

Dangerous Dust Storms in Uzbekistan

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Abstract: The article examines the spatial and temporal distribution of the frequency of dangerous dust storms on the territory of the Republic of Uzbekistan. To analyze the spatial and temporal distribution of dust storms on the territory of the Republic, an analysis of daily meteorological observations at weather stations in Uzbekistan was carried out. From this sample population, the number of days with dangerous dust storms was identified and calculated according to the criteria. Using this dependence, the number of days with dangerous dust storms in the country was approximately determined.

Keywords: climate change, desertification, dust storms, ecology, hydrometeorological phenomena.

The climatic conditions of Uzbekistan are very favorable for the occurrence of dust storms. Long periods without rain, the presence of large areas of sandy and clayey deserts, poverty and weak vegetation cover, frequent stormy winds are all factors that determine the development of dust storms in Uzbekistan. In this vast territory, dust storms are observed all year round and often cause significant damage to many sectors of the economy. It is known that dust storms cause soil erosion, which leads to the death of seeds and immature seedlings in the spring, causes significant harm to grazing livestock, disrupts the normal operation of transport, and has a negative impact on public health. Therefore, a comprehensive study of the distribution of dust storms is of practical importance.

Despite the fact that the first descriptions of individual dust storms in the country date back to the beginning of the 19th century, no strict definition of this phenomenon was given. Most likely, all descriptions of dust storms of this time refer only to pronounced phenomena that caused significant damage to agriculture. During that period, the decrease in visibility as a consequence of dust storms did not affect transport activities, and a weak dust storm went unnoticed. Nowadays, as air and ground transport respond to reduced visibility, the demands on dust storm observations have increased. Now weak dust storms no longer go unnoticed.

To analyze the spatial and temporal distribution of dust storms on the territory of the Republic, an analysis of daily meteorological observations at weather stations in Uzbekistan was carried out. From this sample population, the number of days with dangerous dust storms was identified and calculated according to the criteria. Using this dependence, the number of days with dangerous dust storms in the country was approximately determined. The spatial occurrence and

temporal distribution of the frequency of dust storms for individual regions and for the territory of Uzbekistan as a whole have been studied satisfactorily. However, the question of the spatial distribution of the number of days with dangerous and especially dangerous dust storms is of particular relevance. In the article, dust storms lasting 3-12 hours with a wind speed of 10-14 m/sec and a meteorological visibility range of 500-1000 m are classified as dangerous phenomena. Dust storms lasting 12 hours or more, with a wind speed of 15 m/sec, are considered especially dangerous. and higher, or storms, regardless of the duration and speed of the wind with a meteorological visibility range of 50 m or less. The humus contained in the dust is significantly enriched with nitrogen. A high relative nitrogen content in humus is indicated by a narrow C:N ratio. Materials from aqueous extracts show that, based on the content of water-soluble salts, the dust can be classified as slightly saline. By the nature of salinity, it belongs to chloride-sulfate. The SO:Cl ratio is 2.2, i.e. the sulfate content is more than twice the chloride content.

Among the cations, calcium and magnesium predominate. The total content of sodium and potassium is 0.014%, which indicates an extremely low content of sodium salts, which for the most part are the most toxic to vegetation.

Judging by the ionic composition in the dust, magnesium sulfate predominates (MgSO_4 – 2.14 mg/eq. per 100 g), the content of other salts was distributed as follows: $\text{Ca}(\text{HCO}_3)_2$ – 1.12; CaCl – 1.58; Na_2SO_4 – 1.28; CaSO_4 – 0.08 mg/eq. per 100 g.

Thus, an average of 2.85 tons of sludge, 296 kg of humus, 61.5 kg of salts settled per hectare, of which 24.9 kg of nitrogen and 8.4 kg of chlorine.

To analyze the spatial and temporal distribution of dust storms on the territory of Uzbekistan, the authors carried out a sample from tables of daily meteorological observations at meteorological stations during the observation period. From this sample population, the number of days with dangerous and especially dangerous dust storms was identified and counted according to the criteria described above, and the dependence of the number of days with dangerous and especially dangerous dust storms on the number of days with a dust storm was identified.

Over most of the country, there has been a significant decrease in the frequency of dust storms over the past three decades. Foci of increased recurrence with dangerous and especially dangerous dust storms coincide with foci of increased recurrence of dust storms with a number of days greater than 20. Significant areas of dangerous and especially dangerous dust storms occupy the northwestern part of the region under consideration, the valley of the river. Or, the central parts of the Karakum and Kyzylkum deserts.

Использованная литература

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