt Lake and city of Qom northwest of ARDESTAN east, south and west stagecoach Natanz and Mymeh limited. The cities geographical coordinates 51 degrees 27 minutes east longitude and 33 degrees 59 minutes north latitude is generally gentle and are mild climate. The main reason for the dry air in the vicinity of Kashan Desert and arid region it belongs to the Iranian plateau and is located in the central desert. Based on 44 years of meteorological stations, the average precipitation is 139 mm.

2 - Wind Data

In this study, we analyzed the temporal and spatial data in the event of dust and wind speed station, Semnan, the period of 44 years (1967-2010) and Kashan synoptic stations over the period of 44 years (1967-2010)using it is. Information is taken mainly on wind direction and wind speed are the daily hours specified above will be removed And the offices and files that are intended for this purpose, are recorded. Anemometer data used in this study as an 8-hour and 8-hour day and night time wind readings at 0, 3, 6, 9, 12, 15, 18 and 21, the time is now. Obviously the number of harvest hours per day is more complete information about the wind conditions in the area are available and The resulting models (rose, storm) for the analysis of wind conditions in the region are depicted reality has a greater compliance [4].

3 - Software applications used in

Software Excel: Rain and dust are used for drawing diagrams.

Software WDconvert: software under Windows and now in order to perform the data conversion process of wind Meteorological Organization to formats that can be used in other applications such as WRPlot view is designed. In fact, the soft is a software interface that aims to transform the wind data recorded by meteorological stations in the format such as Lakes Format, CD144 and SCRAM is designed to be able to read the wind soft WRPLOT View provides software.

Software WRPLOT View: From the application software to draw wind rose and storms throughout the region.

Results and Discussion

Statistical Study of Dust Storms

The period of 44 years (1967-2010), a total of 180 days by the meteorological stations of Semnan as days with dust storms have been reported, and an average of 3.65 days in a dust storm occurs. Figure 1 percent annual trend in the frequency of days with dust storms the period indicated above. According to 1345 statistics, with the highest frequency of 19 days during 1352, 1361, 1362, 1367, 1370, 1371, 1372 and 1372, with many zero-days, had the lowest frequency of dust events. Dust days 227 days Kashan stations the day with dust storms has been reported. According to statistics in 1346, with 28 days maximum frequency for years 1351, 1353, 1376, 1380, 1384, 1385 with a frequency of zero days, had the lowest frequency of dust events.

Dust days 227 days Kashan stations the day with dust storms has been reported. According to statistics in 1346, with 28 days maximum frequency for years 1351, 1353, 1376, 1380, 1384, 1385 with a frequency of zero days, had the lowest frequency of dust events (Figure 2).

Furthermore, the occurrence of days with dust monthly and quarterly studied. Figure 3 shows the monthly frequency of days with dust events during the 44-year period (1967-2010), in two regions in Semnan, Kashan show.
Figure 1. The prevalence and annual incidence of days with dust storms in the Semnan province during the period of 44 years (1967-2010)

Figure 2. The prevalence and annual incidence of days with dust storms kashan the period of 44 years (1967-2010)

\[ y = -1.444x + 22.47 \]

\[ R^2 = 0.219 \]
Figure 3. Monthly frequency of days with dust storms in the Semnan province during the period of 44 years (1967-2010)

Figure 4. Monthly frequency of days with dust storms in Kashan 44-year period (1967-2010)

Figure (5 and 6) the seasonal distribution of rainfall and dust in Semnan show. As can be seen the highest rainfall in winter and spring dust storms Most of the dust is allocated. Figure (7 and 8) seasonal distribution of rainfall and dust Kashan show. As can be seen the highest rainfall in winter and spring dust storms Most of the dust is allocated. According to the results of Figures 6 and 8, both of Kashan and Semnan provinces with the largest dust storms in spring and winter are the seasons of the study areas have the highest rainfall.

Figure 5. Seasonal distribution of rainfall in the Semnan province during the period of 44 years (1967-2010)
Figure 6. Seasonal abundance with storm dust days in the Semnan province during the period of 44 years (1967-2010)

Figure 7. Kashan seasonal distribution of rainfall in the period of 44 years (1967-2010)

Figure 8. Seasonal abundance of dust in Kashan days with storm the period of 44 years (1967-2010)

Table (1 and 2) at the brink of wind erosion on the results obtained from the diagram of storms show, the highest percentage of still air (less than 13 knots) annually to the province of Kashan that the two provinces of The dust storms (speeds over 13 knots)
do not differ much in terms of the province and the autumn season.

Table 1. Percentage distribution of wind speed class, annual, quarterly and monthly storm Semnan station period of 44 years (1967-2010)

<table>
<thead>
<tr>
<th>Class speed (m/s)</th>
<th>13-15</th>
<th>15-19</th>
<th>19-23</th>
<th>23-27</th>
<th>27&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>72.9</td>
<td>9.8</td>
<td>9.7</td>
<td>5</td>
<td>1.7</td>
</tr>
<tr>
<td>Spring</td>
<td>61.8</td>
<td>11.8</td>
<td>13.8</td>
<td>6.9</td>
<td>4.9</td>
</tr>
<tr>
<td>Summer</td>
<td>64.6</td>
<td>11.8</td>
<td>12.2</td>
<td>8.9</td>
<td>1.2</td>
</tr>
<tr>
<td>Fall</td>
<td>83.7</td>
<td>7.3</td>
<td>6.1</td>
<td>2</td>
<td>0.8</td>
</tr>
<tr>
<td>Winter</td>
<td>78</td>
<td>9</td>
<td>9</td>
<td>2</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Table 2. Percentage distribution of wind speed class, annual, quarterly and monthly storm Kashan station period of 44 years (1967-2010)

<table>
<thead>
<tr>
<th>Class speed (m/s)</th>
<th>13-15</th>
<th>15-19</th>
<th>19-23</th>
<th>23-27</th>
<th>27&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>73.9</td>
<td>8</td>
<td>6.3</td>
<td>6.9</td>
<td>2.7</td>
</tr>
<tr>
<td>Spring</td>
<td>70.6</td>
<td>6.7</td>
<td>8.6</td>
<td>7.1</td>
<td>4.5</td>
</tr>
<tr>
<td>Summer</td>
<td>74.1</td>
<td>13</td>
<td>5.2</td>
<td>5.6</td>
<td>1.1</td>
</tr>
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<td>4.8</td>
<td>6.7</td>
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<td>1.1</td>
</tr>
<tr>
<td>Winter</td>
<td>71.9</td>
<td>7.4</td>
<td>4.8</td>
<td>8.1</td>
<td>4.1</td>
</tr>
</tbody>
</table>

The results depicted in this Wind Rose and storm seasonal and annual Kashan and Semnan provinces show during the period studied, the prevailing wind direction in the northern most province but northwest winds of autumn are also great frequency. With the onset of winter (the first two months of the season), the more the wind blowing from the northwest of Kashan, Kashan region in the north of the country is under pressure core that makes the Northwest and late winter and early spring are followed. In the coming months to early autumn wind direction is from the North East. In the months of June, July and September, the prevailing wind blows from the northeast to the hot and dusty winds and storms are local. The wind data used in this study, the frequency of calm conditions less than a nat (0.54 mm safely), about 50% was obtained. The results of calculation and drawing up a storm Semnan, based on wind erosion threshold velocity standard (6.5 meters per second) were obtained, indicating that this region of the North and the winds of the storm causing Semnan, Kashan more the northeast is a blow. drawn up according to the storms, the frequency of calm conditions (wind speeds less than the threshold velocity The velocity of less than 5/6 meters per second are included) in Semnan and Kashan Station is about 73 percent. This indicates that storm winds and dust producing less than 30% of the total number of monitoring comprises monitoring.

Results concluding and recommendations

Semnan province in the center of the country and the southern slopes of the Alborz Mountains are high and a large part of its vast deserts and desertification has accounted for; The conditions are favorable for the occurrence of dust storms. The results show that the Semnan dust storms in the period of 44 years (1967-2010) in 1345 with a 19-day storm, with maximum dust storms is that this year's annual average rainfall is less than, equal 87 mm, while the average annual rainfall of 144 mm during the same period by 44 years. Increasing the number of days with dust storms could be due to an increase in wind speed or due to decreased rainfall in that year or the previous year's drought that has occurred in the region. In the months of June, July and September, the prevailing wind blows from the northeast to the hot and dusty winds and storms are local. The wind data used in this study, the frequency of calm conditions less than a nat (0.54 mm safely), about 50% was obtained. The results of calculation and drawing up a storm Semnan, based on wind erosion threshold velocity standard (6.5 meters per second) were obtained, indicating that this region of the North and the winds of the storm causing Semnan, Kashan more the northeast is a blow. drawn up according to the storms, the frequency of calm conditions (wind speeds less than the threshold velocity The velocity of less than 5/6 meters per second are included) in Semnan and Kashan Station is about 73 percent. This indicates that storm winds and dust producing less than 30% of the total number of monitoring comprises monitoring.

Kashan is located in the central Iranian province and has accounted for a large part of its area of desert which has favorable conditions for dust storms.70.3 mm, while the average annual rainfall of 139 mm during the same period by 44 years. Increasing the number of days with dust storms could be due to an increase in wind speed or due to decreased rainfall in that year or the previous year's drought that has occurred in the region. Due to the high sand plains in the north east of the province, it could
play a role in creating dust storm is in the province. Working with Haloxylon made in the area of dust and dust in the region has declined somewhat. In fact, due to lack of moisture and vegetation in arid regions, the adhesion between the particles decreases wind particles with diameters less than 5 mm from the soil level, and carries a. These results with the results (Omidvar and Nekonam, 1390), the most common times of Sabzevar spring dust phenomenon in the study area are considered. With the start of the year due to cold winds with dust from the western half of the Sabzevar has intensified and reaches its maximum in winter but spring and recoil starting system, west winds blowing from Western semi decreases so that, in the summer wind from the West almost to zero and all of the eastern half of the area, blowing Also Dadfar et al, 1390 a major cause of dust storms in Qazvin province, the lack of moisture and reduced rainfall are considered. The most common occurrence of dust storms in summer (June) is because this chapter the study area has the lowest rainfall the result is a soft, dry soil surface, leading to a reduced rate of dust storms are ahead. In this Semnan province, the month of May with an average of 0.74 day of dust storms in the month, the frequency of days with dust in the first place and the month of July with an average of 0.05 day of dust storms per month in the same period, the minimum duration of a round and dust have experienced. In Kashan, May, average 0.95 day of dust storms in the month, the frequency of days with dust in the first place and the months of January and February with an average of 0.05 day of dust storms per month in the same period, the lowest have experienced days of dust. So in these two provinces, the highest incidence in spring and in May the dust monthly. Lower wind speeds below the threshold for erosion control and stabilize sand dunes and proper implementation of biological targets project is considered carminative, The project last year sand dunes and on both of them successfully been implemented in order to control that already exist planting of forests in these regions suggests. Due to the efforts made in the field and harnessed phenomenon sand dune stabilization projects around this area has been done by the Department of Natural Resources, the occurrence of days with dust events in the region has declined.

References