lor a fost validată, a dat şi aceasta rezultate pozitive, care vor suferi rectificări ulterioare.

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Summary:

USING G.I.S. TO IDENTIFY POTENTIAL HABITATS OF SOME SPECIES OF MAMMALS OF THE PUTNA RIVER WATERSHED.

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Keywords: spatial niche, environmental requirements, suitability, GIS

This paper aims to identify ways of determining the specific habitats of several species of mammals by integrating five geographic physical variables in GIS TNTmips 6.9 software. The study area is in the upper basin of the river Putna. The animals for which were calculated the potential biotops are wild boar, bear, wolf and lynx. We used two methods for calculating the degree of suitability and the results are interpreted in the paper.

THE AGRO-CLIMATIC ZONING WITHIN THE DNIESTER RIVER BASIN USING GIS TECHNOLOGIES

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Introduction

Concerning the degree of moisture and heat supply necessary for crops development, by the landscape character, the Dniester basin territory can be divided in 10 zones, agro-climatic regions, five of which belong to mountain and pre-mountain areas. This regionalization includes several steps and their generalization represents the final product. We note that such research for the study area is carried out firstly.

So the Dniester basin surface constitutes 68.627 km2 and the hydrographical basin area is 72.100 km2. The coordinates of the Source are 46°21′N 30°14′E and at the Mouth - 46°18′13.26″N 30°16′24.19″E. The difference in altitude represents 1.000 m (fig. 1).

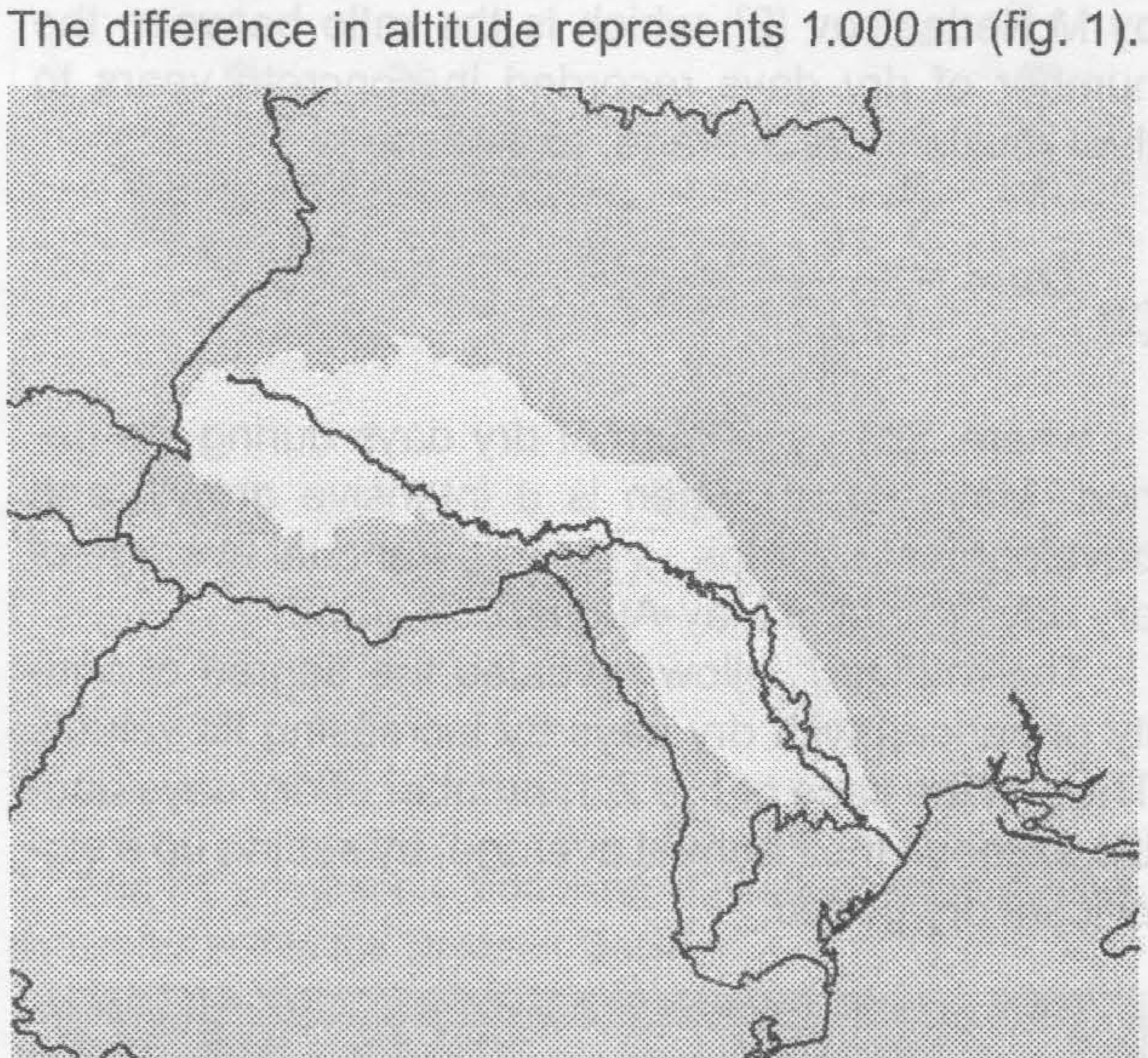

Fig.1 Map of the Dniester basin

Source: http://en.wikipedia.org/wiki/Dniester#me-diaviewer/File:Dniester_map.png

Initial material and research methods

At the first step in achieving agro-climatic regionalization, initially was created Information Data Base representing complex information regarding annual atmospheric precipitation regime, sum of active temperatures and the absolute minimum of the year, thus reflecting heat, moisture resources and winter conditions. If until recently in estimation the degree of aridity Seleaninov Hydrothermal Coefficient (HTC), as an appropriate indicator was used, the highly variable character of atmospheric precipitation regime over time denotes that its use at present does not adequately reflect the degree of aridity (eg. CHT in south-eastern part of the Republic of Moldova constitutes currently 0.9). But since World Meteorological Organization confirms the utility of Standardized Rainfall Index (SPI) in predicting droughts (formulated by Mc.Kee) its calculation has been made for particular years [3]. This index represents the equivalent of standardized anomaly of the random variable from climatic norm:

$$SPI = (x_i - x)/s \qquad (1)$$

(where x_i and x represent the meteorological factual value and of climatic norm, s - standard deviation).

So, using SPI to assess spatial extremes, it enables to find out consecutive manifestation of some climate extremes outside the country and to use various regional and international Information Databases.

But the intensification of aridity process over a significant part of the Dniester Basin more and more destructive influence the main phases of ontogenesis, being the reason why and Dry Periods Index (Izu) was taken into account, an index proposed by M.Nedealcov [2], which is the ratio between the number of dry days recorded in concrete years to their multiannual average, expressed by:

$$Izu = \frac{\sum zu_{(V-VIII)}}{\overline{X} zu_{(V-VIII)}}, \qquad (2)$$

where $Szu_{(V-VIII)}$ – sum of dry days during the period (May-August) when is a intensive growth and development of crops, $\overline{X} zu_{(V-VIII)}$ – annual average of dry days (months May-August).

The ratings I_{zu} allow revealed the degree of aridity of periods with dry days by increasing its values. Thus, in the case of I_{zu} = 2.1, number of dry days double exceeds their annual average, by setting up a significant dry period.

ID	STATION	ALTITUDE	X	Y	SUMAT	PAN	MINABS	ORIG_FID
0	Bravicea	80,5	808585,8	5247527	3313,3	574,3	-21,2	0
1	Baltata	79	854637,2	5213330	3332,8	504,4	-20,5	1
2	Balti	103	571222,4	5281688	3253,7	504,8	-21,6	2
3	Camenca	38,3	627810,5	5322380	3189	538,5	-21,1	3
4	Chisinau	172	840589,1	5203676	3444,9	549,2	-18,8	4
5	Dubasari	41	881024,1	5238537	3487	511,7	-17,8	5
6	Falesti	180,3	653001,9	5270240	3371	588,7	-18,4	6
7	Rabnita	97	651056,5	5292974	3257,8	523,1	-19,7	7
8	Soroca	171	587484,2	5339184	3088,1	548,5	-21,1	8
9	Stefan Vo	171	703320,7	5158118	3349	540,8	-17,7	9
10	Tiraspol	38	898955,3	5183474	3458,5	509,1	-18,4	10
11	Drogobyc	275	250748,1	5473383	2405	754	-24	11
12	Lviv	319	281680,1	5521647	2600	721	-20,8	12
13	Slavskoe	592	239587,4	5418860	2053	509	-28,9	13
14	Novodnes	241	533187,8	5381236	3006,7	601	-19,7	14
15	Nov. Usita	292	518895,8	5409818	2744,5	648	-21	15
16	K. Podolsl	217	471197,5	5393440	2818,2	832	-23	16
17	M. Podolsl	77	557840,8	5386613	3058,2	591	-20,8	17
18	Zatishie	193	717832,8	5246238	3218	509	-18,2	18
19	Razdelnay	148	734107,3	5183075	3355,9	608	-17,1	19

Fig. 2. Annual average (1980-2013) concerning atmospheric precipitation regime, the amount of active temperatures and of the absolute minimum from meteorological stations within the Dniester Basin

As an indicator of „dry days" is T of the air higher >25^{0}C) and low relative air humidity (U<30%).

Therefore, using Geographic Information Systems [1] in the proposed researches, for the first time was developed agro-climatic regionalization of the territory included in the Dniester Basin, which includes the eastern territory of the Republic of Moldova and western Ukraine. Initially it was created the basis of Information Database in Microsoft Excel, part of Microsoft Office Professional (fig. 2).

As our experience demonstrates, this system is quite convenient for storage and use of climate information in tabular form. In addition, for the statistical processing of this information and presenting was also used spatial Statgraphics Centurion XV, and digital maps development– ArcGis Programme.

As initial material for the study served multiannual data concerning atmospheric precipitation regime, the amount of active temperatures and absolute minimum from 20 meteorological stations within the Dniester Basin (11 stations from the territory of the Republic of Moldova and 9 - from Ukraine).The second step was to develop regression models that demonstrate the dependence of agro-climatic indices by absolute altitude of the territory, geographic latitude and longitude (fig.3, 4, 5).

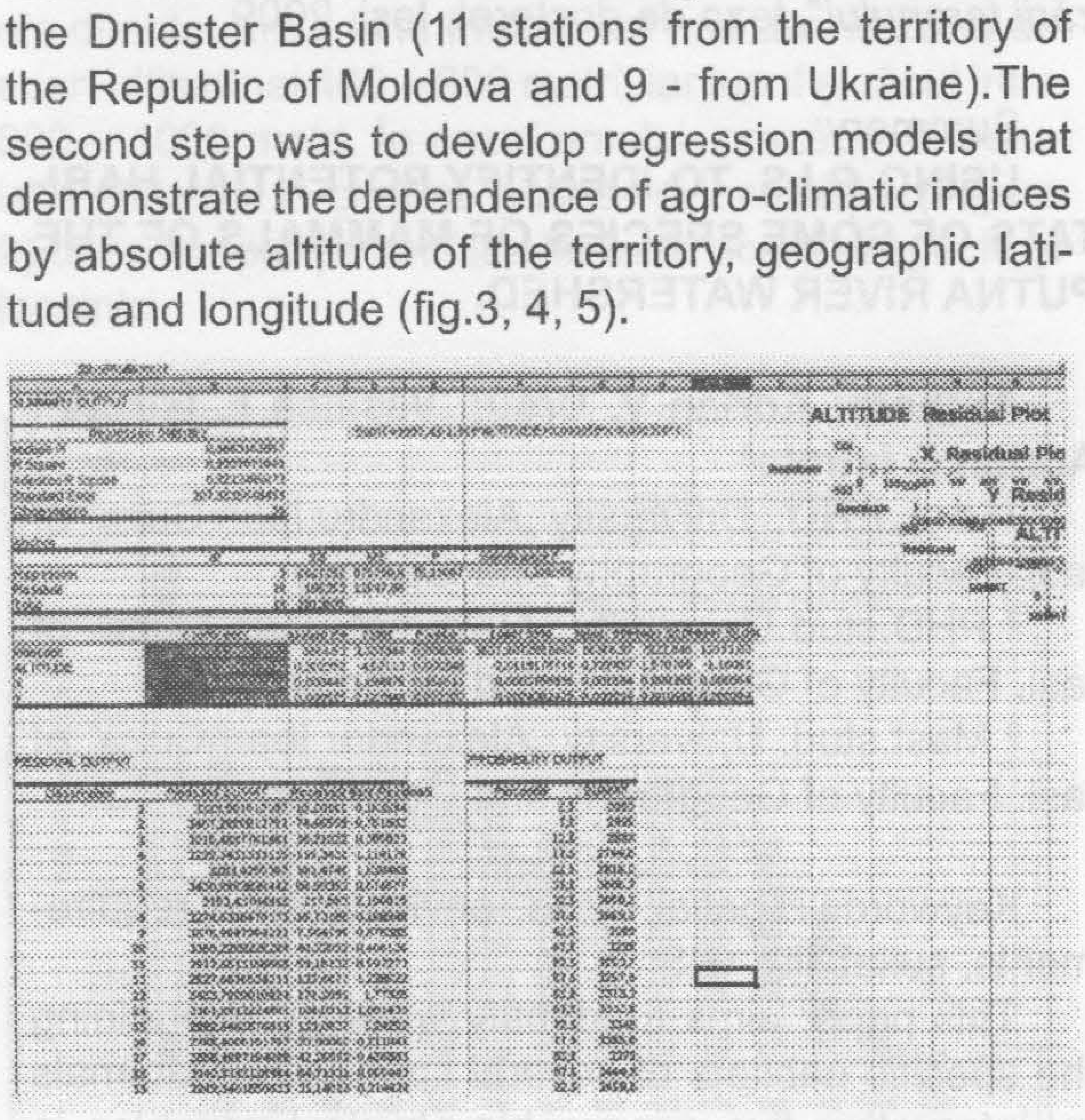

Fig. 3. The regression model of the amounts of active temperatures within the Dniester Basin

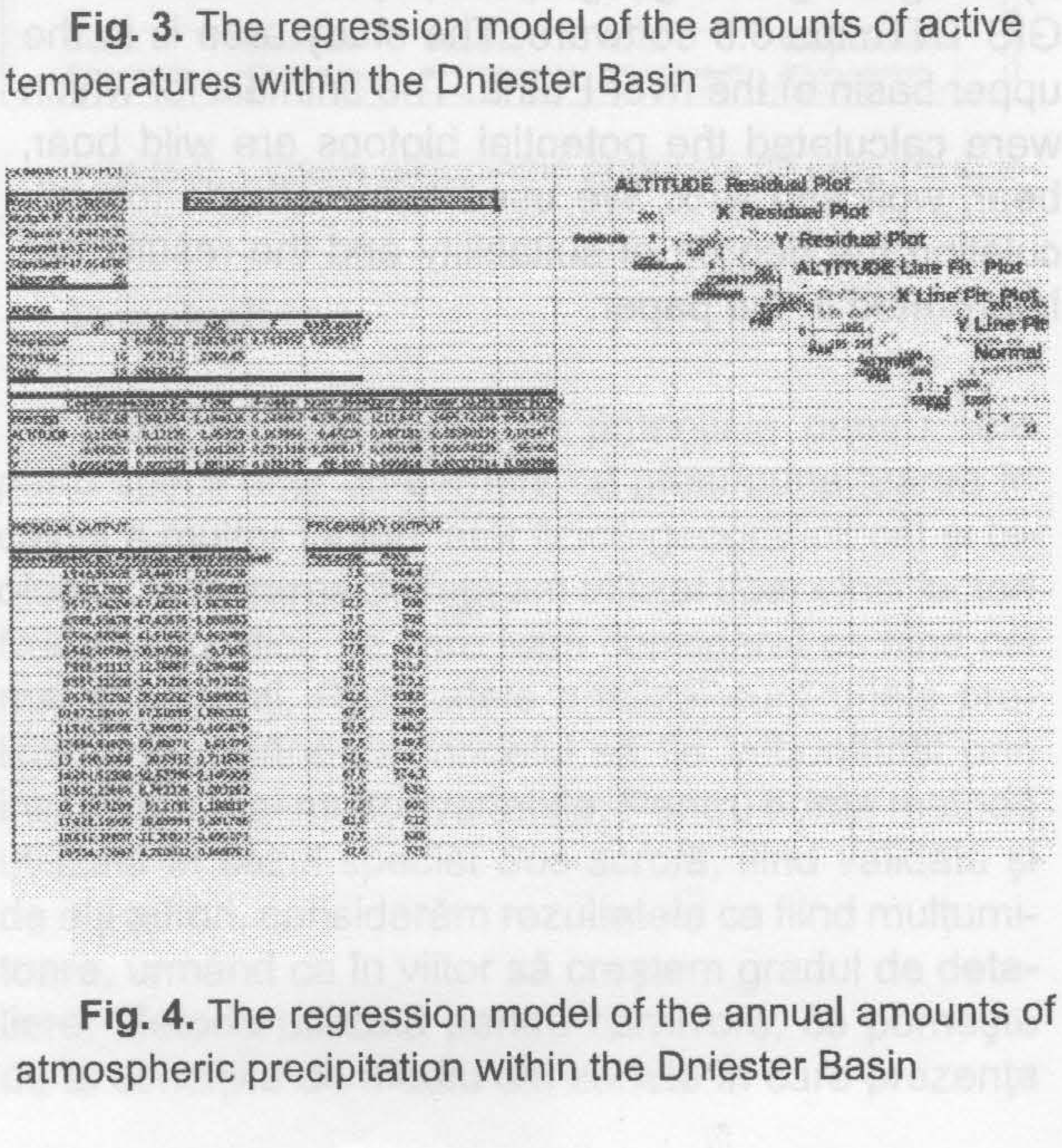

Fig. 4. The regression model of the annual amounts of atmospheric precipitation within the Dniester Basin

The values of the coefficient of determination R^2 indicates, as usual; the independent variables (absolute altitude of the territory, geographic latitude and longitude) included in the model explained by percent the variability agro-climatic indices, so the dependent variable). At the same time with coefficient of determination value, the level of significance of the pattern as a whole is seeks, and the meaning of each independent variable included in the model. If the significance of these values exceeds the level of credibility then given variable is excluded from the pattern. In this context, is used multiple regression analysis, gradually excluding and including variable. Therefore, the determination coefficient values for the regression model of amounts of active temperatures is quite significant and constitutes 0.93. And each physical-geographical factors included in the model that demonstrate as well the interpolation quality varies between significance level P from 0.0003 absolute altitude to 0,1- the geographic latitude (fig. 3).

The values of the determination coefficient for the regression model of amounts of atmospheric precipitation constitutes 0.65 which shows that the correlation coefficient is less than 0.8, showing as well the quality model. And each physical-geographical factor included in the model and the significance level P values are from 0.07 geographical longitudes to 0.29 - geographic latitude (fig. 4).

The absolute altitude significance level is higher than that of geographical latitude and it is 0.1.

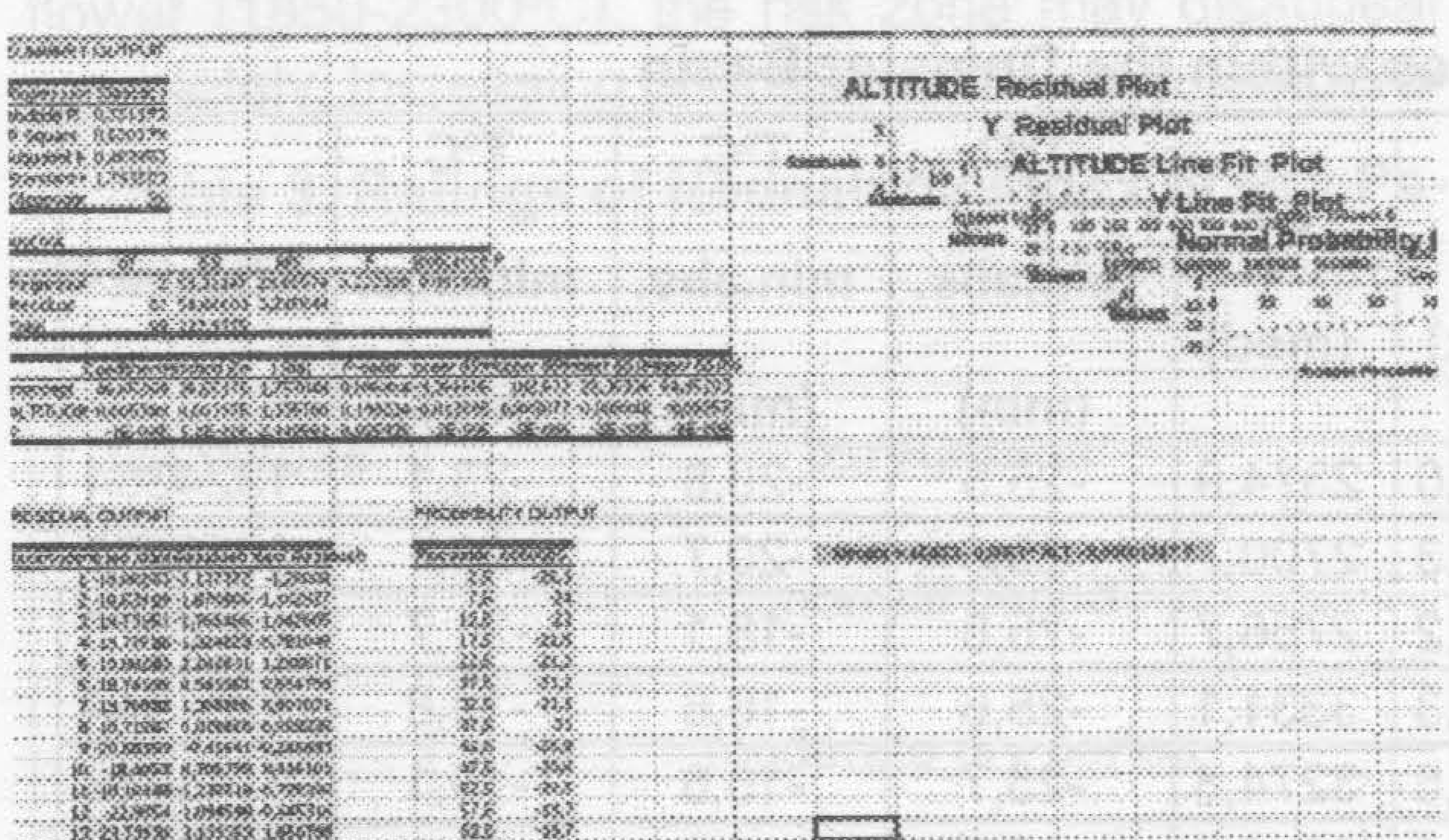

Fig. 5 The regression model of the average of the absolute minimum within the Dniester Basin

The values of the coefficient of determination for the regression model of absolute minimum of the year constitutes as in the previous case 0.52 which shows that the correlation coefficient is equal to 0.77 explaining also the quality of the proposed model. The values of significance levels P are from 0,02- geographical longitude to 0.1 - absolute altitude (fig. 5).

Analysis of the obtained results

The third step was to develop map models which were further at the basis of automatically agro-climatic zoning. Cartographic Modelling of indices that characterize these resources allows emphasizing regional particularities in the context of climate change. Thus, for the first time was obtained regionalization agro-climatic resources within the Dniester Basin, studies necessary to ensure the development of sustainable agriculture within the region.

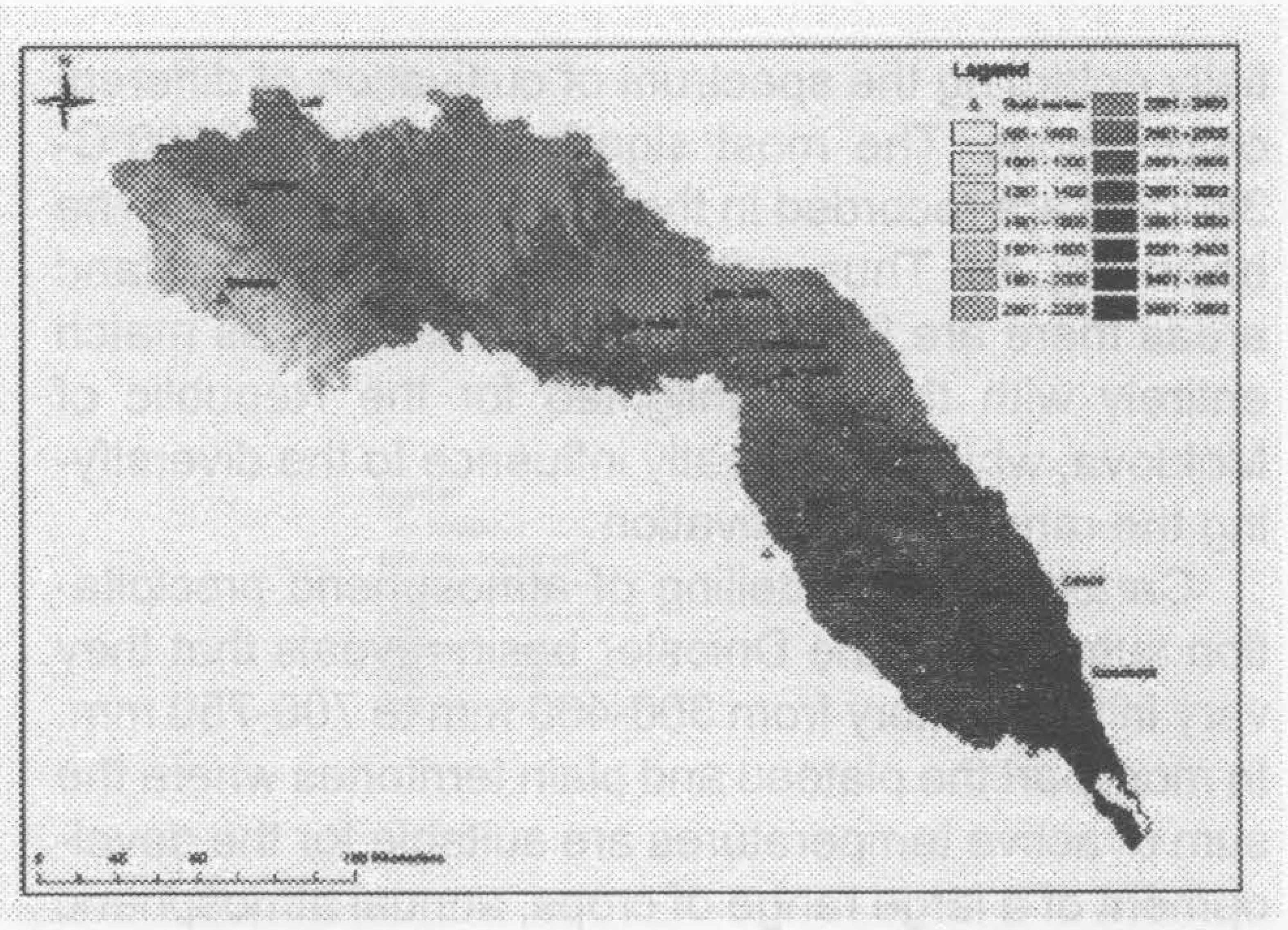

Fig. 6 Cartographic Modelling of active air temperatures sums within the Dniester Basin

Spatial distribution of active temperatures sums varies between mountain and pre-mountain territories from 800 to 2600°C. Within plateau and lowland areas they range from 2700-3800°C, essen-

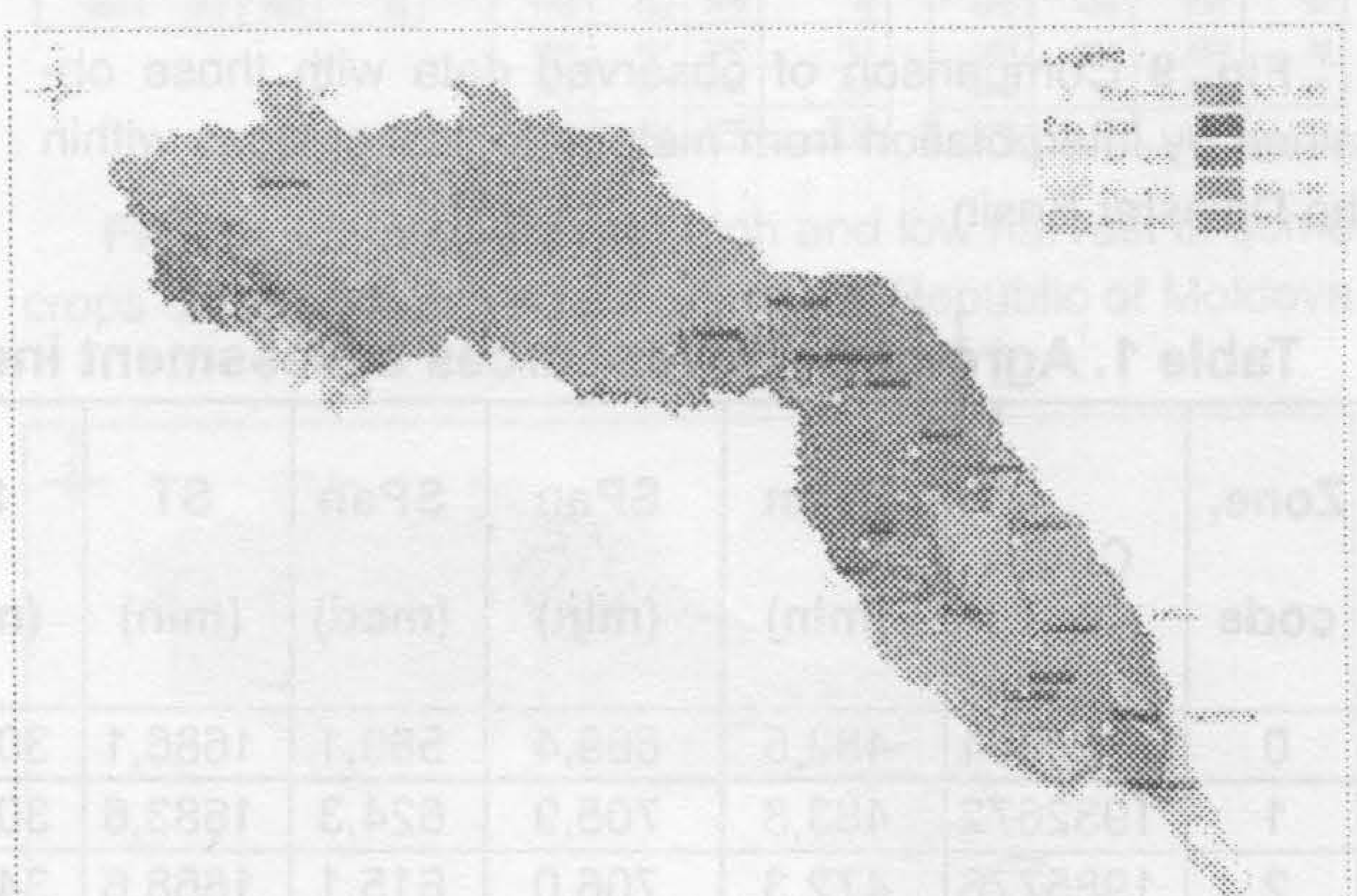

Fig. 7 Cartographic Modelling of atmospheric precipitation sums within the Dniester Basin

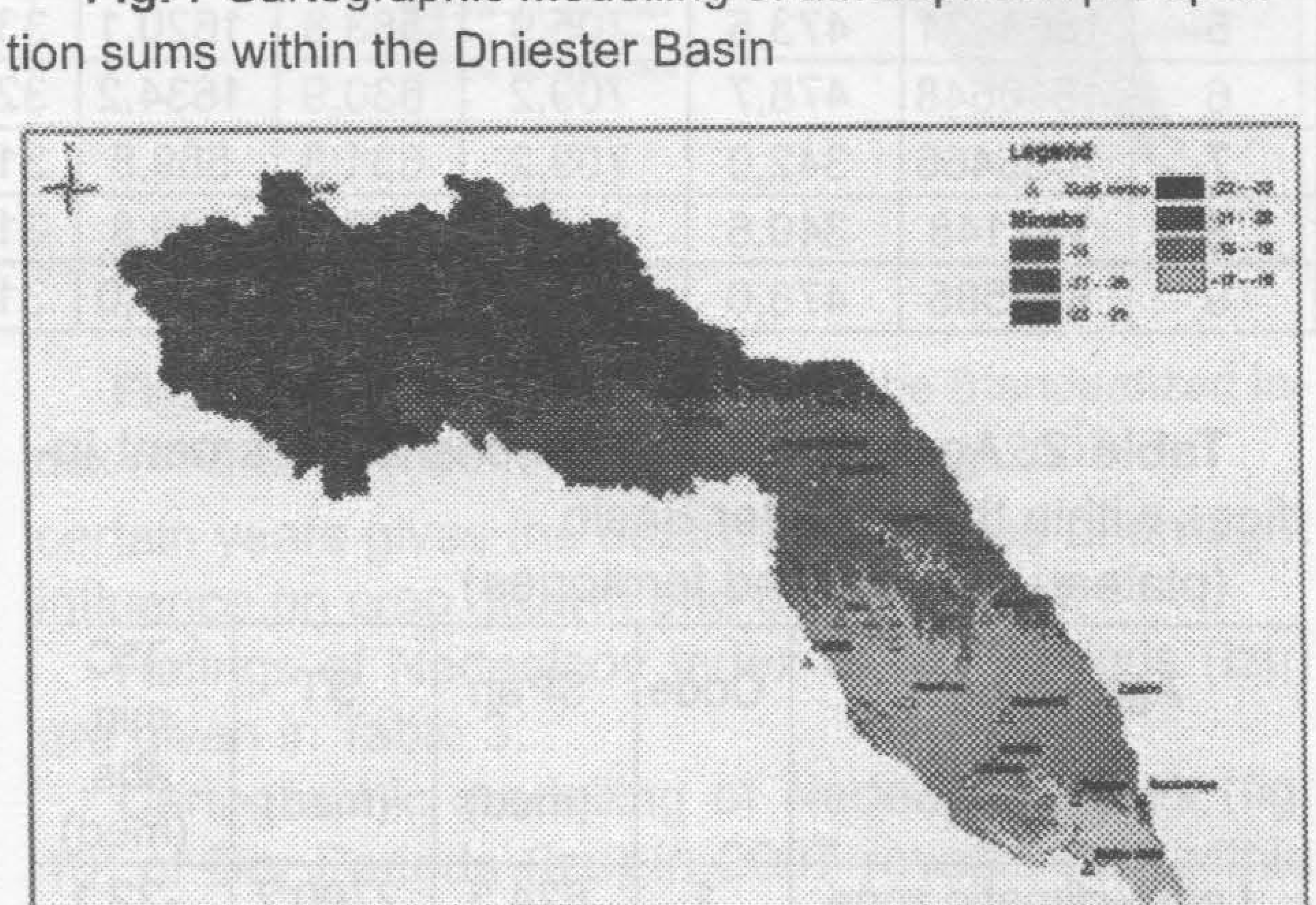

Fig. 8 *Cartographic Modelling of the absolute minimum of the year within the Dniester Basin*

tially enlarging the spectrum of cultivation of different crop groups. The most significant values (3600^{0}C-3800^{0}C) are recorded in the extreme southeast of the basin (fig. 6). Thus, within the plateau and lowland areas there are 900^{0}C and spatial differences match entirely with those highlighted for the Republic of Moldova, which can greatly influence to the diversifying the range crop cultivation.

Cartographic Modelling of atmospheric precipitation sums within the Dniester basin reveals that they vary in the territory from 300-400 mm to 700-750 mm. In most part the plateau and plain territories where the sum of active temperatures are suitable for the development of a large range of crops, annual atmospheric precipitation constitutes 500-550 mm (fig. 7).

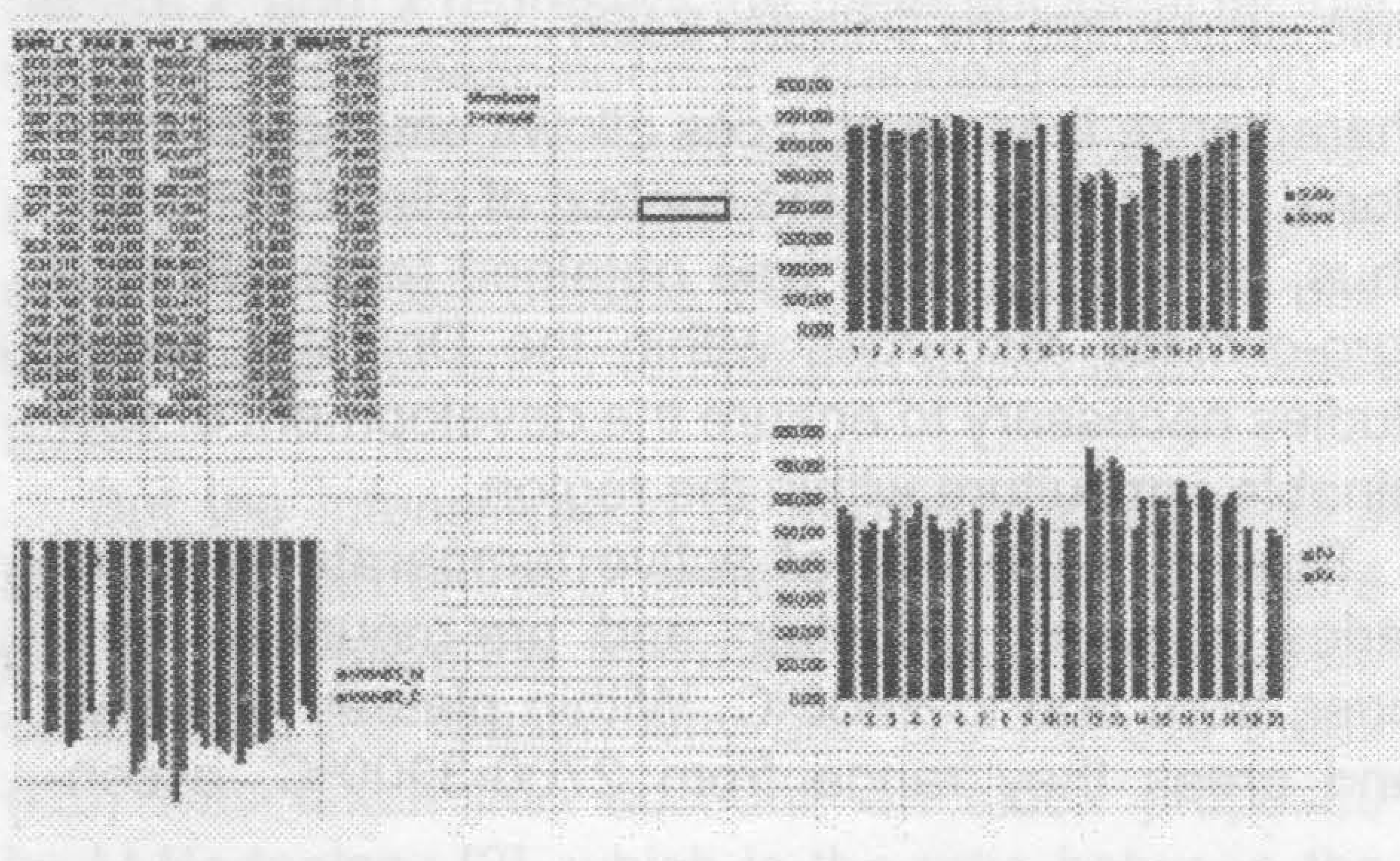

Fig. 9 Comparison of observed data with those obtained by interpolation from meteorological stations within the Dniester Basin

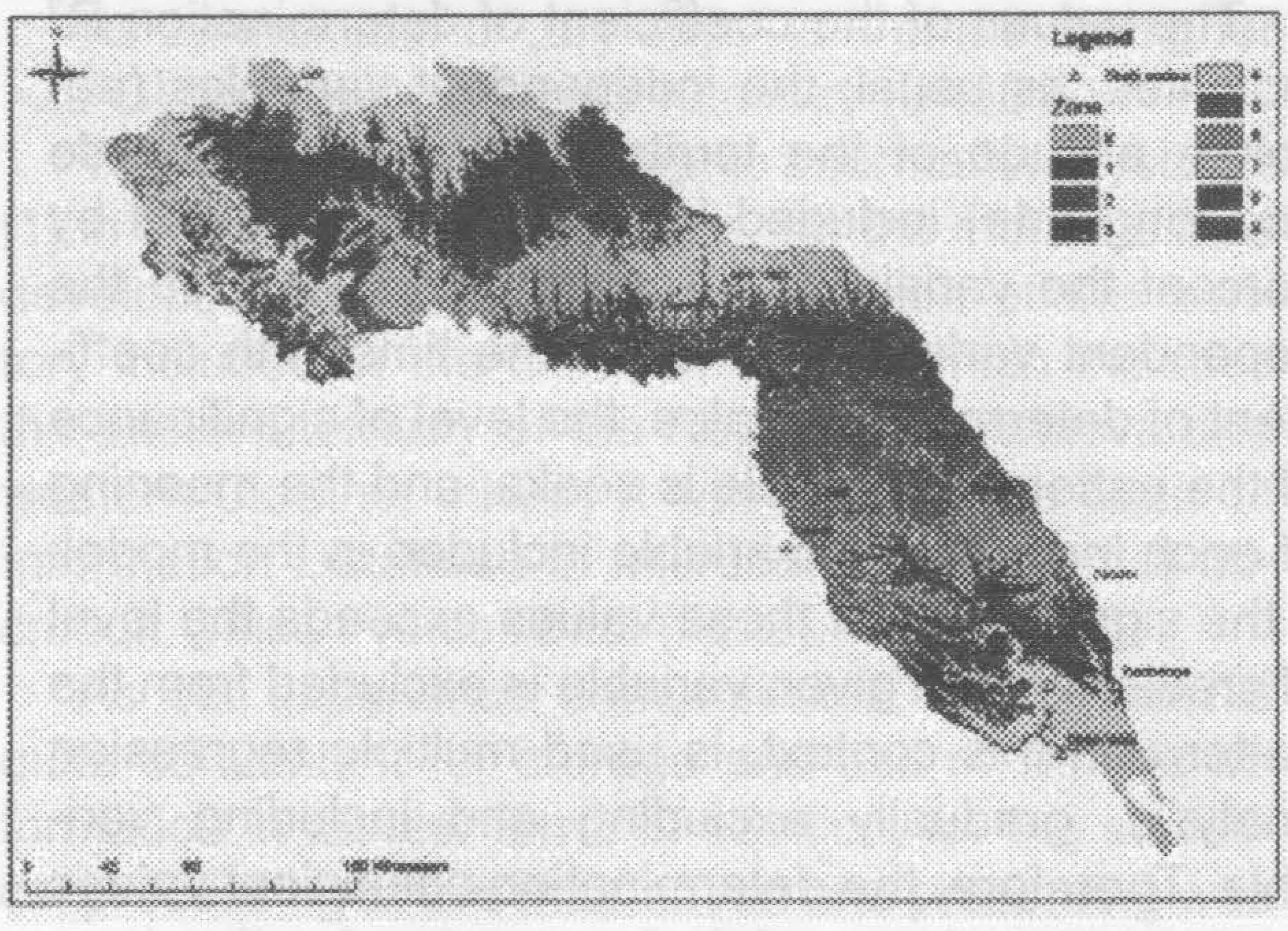

Fig. 10. Agro-climatic zoning of the territory (Republic of Moldova and Ukraine) included within the Dniester Ba*sin*

One of the main indicators of the wintering conditions is the absolute minimum of the year because its values characterize favourability multiannual crops wintering. Thus, in intermountain depressions, the average of the absolute minimum of the year calculated for the period 1980-2013 ranges from -28...-24^{0}C, in mountain and pre-mountain regions it constitues -23...-21^{0}C, and within plateau and plain regions this agro-climatic index constitutes -20...-16^{0}C (fig. 8).

Comparing data obtained from cartographic modelling and those observed (fig. 9) essential differences are highlighted, indicating that these models are useful in further agro-climatic regionalization of Dniester Basin.

Thus, in the piedmont and mountains, and plateaus and plains areas each respectively define 5 agro-climatic districts. The mountain and piedmont is expressed by numerical codification 0, 8,7,2,6 and the rest of the territory namely plateau and plain territories - by numbers 1, 5, 9, 4, 3 (tables 1, 2, fig. 10).

So agro-climatic zoning of territory (Republic of Moldova and Ukraine) included in the Dniester Basin delimits the plateau and plain areas following agro-climatic zones or districts (fig. 10):

- I agro-climatic zone (code 1)- is characterized in the territory by the sum of active temperatures

Table 1. Agro-climatic resources assessment indices within the Dniester Basin

Zone, code	Count	SPan (min)	SPan (min)	SPan (med)	ST (min)	ST (max)	ST (med)	T^{0}C min.abs. (min)	T^{0}C min.abs. (max)	T^{0}C min.abs. (med)	Count
0	1324364	483,5	669,4	589,1	1686,1	3019,0	2374,9	-25,5	-20,8	-23,1	1324364
1	1932672	483,8	705,9	624,3	1683,6	3020,3	2700,7	-25,5	-20,7	-22,1	1932672
2	1985776	472,3	706,0	615,1	1668,6	3494,2	2756,7	-25,6	-18,1	-21,7	1985776
3	1231044	465,6	705,9	526,8	1652,1	3738,3	3331,1	-25,6	-16,6	-18,8	1231044
4	1143072	465,5	706,0	534,9	1640,1	3739,6	3274,8	-25,7	-16,6	-19,1	1143072
5	1864971	473,5	705,9	583,8	1620,1	3348,6	2916,0	-25,7	-18,9	-21,0	1864971
6	1810648	478,7	709,2	630,9	1634,2	3226,4	2605,5	-25,7	-19,6	-22,5	1810648
7	1035466	342,0	709,2	631,3	589,8	3197,0	2312,2	-29,6	-19,7	-23,7	1035466
8	787148	340,6	638,7	550,4	589,8	3189,3	2784,4	-29,6	-19,8	-21,4	787148
9	662585	476,0	637,8	561,8	2851,0	3187,4	3059,8	-20,9	-19,8	-20,4	662585

Table 2. Agro-climatic resources assessment indices within the Dniester Basin
(plateau and lowland territories)

Agro-climatic zoning	Code	SPan (med)	ST (med)	T^{0}C min. abs. (med)
I agro-climatic zone	1	624,3	2700,7	-22,1
II agro-climatic zone	5	583,8	2916,0	-21,0
III agro-climatic zone	9	561,8	3059,8	-20,4
IV agro-climatic zone	4	534,9	3274,8	-19,1
V agro-climatic zone	3	526,8	3331,1	-18,8

2700 ^{0}C, 624mm - sum of annual atmospheric precipitation, and the average of the absolute minimum of the year -22,1^{0}C.

- II agro-climatic zone (code 5)- is characterized in the territory by the sum of active temperatures 2916 ^{0}C, sum of annual atmospheric precipitation of 584mm and the average of the absolute minimum of the year -21,0^{0}C.
- III agro-climatic zone (code 9)- is characterized in the territory by the sum of active temperatures 3060 ^{0}C, sum of annual atmospheric precipitation of 567mm and the average of the absolute minimum of the year -20,4^{0}C.
- IV agro-climatic zone (code 4)- is characterized in the territory by the sum of active temperatures 3275 ^{0}C, sum of annual atmospheric precipitation of 535mm and the average of the absolute minimum of the year -19,1^{0}C.
- V agro-climatic zone (code 3)- is characterized in the territory by the sum of active temperatures 3331^{0}C, sum of annual atmospheric precipitation of 525 mm 567mm and the average of the absolute minimum of the year -18,8^{0}C.

Therefore, only the change in heat resources in this region, will contribute to the movement of thermal optimum for cultivation, which will carry along to northward thermophilic crops cultivation. Thus, as the risk zone of growing late varieties of vines, peach, cherry, apricot has changed (3500^{0}C), which will contribute to optimal growing area movement to the north, and for certain crops such as maize (2200-2700^{0}C), sunflower (1850-2300^{0}C), the risk zone may disappear completely. Increasing of amounts of active tempera-

Table 3. Ratings of Nedealcov Index of Dry Periods (Izu)

Izu Values	Izu Ratings
0,1-1,0	normal period
1,1-2,0	moderate dry period
2,1-3,0	significant dry period
3,1-4,0	hazardous dry period
>4,1	exceptional dry period

tures, contrary, will negative influence the productive process of winter wheat varieties (1400-1500^{0}C). The emergence of areas with temperatures amounts of 3600 - 3800^{0}C occur favourable thermal conditions for cotton cultivation.

Undoubtedly, the actual moisture resources will be determined and will be used as a bordering factor in the cultivation of various crops, including cotton. Currently there is a frequent manifestation of the long dry periods. Therefore the Regional Index Nedealcov of Dry Periods (Izu) was developed (tab. 3), which in certain years gives the destructive degree of drought influence on crop growth and development.

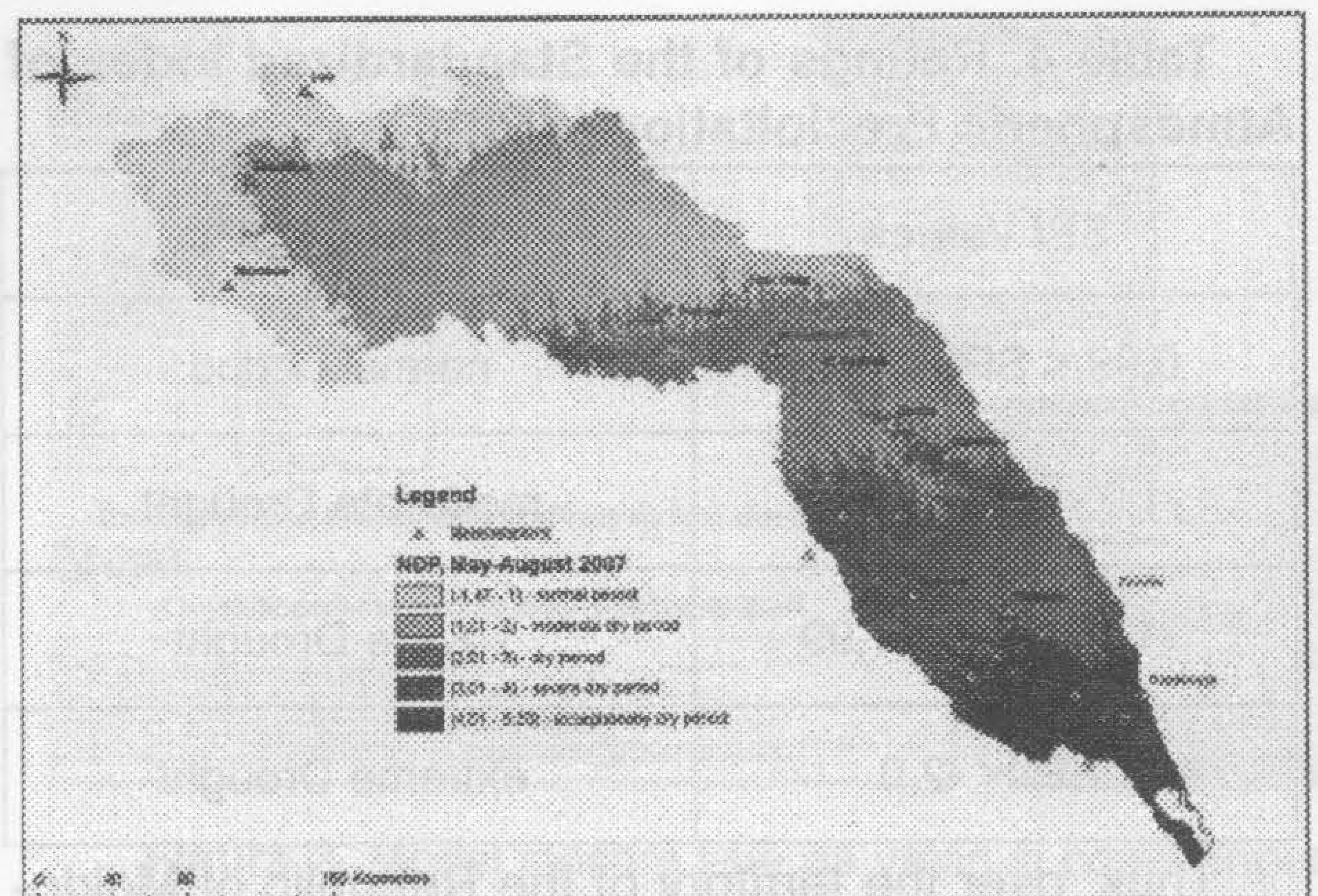

Fig. 11. Cartographic modelling of Nedealcov Index of Dry Periods (Izu) in the year 2007 (May-August)

The top 10-year with high and low yields (q / ha) on crops under study and record (1960-2012) in the Republic of Moldova

winter wheat

1960-2012			
Anii	Recolta	Anii	Recolta
1966	42.4	[illegible]	[illegible]
1988	42.1	1964	9.3
1990	41.2	1963	11.8
1978	42.5	2007	13
1984	40	1968	13.4
1977	39.2	1962	14.3
1975	38.8	1950	14.7
1974	38	1961	16.1
1989	37.4	2012	17
1991	38.8	1987	19

sunflower

1960-2013			
Anii	Recolta	Anii	Recolta
1969	23.8	2007	[illegible]
1988	21.2	[illegible]	[illegible]
1984	20.7	2012	10
1973	20.0	1997	10,1
1979	20,6	1994	10,7
1986	19,6	2003	11,1
1990	18,9	1976	12
1983	18,7	2005	12,1
1977	18,5	2001	12,2
1985	18,1	2002	12,4

maize

1960-2013			
Anii	Recolta	Anii	Recolta
1989	50	2007	8
1979	49,6	2012	[illegible]
1991	48	1994	22
1988	44	2000	23
1978	41,9	1963	23,51
1984	42	1972	24
1972	48,5	2001	24
1973	48,2	2003	26
1980	40	2002	27
1997	40	1981	28

Fig. 12 Top of years with high and low harvest of some crops cultivated on the territory of the Republic of Moldova

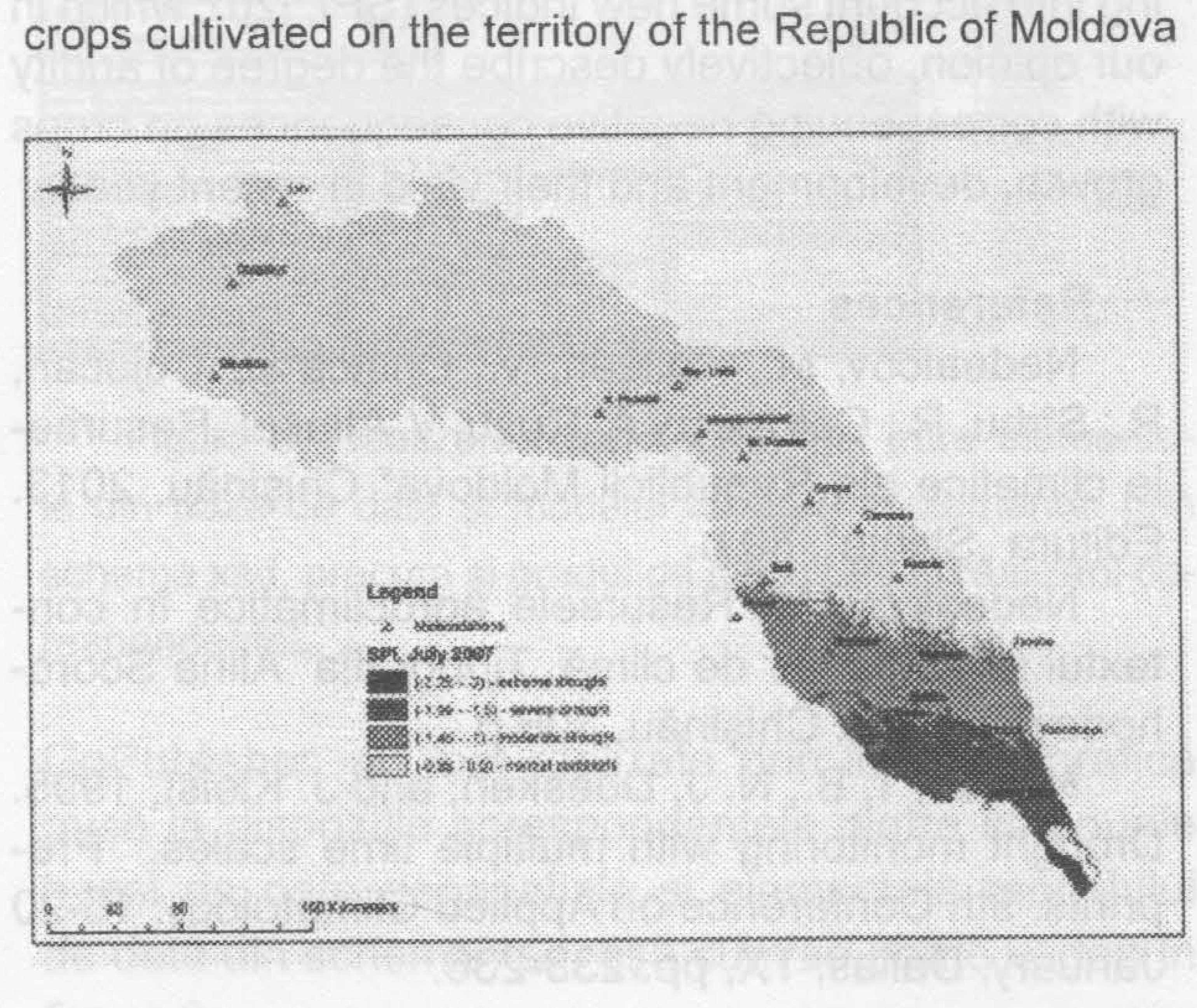

Fig. 13. Cartographic Modelling of the Standardized Index of Atmospheric Precipitation, in the July 2007

Ratings of Nedealcov Index of Dry Periods (Izu) are given in Table 3.

Cartographic modelling of Nedealcov Index (fig. 10) of Dry Periods (Izu) in 2007 reveals that within the Dniester Basin dry periods had a dangerous and exceptional manifestation during crop growth and development (months V-VIII) especially in the II, III, IV, and V agro-climatic zones (fig. 11).

Table 4. Ratings of the Standardized Index of Atmospheric Precipitation (SPI)

SPI Values	Ratings SPI
0,99 < SPI <-0,99	normal period
-1,0 < SPI < -1,49	moderate Drought
-1,5 < SPI <-1,99	severe Drought
SPI < -2,0	extreme Drought

Thus, over the territory of the Republic of Moldova the productivity of cereals (maize) and industrial crops (sunflower) was the lowest for the last 53 years (1960-2012), namely due to long dry period installation during the months May - August that conditioned a low productivity of these crops.

Winter wheat yield recorded in 2007 also was one of the lowest, ranking the fourth place among the years with the lowest yields. We note that the wheat grain in most part of the territory taken under study was extremely crumbly (fig. 12).

Cartographic modelling of the Standardized Index of Atmospheric Precipitation elaborated for July 2007, for example, denotes that during this month, the crops in the fourth and fifth agro-climatic zones developed in severe and extreme drought conditions (fig. 13, tab. 4).

In conclusion we find that the specific of aridity manifestation within the Dniester Basin requires taking into account some new indices (SPI, Izu), which in our opinion, objectively describe the degree of aridity with corresponding negative consequences on crops growth, development and their yield in recent years.

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SPECIFICAŢIILE TEHNICE INSPIRE PENTRU ARIILE NATURALE PROTEJATE, INCLUSIV A SITURILOR NATURA 2000, CERINŢĂ PENTRU RAPORTĂRILE EFECTUATE DE ROMÂNIA LA NIVEL EUROPEAN

Mihai Ioniţă, Sorin Rusu, Daniel Cocanu, Daniel Urdă

Teamnet Solutions

Contact:

Articolul de faţă îşi propune să prezinte o modalitate de realizare a setului de date privind ariile naturale protejate din România în conformitate cu specificaţiile de date Inspire.

Infrastructura de date spaţiale din Europa (INfrastructure for SPatial InfoRmation in Europe) reprezintă o infrastructură de date spaţiale la nivel european pentru sprijinirea politicilor comunitare de mediu şi a activităţilor şi politicilor cu posibil impact asupra mediului. Directiva Inspire (2007/2/EC) din 14 martie 2007 a fost publicată în Jurnalul Oficial pe data de 25 aprilie 2007. Pentru a deservi scopul de asigurare a interoperabilităţii datelor spaţiale la nivel comunitar, au fost adoptate regulamente de implementare specifice mai multor arii: metadate, date, servicii de reţea, partajarea de date şi servicii, şi monitorizare, şi raportare. Infrastructura europeană pentru date spaţiale este constituită din metadate, seturi şi servicii de date spaţiale, servicii şi tehnologii de reţea, acorduri de partajare, accesare şi utilizare, mecanisme, procese şi proceduri de coordonare şi monitorizare, stabilite sau puse la dispoziţie conform directivei şi regulamentelor subsecvente.

Infrastructura europeană de date spaţiale se bazează pe infrastructurile pentru informaţii spaţiale, instituite şi exploatate de către statele-membre. Statele-membre trebuie să creeze metadatele în termen de 2 ani de la data adoptării normelor de aplicare (Regulamentul CE nr. 1205/2008 al Comisiei din 3 decembrie 2008) pentru seturile de date spaţiale corespunzătoare categoriilor enumerate în anexele I şi II (3 decembrie 2010), respectiv 5 ani pentru seturile de date corespunzătoare categoriilor din anexa III (3 decembrie 2013).

Statele-membre trebuie să se asigure, în măsura posibilităţilor, că toate seturile de date spaţiale nou colectate şi restructurate masiv, precum şi serviciile de date spaţiale corespunzătoare acestora, sunt disponibile în conformitate cu normele de aplicare menţionate la alineatul (1) (regulamentele de implementare), în termen de doi ani de la adoptarea acestora. Ţinând seama de eforturile semnificative necesare pentru a aduce seturile şi serviciile de date spaţiale