TOPOGRAPHIC FACTORS AS THE POSSIBILITIES TO DETERMINE THE RELIABILITY ZONES OF TRANSFERRED INFORMATION OF CONTINUOUS FEATURES MEASURED IN POINT

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NOWADAYS WE HAVE MORE AND MORE DATA AND INFORMATION ABOUT PHENOMENA. CHOOSING DATA FROM SUCH A WIDE RANGE OF GEOGRAPHIC DATABASES REQUIRES ESTABLISHING THE NEEDS AND THE AIM OF CREATING THE MODEL OF THOSE DATA AS WELL AS INFORMATION WE WANT TO OBTAIN FROM SUCH A MODEL. PROFESSIONAL KNOWLEDGE ABOUT RESEARCHED PHENOMENON, PREDICTING POSSIBLE SOLUTIONS AND USAGE OF CREATED MODEL ARE CRUCIAL

MODELLING OF CONTINUOUS FEATURES INDICATED IN POINTS

In models, connected with values measured in discrete point, truthfulness, adequacy as well as representativnes of information are very difficult to characterize. **What is proposed is the division of the area around the measured points into the regions of homogenous conditions containing the same type of information.** Geometric basic units of the system can be aggregated in adequate areas on the grounds of their belonging to suitable regions. We can differentiate areas which have similar group of accompanying and affecting the phenomenon distribution factors. For example: distance, height above the sea level and land use/ land cover. Each region consists of elementary fields, which can be assigned to determine the type of conditions with adequate degree of risk which is the product of probabilities of information transfer.

It has been shown on the example of precipitation. Values measured in meteorological stations are the basis for calcula-ting different kinds of climatic characteristics: sums of precipitation in different periods, probability of the risk of thunderstorm or extreme minimum temperature.

After the analyses for elaboration of parameters' distribution, the basic fields in elaborations of the size of 1 km square were chosen. In Poland one of the basic systems is the TEMKART. The initial unit is a trapezium with sides that correspond with one degree in geographic reference system, divided into fields with sides 10' and 5'.

DISTANCE BETWEEN METEOROLOGICAL STATIONS

Basing on the model of probability's distribution together with the increase in distance between meteorological stations, it was assumed that probability of the transfer of the values of, for example, precipitation sums, diminishes along with the distance (Fig.1).

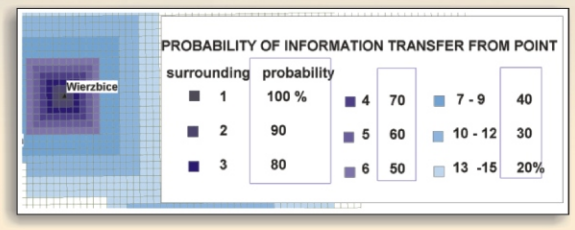


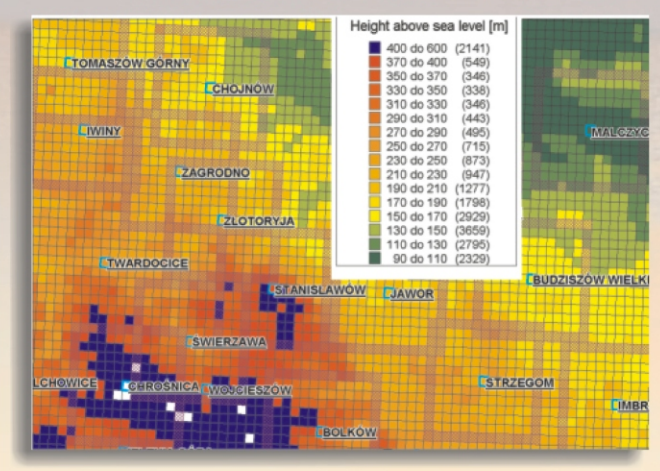
Fig 1. Assigning point information about adequate attributes to elementary fields in spatial information groundwork

Such an assumption of information transfer results in the fact that some of elementary fields are included in two or even 3 indicating points' surroundings. (Fig.2).

Fig 2. Some of elementary fields are included in two or even 3 indicating points' surroundings

COMBINATED MODELLING OF VALUES OF PHENOMENA INCLUDING TOPOGRAPHIC DATA CONSIDERED TO BE THE FACTORS

THE HEIGHT OF THE STATION ABOVE THE SEA LEVEL

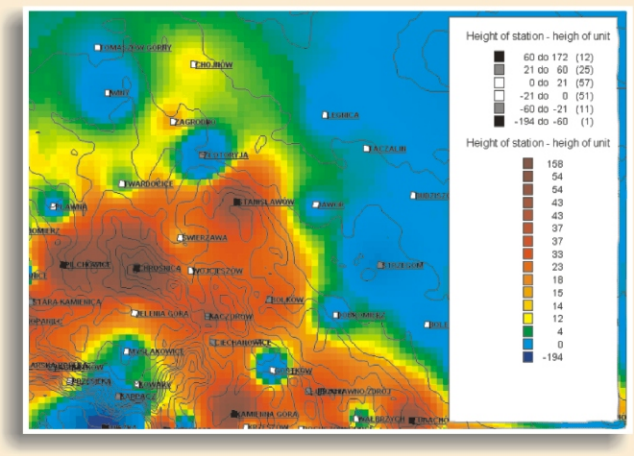


The height of the station is very often an additional usable information in modeling spatial distribution of meteorological phenomena. I assume that the condition of surface continuance in surroundings was preserved while defining probability of similarity of height. Then, the height of the station above the sea level and the class of probability of transferring information were analyzed.

Before beginning works over the construction of borders of regions of similar factors, indicated spatial distribution of topographic-dependent phenomena's average height above sea level was evaluated Fig. 3

Fig 3. Cartographic presentation of height above the sea level

This problem is being tested and as a result, some digital cartographic models presented in Fig. 4 have been obtained. In the picture choropletic map with classes of differentiation of height, contour lines and isolines of absolute differences can be seen. Values of accepted height differences- brackets of classes' borders were accepted on the basis of previous elaborations of factors accompanying the precipitation.



Fig, 4. Possibility of substituting data of height of measurement station with average heightabove the sea level of elementary field including this station

This condition excluded tran-sferring information in mountainous terrains in the area of 3 km, or even less, around the station. 2 groups of height were distinguished and acceptable differences of height for the field with measurement station were classified. The above mentioned assumptions have been determined for the studies area (Fig. 5).

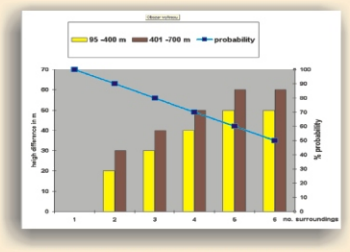


Fig. 5. Acceptable difference of average height above the sea level between the elementary fields

ASSIGNING TO THE SURROUNDINGS THE PROBABILITY, ACCORDING TO THE SIMILARITY BETWEEN HEIGHTS ABOVE THE SEA LEVEL

This geography analyses show that only the station in lowland can be represented by the unit including station. Basing on the model of probability's distribution together with the increase in distance between meteorological stations, it was assumed that probability of the transfer of the values of precipitation sums diminishes (Fig. 6).

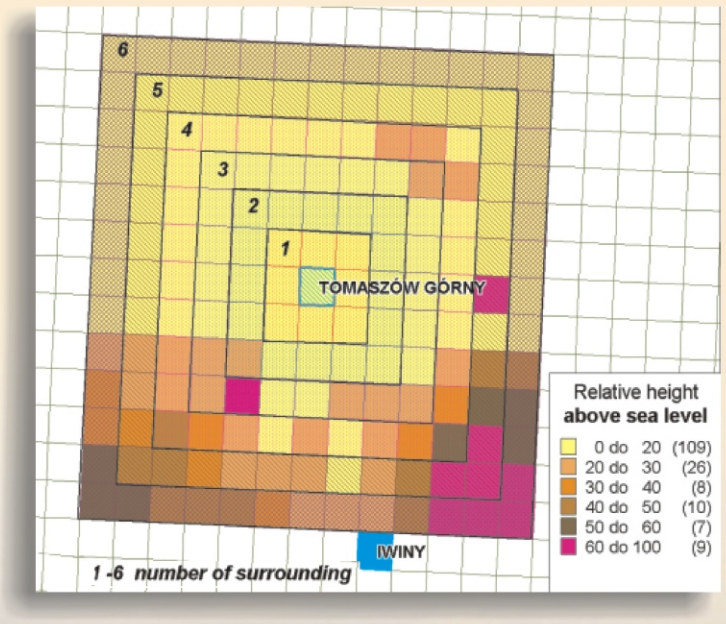


Fig. 6. Relative height can be a basis for decisions about transfer of information from measurement point

Cartographic models show the possibilities of transfer of information and they were made for different periods of observation. In picture no 7. the localization of zones for one of those periods can be seen.

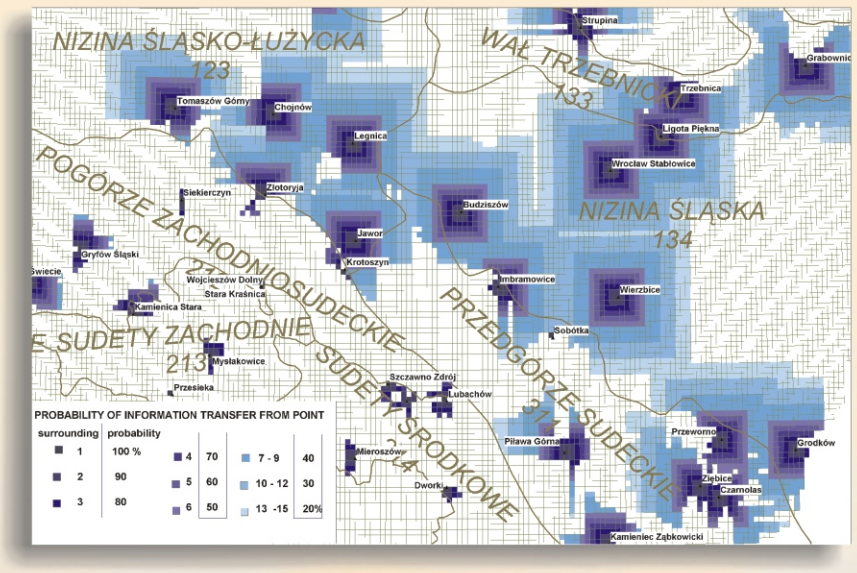


Fig 7. Assigning point information about adequate attributes to elementary fields in spatial information groundwork, connected with acceptable difference of average height above sea level between elementary fields including point and fields in surrounding (stations active 1960-1980)

CONCLUSION

The reliability of the model of phenomena distribution can be increased due to the additional factors connected with conditions in the place of measurement of parameters. This reliability can be precisely calculated. To make this calculations, we need metadata about indicated factors of distributions. In data base, the values of probability connected with the distance between the station and elementary fields in its surroundings, as well as the probability connected with height differences above the sea level were calculated.

The above mentioned method can be used as well while applying different methods of indicating probability of information, not only such factors as height or distance. After many geographic analyses, made on the basis of complicated DMT and multi-dimensional analyses, it turned out that the borders connected with environmental factors of sub-regions are compatible in 85% with the borders of physiogeographic units indicated by Kondracki*. It turned out that it is useful to find cartographic elaborations made by the professionals and then it became clear that we do not have to do everything once again from the very beginning using digital methods.The next problem to be solved in the nearest feature, connected with the issue discussed above, will be a presentation of the errors of the information's value.

Elaborating such a visualization of those errors is significant for decision - making. The precise determination of zones, for which the value of natural parameters has been found with height probability, is of great importance particularly in interdisciplinary research where specialists from different scientific fields cooperate. Final construction of the spatial model probably will depend on the accepted collection of interpolation criteria. Lack of knowledge on that fact may lead to drawing wrong conclusions when it comes to phenomenon distribution and to elaborating incorrect forecasts.

** This famous Polish professor of geography made his geographic analyses many years ago. Professor Jerzy Kondracki (1908 1998) worked in ICA Commission on National and Regional Atlases in 70'.*

Such solutions will be tested along with developing a Lower Silesia Spatial Information System in Department of Geodesy and Cartography of the Office of the Marshal of Lower Silesian Voivodship no. 9/MGW/2003
Cartographic modelling mentioned above was elaborated in research project "Geographic Information System tools in modelling of climatic data in regional and local standard " no. 8 T12E 042 21 financed by The State Committee for Scientific Research in Poland