

# Effects of Climate Change on the Environment of Southern Region of Ukraine

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The southern regions of Ukraine are located in the steppe zone, adjacent to the Black and Azov Seas and have special climatic characteristics. Climate change is particularly noticeable here. Temporal and spatial features of climatic parameters are important for forecasting regional climate change by 2050 and their impact on natural ecosystems, population and economy of Southern Ukraine. To analyze the features of climate change in these regions, data of meteorological observations from the stations Zaporozhye, Nikolaev, Odessa, Kherson were used. Data of surface air temperature, precipitation and frequency of adverse weather events represent the average estimates for the region for the period 1990-2020 and 1900-2020. The average annual temperature in the Southern regions of Ukraine for the period 1990-2020 is  $10.7 \pm 1.0^{\circ}\text{C}$  (the meteorological norm for the period 1961-1990 is  $9.8 \pm 0.9^{\circ}\text{C}$ ), and the annual amount of precipitation is  $440 \pm 101$  mm/year (the meteorological norm of  $472 \pm 96$  mm/year). Quite intensive increase in temperature at the rate of  $0.77^{\circ}\text{C}/10$  years has been observed. The general increase in precipitation by 3-5%/10 years occurs at seasonal disparities, in particular, there is a decrease in precipitation in summer and autumn. The steppes, coastal zones of the Black and Azov Seas, the deltas and estuaries of the Southern Bug, Dniester, Dnieper River are most vulnerable to the influences of climatic factors. Results of the analysis of the response of the steppe, coastal and water ecosystems to the increase of droughts, dust storms and other extreme weather events, provoked by climate change, have been described and discussed.

## Keywords

Climate change, surface air temperature, precipitation, ecosystems, Southern Ukraine

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