

Abstract

Changes to the fire regime caused by climate change in the 21st century on the example of the Forest Promotional Complex Spalsko-Rogowskie Forests.

Contemporary climate changes entail changes in related systems. One of them is the fire regime, which under the influence of the increase in the average temperature can undergo a significant modification. The aim of the study is to examine whether contemporary warming affects the fire regime on the example of the Forest Promotional Complex Spalsko-Rogowskie Forests. At the beginning of the work, the current fire regime was analyzed. Detailed information was collected on 673 fires taking place in the research area in the period 1989-2013. Information on the species composition, age and density of stands as well as information about the habitats on which they are located were also collected. Forestry secretions were assigned fuel types according to the the Canadian Wildland Fire Growth Simulation Model –Prometheus. Prometheus simulates the creation and development of fires for a given weather. The model has been verified using data on historical fires and satisfactory compatibility of the simulation with reality has been obtained. The scheme of occurrence of the ignition source was determined, taking into account its temporal and spatial distribution and the probability of a fire evacuated by the Prometheus program. To determine the climate impact on the fire regime, three ten-year simulations series were carried out for the trial period - the first decade of the twenty-first century, based on meteorological historical data and the decades 2091-2100 for two climate scenarios RCP 4.5 and RCP 8.5. In each series the same set of 370 fires was modeled, identical in terms of location and time throughout the year and day.

The comparative analysis of three series of simulations showed no one-way fire regime change for the future according to the RCP 4.5 scenario and unequivocal unfavorable changes according to the scenario 8.5, including an increase in the frequency and size of future fires.