CLIMATE INDICATORS OF THE BUKHARA REGION AND THEIR IMPACT ON SOIL FORMATION PROCESSES

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Abstract. *This article provides an analysis of long-term climate data for the Bukhara region. The study presents indicators of air and soil surface temperatures, as well as annual precipitation levels. By examining these hydrometeorological data, the authors aim to characterize the role of climatic factors in soil formation and the transformation of soil properties within the context of abiotic influences.*

Keywords: *Bukhara region, air temperature, soil surface temperature, annual precipitation, hydrometeorology, soil, abiotic factors, arid climate.*

The main part

From the perspective of climatic zoning, the Bukhara region is located in the semi-desert and gray soil (sierozem) zone of Central Asia. According to long-term data from the Bukhara hydrometeorological station, the region's climatic indicators exhibit significant seasonal variation.

In 2023, the average annual air temperature was approximately 17.5°C, with maximum temperatures of 37.9–39.1°C recorded during June–July. The minimum air temperature reached -8.0°C in January. The average annual soil surface temperature was +19.2°C, peaking at +54–56°C in the summer months, while the minimum temperature of -4°C was observed in December. The average annual atmospheric precipitation was 101.4 mm.

In 2024, the average annual air temperature was 16.5°C, with summer peaks reaching 37.1–37.5°C. The lowest air temperature was recorded in December at -2.4°C. The average annual soil surface temperature was +18.7°C, with a maximum of +56°C. Annual precipitation increased to 217 mm.

In 2025, the average annual air temperature rose to 18.7°C, with maximum temperatures reaching 36.9–39.6°C during the June–July period. The minimum air temperature was -1.7°C in January. The average annual soil surface temperature was +21.4°C, with extreme highs of +60–61°C. Annual precipitation was 68.6 mm.

Table 1

Long-term data on climatic conditions of the Bukhara region

Months	Average air temperature	Maximum air temperature	Minimum air temperature	Average soil surface temperature	Maximum soil surface temperature	Minimum soil surface temperature	Average precipitation, mm	Annual precipitation, mm
2023-year								
I	-3,1	3,3	-8	-4	7	12	5,2	101,4
II	6,1	12	1,4	5	16	-1	35,5	
III	16,7	24,8	9,7	18	37	6	4,8	
IV	19,1	26,8	12	20	39	8	26,1	
V	24	31,2	16,2	26	45	12	7,7	
VI	30,4	37,9	22	34	54	17	0,0	
VII	31,7	39,1	23,6	37	56	21	0,0	
VIII	28,3	35,5	20,7	33	-	-	0,0	
IX	21,8	29,3	14,4	26	50	12	0,0	
X	17	24,4	10,8	19	38	8	6,4	
XI	12,9	20,3	6,9	12	27	3	11,2	
XII	4,5	11	-0,3	4	16	-4	4,5	
Annual average	17,5	24,6	10,8	19,2	35	8,5		
2024-year								
I	4,8	10,2	0,6	4	15	-2	42,6	217
II	4,5	9,9	0,4	4	12	-1	33,8	
III	11	17,6	5,7	12	24	4	34,4	
IV	18,8	25,7	11,9	22	44	8	2,7	
V	22,4	29	15,8	26	43	13	49	
VI	30,1	37,5	21,7	36	56	19	0	
VII	30,8	37,1	23,4	36	55	20	0	
VIII	28,7	36,1	20,9	34	56	18	0	
IX	21,5	29,2	14,2	25	46	12	3,4	
X	14,8	21,5	8,9	15	30	6	38	
XI	9,4	16,4	4	9	22	1	6,3	
XII	1,5	6,8	-2,4	1	10	-5	6,8	
Annual average	16,5	23,1	10,4	18,7	34,4	7,8		

2025-year								
I	2,8	8,8	-1,7	2	13	-4	0	68,6
II	3,7	9,1	-0,7	4	14	-2	46,6	
III	12	19,7	5,4	13	32	2	0,4	
IV	21,1	28,9	13,5	24	43	11	21	
V	26,5	34,2	18,2	32	56	15	0	
VI	29,5	36,9	21,1	36	60	17	0	
VII	31,9	39,6	23,9	38	61	20	0	
VIII	28,9	36,5	20,9	34	58	18	0	
IX	23,3	30,8	15,3	27	51	12	0	
X	16,9	25	9,7	17	38	6	0	
XI	8,8	17,4	1,9	8	26	-3	0,6	
Annual average	18,7	26,1	11,6	21,4	41,1	8,4		

Conclusion

The climatic data for the Bukhara region confirm its classification within an arid climate zone. High summer temperatures accelerate soil moisture evaporation, which subsequently leads to the accumulation of water-soluble salts in the upper soil horizons. These processes contribute to soil salinization and increase the irrigation requirements for crops. During the winter, freezing soil surface temperatures pose significant challenges for conventional tillage and soil leaching operations.

References

1. Artikova, Hafiza Tuymurodovna, and Hilola Hamroevna Salimova. "Morphological Condition of Irrigated Soils of Gijduvan District of Bukhara Oasis, Salinity Levels and Increase of Their Fertility." *Annals of the Romanian Society for Cell Biology* 25.3 (2021): 3214-3223.

2. Курвантаев, Р., et al. "ЭВОЛЮЦИЯ И ПРОГНОЗ РАЗВИТИЯ ОРОШАЕМЫХ ТИПИЧНЫХ И СВЕТЛЫХ СЕРОЗЁМОВ НА ТРЕТЬЕЙ ТЕРРАСЕ РЕКИ ЗАРАФШАН." *Владимирский земледелец* 4 (98) (2021): 14-20.

3. Artikova, Hafiza Tuymurodovna, and Hilola Salimova. "The composition, properties and meliorative situation of the irrigated soils in the Gijduvan district of the Bukhara Oasis." (2022): 668-675.

4. Abdukarimovna, Qodirova Dilrabo, and Rahimov Zarqum Zafarjonzoda. "TUPROQ BIOLOGIK FAOLLIGINING UMUMIY TUSHUNCHASI." *Science and innovation* 3.Special Issue 39 (2024): 156-158.