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## **PERSPECTIVES OF THE STUDIES AT THE WIELICZKA FOOTHILLS**

The climatic changes during the recent decades can be analysed in the framework of the global changes and against the background of the changes in the land use in the Carpathian Foothills. These are two different approaches. Using the first one, the changes are considered on the global scale and in large regions, while using the second approach, the transformations on the local scale are the consequences of the land use that result in the changes in the energy balance and water circulation. In both the research approaches, the reasons and effects of the climatic changes and of the environmental changes are analysed at a different level of the details involved. Moreover, the effects of the global warming can be amplified or reduced under the influence of the overlapping local changes in the air thermal and humidity conditions that occur in the spatial structure of the topoclimate.

The present monograph belongs to the rare studies devoted to the examination of the transformations of the selected components of the environment on the local scale after the construction of the reservoir on the Raba river in Dobczyce. According to R. Soja (in this issue) a new dynamic drainage system has developed in the examined region. This system, as shown by the group of pedologists (cf. Skiba et al. in this issue), affected the groundwater table's stabilisation in the entire surroundings of the reservoir. Namely, in the vicinity of the Dobczyce Water Reservoir there were no areas flooded due to the raise of the ground water table, thanks to the foreland relief and the soils properties (low permeability). Small floodings occurred in the bottoms of the ravines which at present reach the reservoir's shore. In the vicinity of back water area of the reservoir, the floodings were restrained by the embankments. Additionally, the well-functioning pumping-station in the Osieczany-Droginia region guaranteed the efficiency of the drainage system. On the local scale, therefore, one can expect the development of the glei-processes (at the top horizons of the soils), which are typical of the Luvisols. On the scale of the whole examined region, one can expect the extreme phenomena to occur in relation to the interacting water and soil subsystems. These are, for example,

the mass movements that deteriorate the soil cover or the shore abrasion, which destroys the soil.

H. Trzcińska-Tacik and A. Stachurska-Swakoń (in this issue) relate the changes in the plant cover in the surroundings of the Dobczyce reservoir to the mechanism of the landscape transformation, management around the reservoir as well as to the farming practices. The forest communities in the examined region have not change, and the non-flooded terrains have been assigned to the same communities as 30 years ago. The total area occupied by the forest communities has remained unchanged in principle. The outstanding fact is that the most significant transformations occurred in the case of the semi-natural and anthropogenic communities, which development and forms depend directly on the land use. Both, in the aforementioned phytosociological study and in the study on the ecoclimate of the oak-hornbeam forest *Tilio-Carpinetum* (Obrębska-Starkel, in this issue) it has been stated that the changes in the local climate in the period from 1971-1996/1997 did not result in the significant changes in the number of the tree species. The revealed increase in the temperature and changes in the air humidity did not exceed the range tolerated by the tree species. The favourable factors contributing to the preservation of the species composition of the tree stands consisting of beech, linden, hornbeam etc. were the warm winter seasons. That was the evidence of the usually widely discussed, topo- and mesoclimatic preferences for the development of deciduous species. The changes observed in the spatial pattern of the air thermal and humidity conditions in the examined area result from the global and regional climatic changes induced by the solar factors and the atmospheric circulation as well as by the land use after the construction of the reservoir. The effects of the changes caused by the particular climate-forming factors, and especially their quantitative evaluation, are difficult to estimate. J. Trepieńska (cf. this issue) emphasises the definite changes in the air temperature trends in Gaik-Brzezowa in the multi-year period from 1971-1997. These differences exceed as to their magnitudes the corresponding trends in the air temperature in the centre of Cracow and in Szymbark, the latter representing the eastern part of the Carpathian Foothills. J. Trepieńska is of opinion that it might be the results of the influences of the reservoir on the local climate of the surroundings. The more detailed quantitative evaluation of these changes, carried out also from the genetic point of view, requires the record series to be elongated so as to make the calculation of the trends in the changes in the air temperature and humidity characteristics reasonable.

The rather little variable solar conditions stated in the period from 1971-1997 by Z. Olecki can be a certain aid in these studies, if these tendencies persist.

Based on the pedologic, climatologic and phytosociological studies, the further continuation of the observations and investigation on the transformations of the environment in the Wieliczka Foothills are postulated. The presently discussed dynamic equilibrium in the surroundings of the Dobczyce reservoir can change as time passes, especially as the variability of the hydrologic and climatic phenomena increases starting from the 1980s. The consequences of these phenomena should be traced by: the repeated soil mapping every 5-7 years and phytosociological relevé – every 10 years, for example; the permanent monitoring of the selected surfaces in the particular

plant communities; the development of the studies on the structure of the topoclimates according to the suggestions presented in the chapter on the ecoclimate.

In general, the interdisciplinary studies undertaken in Gaik-Brzezowa are of cognitive and practical values, as the identification and characterisation of the mechanism of the effects of the climatic changes and variability of the climatic phenomena on various ecosystem can be useful in the landscape planning and management.

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