DOI: https://doi.org/10.30836/igs.iies.2024.5

Starodubets K., Yaroshovets-Baranova K.

Institute of Geological Sciences of the National Academy of Sciences of Ukraine, Kyiv, Ukraine.
E-mail: starodubets.kirill@ukr.net, katerina.yaroshovetseo_33@ukr.net

LANDFORMS INFLUENCE ON THE TEMPERATURE DISTRIBUTION IN SUBSOIL LAYER

The main aim of this work is to research the distribution of the subsoil layer temperature during the period of stable meteorological conditions in the presence of different landforms.

To achieve the aim, two main tasks were solved.

The first task is to conduct field work, as a result temperature survey of the subsoil layer were performed at 50 research points with step 700 meters on a total area 40 km^2 within the limits of the Novomoskovsk district of the Dnipropetrovsk region, Ukraine. At each research point, the following was performed: auger drilling of hole with depth of 1.0 meter, installation of a thermal probe in the hole and recording of temperature value. The equipment and research methodology are patented [1] and described in a number of publications [2-4].

The second task is the processing of the obtained field data and the features research of the area temperature distribution depending on the landform. The influence of meteorological conditions was taken into account.

Survey of the subsoil layer temperature was carried out in the square version for two days, according to the data of the nearest weather station, during fieldwork the weather was cloudless, there was no precipitation, the average value of the temperature showed a slight increase.

The results of the temperature survey are presented in a graph (Figure 1) obtained during August 25 and 26, 2018.

On the first day of fieldwork, measurements were taken on a plain, which is represented by agricultural lands, with absolute heights 120-130 meters. The last research point was carried out on the slope to lowland number 1.

On the second day of fieldwork, measurements were continued in lowland number 1, the width of lowland varies from 50 to 100 meters, the absolute heights are 100-110 meters, the vegetation is represented by shrubs and single trees, the soil is moistened, movement of the temperature survey took place along the lowland number 1. The following 7 points of survey were carried out on the upland plateau, the width of plateau varies from 500 to 600 meters with absolute heights 130-140 meters, the vegetation is represented by wild grasses and shrubs, movement of the temperature survey took place along the upland plateau, the corresponding changes in the measured temperature are recorded on the graph. Further observation points were made in lowland number 2 and on slopes to it, the width of the lowland number 2 varies from 100 to 200 meters, the absolute heights 100-110 meters, the vegetation is represented by shrubs and single trees, the soil is wet in places, movement of the temperature survey took place along the lowland.

Given the absence of a significant difference in meteorological conditions for the two days of fieldwork, no correction was made for the difference in temperature when graph constructing.

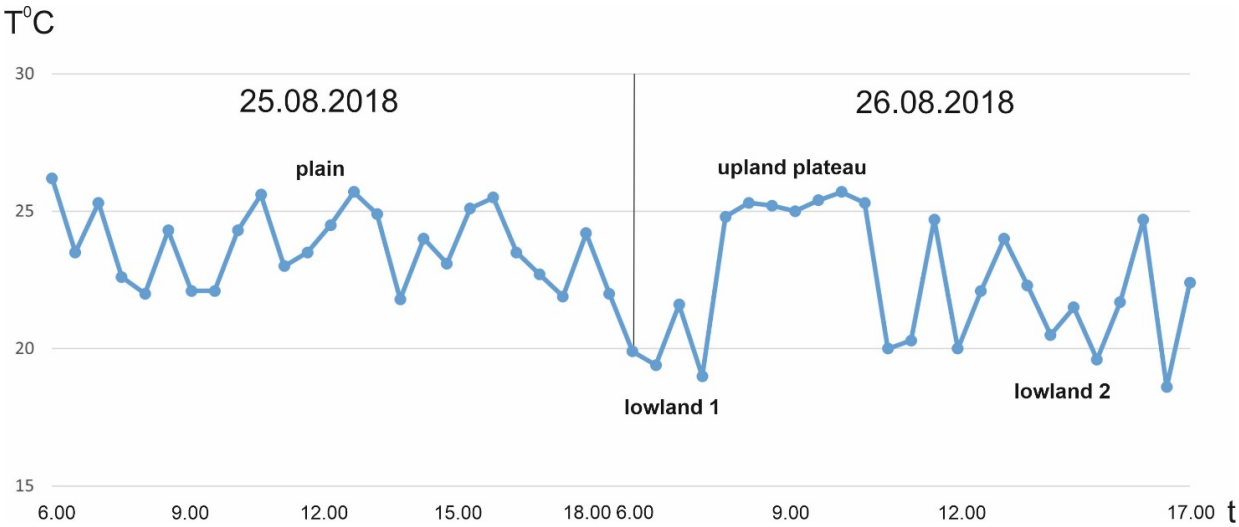

Fig. 1. Temperature distribution graph of the subsoil layer at depth 1 meter on the research area, August 25-26, 2018

According to the results of the conducted survey, data on the temperature distribution at a depth of 1 meter were obtained and analyzed.

As a conclusion, in the summer period of high air temperatures, in the absence of other significant factors of influence, such as urbanized areas, water objects, uneven distribution of green spaces and forests, precipitation, – the distribution of the subsoil temperature at depth of 1 meter actually reflected the relief of the research area. When evaluating average values: the maximum value is typical for local highlands, an intermediate value for plains, and a minimum value for local lowlands.

References

1. Bagrii I.D., Gozhik P.F. Complex method of structural-thermo-atmogeochemical research (STAGR), author's certificate No. 28176, 31.03.2009, Ukraine.
2. Bagriy I.D. Development of geological-structural-thermo-atmogeochemical technology for forecasting mineral exploration and assessment of the geoecological state of the environment. – Kyiv: Logos, 2013. – 510 p. (In Ukrainian).
3. Bagriy I.D., Gordieieva Yu.K., Glon V.A., Kulish A.P., Starodubets K.M. Structural geothermal atmo-hydrological-geochemical studies of the territory of the Bobrikivska depression. Geoinformatika, 2017. Volume 62, № 2. P. 5-13. (In Ukrainian).
4. Starodubets K.M. Interpretation of results of structural-thermal-atmogeochemical research on the Voskresenivska area. Geological Journal, 2018. Volume 362, № 1. P. 89-94. DOI: https://doi.org/10.30836/igs.1025-6814.2018.1.126573 (In Ukrainian).