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Research Article

HALOGEOCHEMISTRY, BIOGEOCHEMICAL FEATURES OF SALINE LANDSCAPES IN CENTRAL FERGANA

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ABSTRACT

The paper presents the quantity and quality of salts in the solonchaks of Central Fergana. Soda was found in the profile of solonchaks in the amount of 0.08-0.19%. Solonchak vegetation is characterized by high ash content, while it is found that in salt marshes of the desert zone, arsenic accumulates in the amount of 7-8 CC, the biological absorption coefficient is 1.17-11.9.

KEYWORDS

Salt marsh, soda, sol, arsenic, accumulation, Clarke concentration, biological absorption coefficient.

INTRODUCTION

Currently, it has been proven that many trace elements significantly affect the soil-forming process and the formation of solonchaks in the desert zone. The distribution of the quantity and quality of a number of

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macro-microelements over the genetic horizons of soils affect the processes of formation of saline soils and solonchaks. During the formation of humus-accumulative horizons, elements are mainly accumulated in the upper part of the soil profile. In the process of solonchak formation, macro- and microelements are redistributed along the soil profile. In this regard, the study of salt marshes, as well as the accumulation and redistribution of chemical elements in salt marshes, is an urgent problem of science and production.

Object and methods of research: The saline massif-reserve of the Fergana Experimental Cotton Growing Station was chosen as the object of research. As for research methods, Dokuchaevka's morphogenetic method was taken as the basis. Agrochemical studies were carried out by conventional methods. Elemental analysis was carried out by neutron activation analysis at the Institute of Nuclear Physics of the Academy of Sciences of the Republic of Uzbekistan.

Research results: The desert solonchaks studied by us are characterized as hydromorphic typical alluvial-saz soils and belong to the group of soils with progressive salinity. Salt marshes typical of saz are distinguished by higher degrees of salinity of the entire profile, but a significant accumulation of salts occurs in the upper horizons. The salt content in the upper layers varies within 2-5% of the dry residue. In the underlying horizons, the amount of salts is 1.3-4.0%.

The surface of these solonchaks is sometimes covered with a crust 0-3 cm thick. The maximum of salts is observed in crustal and subcrustal horizons. The accumulation of water-soluble toxic and non-toxic salts in the upper 0-3 cm and 3-40 cm layers of the studied solonchaks reaches 2.7-3.1%. Moreover, the amount of toxic salts, respectively, in these horizons reaches 1.8-2.2%.

Quantity and quality of salts, %

Release number	Depth, cm	Na_2CO_3	$Ca(HCO_3)_2$	$CaSO_4$	$MgSO_4$	Na_2SO_4	NaCl	toxic	non-toxic	Total
1-salt marshes	0-3	0,017	0,105	0,737	1,406	0,201	0,603	2,227	0,842	3,069
	3-40	0,017	0,084	0,768	1,213	0,136	0,438	1,804	0,852	2,656
	40-70	0,008	0,089	0,771	1,030	0,146	0,303	1,487	0,860	2,347
	70-120	0,008	0,097	0,598	0,849	0,277	0,245	1,379	0,695	2,074
	120-160	0,017	0,097	0,677	0,885	0,259	0,247	1,408	0,774	2,82
	U.g.w., g/l	0,19	1,647	12,40	13,812	2,707	3,406	19,70	14,47	34,170

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The nature of the distribution of salts in the upper part of the soil profile indicates that in these soils the process of salt accumulation is replaced by temporary desalinization. The type of salinity is chloride-sulfate. According to the mechanical composition, the studied solonchaks are light and medium loamy.

In this regard, the humus content in the upper 3-40 cm horizon reaches 0.65%, then there is an intensive decrease and reaches 0.26%. The ratio of nitrogen to carbon in these layers ranges from 5.2 to 6.1.

The content of carbonates in solonchaks fluctuates in the range of 10.2 -15.1%. Soil and groundwater regime saz.

Establishing the average concentration of cyclic trace elements in solonchaks is associated with relatively great difficulties. This is not surprising, because one should take into account the influence of numerous factors such as: the concentration of water-soluble salts, the quantity and quality of toxic salts, the composition and properties of soil solutions, the composition and properties of ground and mineralized waters, etc.

The concentration of a number of cyclic chemical elements in the solonchaks of Fergana varies in the upper 0-3 cm layers within the range of 1.7-28500 mg/kg. Microelements are arranged quantitatively: Fe > Mn > Sr > Zn > Cr > Ni > Co > As > Mo > Sb. A similar pattern persists in the underlying horizons. At the same time, as expected, there is a slight increase in the concentration of iron, manganese, strontium, nickel, molybdenum at the horizon of soil-soil contact with groundwater, which is associated with gley barriers.

The presented material testifies to a peculiar regularity in the distribution of chemical elements in the solonchak profile. Therefore, along with determining the amount and average concentration of trace elements in general, it is necessary to take into account their ability to concentrate and disperse in the horizons of the studied solonchaks. For a quantitative assessment of chemical elements in the lithosphere, V.I. Vernadsky introduced a special indicator - concentration clarke (CC), which characterizes the deviation of the content of a chemical element in a given object from its clarke.

Based on this, it can be said that strontium gradually accumulates in the underlying relatively gypsum, carbonate layers of solonchaks, where its fluctuation in these horizons varies within 1.56-2.09 CC. There is also an increase in the CC of zinc in the range of 1.11-1.45, unfortunately, there is a significant increase in the CC of arsenic in all horizons of solonchaks in the range of 6.8-8.12 CC, which is obviously associated with the nearby mercury-antimony halos of the deposit. An increase in the CC of molybdenum and antimony is also observed.

The content of other studied elements such as Fe, Mn, Cr, Ni, Co is below their clarke values, according to Dobrovolsky, it is not concentrated in solonchaks. The series of scattering clarks repeat the patterns of distribution of concentration clarks in reverse order, that is, the studied elements in the upper 0-3 cm layer in this regard occupy the following distribution series: Ni > Mn > Fe > Sr > Co > Cr > Zn > Sb > Mo > As.

Solonchak vegetation is characterized by high ash content. Their sols are dominated by chlorides, sulfates of sodium and alkaline earth elements.

CONCLUSION

Thus, in the desert hydromorphic solonchaks of Central Fergana, a high degree of arsenic accumulation is observed, CC, which reaches 7-8, and KP ranges from

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0.12-0.16. There is an accumulation of molybdenum and antimony. Molybdenum and cobalt tend to accumulate in solonchak plants, the coefficient of biological absorption of which, respectively, fluctuates in the range of 1.66-11.31 and 1.12-1.38, the remaining elements are captured by solonchak plants.

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