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CLIMATIC PHENOMENA OF RISK IN THE CRISURILOR AND SILVANO – SOMEŞENE HILLS

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Résumé: ***Phénomènes climatiques de risques dans les Collines de Criş et dans les Collines Silvano-Someşene.*** Les phénomènes climatiques de risque, possibles pendant toute la durée de l'année, apparaissent en deux situations: quand il y a un déficit d'eau, respectivement des phénomènes de sécheresse et lorsque un excès d'humidité apparaît. Ces phénomènes climatiques de risque sont possibles dans des unités de relief qui s'élèvent jusqu'à 700 m. d'altitude, c'est-à-dire dans les Collines des Criş et du Someş (les Collines Silvano-Someşene). L'analyse des données météorologiques de la période 1971 – 2002 prouve que ces collines ne sont pas affectées fréquemment et brutalement pas des phénomènes climatiques de risque. Même si ceux-ci se produisent, ils ont un caractère isolé, de courte durée.

Mots - clés: risque climatiques, déficit d'eau, excès d'humidité

The climatic phenomena of risk, possible during all year around, appear in two situations only: when there is a deficit of water, respectively the dryness and the drought phenomena or when it appears an excess of humidity. These climatic phenomena of risk are possible in the relief high up to 700 m altitude that is in the low fields and in the plain.

1. The dryness and drought phenomena

The dryness represents the time interval characterized by the absence of precipitations during 5 days in succession or, if it has rained, the precipitations didn't surpass the average for that day.

The drought is the time interval characterized by the absence of precipitations during at least 14 days in succession during October- March and during at least 10 days in succession in the warm period(April-September) or, if there were any precipitations, they didn't surpass 0,1 mm. (O. Gaceu, 2002).

As in the case of other climatic phenomena and at the foundation of dryness phenomena there are several elements: the factors that define the particularities of the active surface's structure (relief particularities, vegetation, ground, hydrography); factors that define the time particularities (elements of weather, the spare of soil water etc.); anthropologic factors. The most important of all these mentioned factors are the lack of precipitation. Their presence is favoured by the anticyclones which appear in Central Europe, Eastern Europe and North-Eastern Europe. A very important part is marked by orographic dam created by the Carpathians.

These dryness and drought phenomena are very variable in time and space. In Romania, their length and intensity grows from West and South-West to East and North-East, in accordance to the growth of the continental gradient. For the habitat we study, the dryness period was calculated to 16-17 days (C. Donciu, 1928, 1970; Octavia Bogdan and the contributors, 1972).

The frequency of the dry and drought time can be watched through the Peguy and Walter-Lieth climogrames, where one can correlate the temperature and precipitation

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conditions (Romanian Geography) According to the maps made in these regions which are lees exposed to these climatic risk phenomena, are the West Plain and Hills. The intensity of these phenomena can be expressed by the aridity index Emm. de Martonne. According to this index, the values are comprised between 30/ 40, while other regions which are more exposed to these phenomena have values under 20 (Romanian Geography).

The most frequent periods of dryness are during the winter time- January and February, and during the summer time- June and July. The drought periods appeared at the end of the summer time and the beginning of autumn (August, September and October), respectively during the spring time in March and April.

2. The Humidity Excess

Humidity excess represents the situation where the precipitation amount fallen in a certain time interval exceeds the amount of soil infiltration, or evaporation.

Unperiodically variation of precipitation quantity and their positive digression Holod **Table 1**

Year	Yearly average (mm)	Multiyear average (mm)	Deviation (mm)			
			+	%	-	%
1972	657,6	703,7			-46,1	- 6,5
1973	574,5	703,7			-129,2	- 18,3
1974	896,5	703,7	192,8	27,2		
1975	556,6	703,7			-147,1	- 20,9
1976	595,6	703,7			-108,1	- 15,3
1977	782,4	703,7	78,7	11,0		
1978	792,3	703,7	88,6	12,5		
1979	738,0	703,7	34,3	4,8		
1980	875,6	703,7	171,9	24,3		
1981	847,2	703,7	143,5	20,3		
1982	610,7	703,7			-93	- 13,2
1983	563,0	703,7			-140,7	- 19,9
1984	670,3	703,7			-33,4	- 4,7
1985	728,8	703,7	25,1	3,5		
1986	610,8	703,7			-92,9	- 13,2
1987	772,7	703,7	69	9,8		
1988	729,9	703,7	26,2	3,6		
1989	730,4	703,7	26,7	3,6		
1990	425,5	703,7			-278,2	- 39,5
1991	727,6	703,7	23,9	3,2		
1992	572,6	703,7			-131,1	- 18,6
1993	632,5	703,7			-71,2	- 10,1
1994	634,6	703,7			-69,1	- 9,81
1995	771,2	703,7	67,5	9,5		
1996	634,1	703,7			-69,6	- 9,89
1997	634,1	703,7			-69,6	- 9,89
1998	730,7	703,7	27	3,8		
1999	818,4	703,7	114,7	16,2		
2000	377,6	703,7			-326,1	- 46,3
2001	910,4	703,7	206,7	29,3		
2002	578,7	703,7			-125	- 17,7
Departure (%)	**+**			**48,4**		
	-					**51,6**

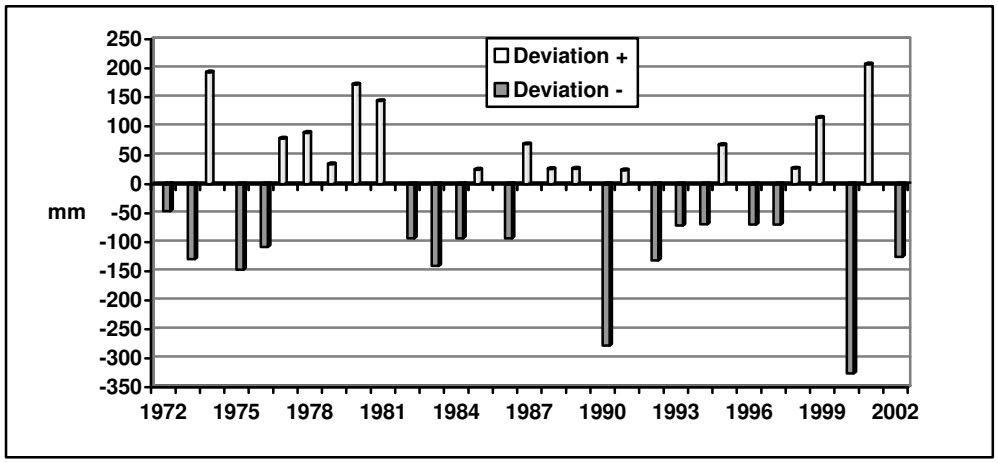

Fig.1 Quantity digression of precipitations at Holod station

Western hills' position in the way of west air mass can cause the production of a big amount of precipitation and as its effect a greater humidity, witch can grow till excess. The humidity excess is a direct relation with the thermal values, witch leads to evaporation and evapo- transpiration.

Unperiodically variation of precipitation quantity and their positive digression.Dumbrăviţa de Codru

Table 2

Year	Yearly average (mm)	Multiyearly average (mm)	Deviation (mm)			
			+	%	-	%
1983	608,7	821,2			-212,5	- 25,8
1984	927,3	821,2	106,1	12,9		
1985	847,5	821,2	26,3	3,2		
1986	727,1	821,2			-91,9	- 11,4
1987	795,1	821,2			-26,1	- 3,1
1988	950,5	821,2	129,3	15,7		
1989	831,4	821,2	10,2	1,2		
1990	630,5	821,2			-190,7	- 23,2
1991	884,8	821,2	63,6	7,7		
1992	672,5	821,2			-148,7	- 18,1
1993	814,5	821,2			-6,7	- 0,8
1994	729,4	821,2			-91,8	- 11,1
1995	927,4	821,2	106,2	12,9		
1996	950,4	821,2	129,2	15,7		
1997	845,3	821,2	24,1	2,9		
1998	957,6	821,2	136,4	16,6		
1999	964,8	821,2	143,6	17,4		
2000	582,0	821,2			-239,2	- 29,1
2001	1070,1	821,2	248,9	30,3		
2002	705,4	821,2			115,8	- 14,1
Departure (%)	**+**			**55**		
	-					**45**

The causes that generate the humidity excess appear in the general circulation of the atmosphere, when the most fortunate are represented by the active surface characteristics (altitude, soil type)

Humidity excess is a phenomenon that can happen in any season.

Among the excess humidity parameters we can name the unperiodically variation of precipitation quantity and their positive digression.

In accordance with the Hellman criteria the 1974, 1980, 1981 and 2001 were extremely rainy, 1999 very rainy, 1977, 1978 rainy; 1987, 1995 medium rainy; 1979, 1984, 1985, 1988, 1989, 1991, 1998; 1972, 1994, 1996 and 1997 moderate drought; 1986 and 1993 drought; 1973,1975, 1976,1983,1990,1992,2000 and 2002 were very droughty and extremely droughty.

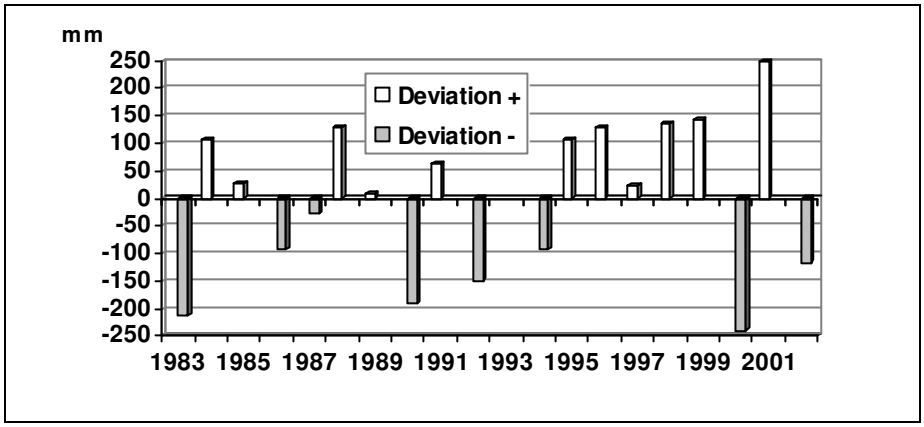

Fig.2 Quantity digression of precipitations at Dumbrăvița de Codru station.

According to the diagram one can notice that the negative diversions at Dumbrăvița de Codru are more frequent and have a bigger value. The years these diversions occurred are: 1983, 1986, 1987, 1990, 1992, 19994, 2000 and 2002. The year 2000 excels in a negative diversion of about one third of the annual average.

Unperiodically variation of precipitation quantity and their positive digression.

Şiria Cetate **Table 3**

Year	Yearly average (mm)	Multiyearly average (mm)	Deviation (mm)			
			+	%	-	%
1984	581,2	646,4			-65,2	- 10,0
1985	565,8	646,4			-80,6	- 12,4
1986	516,6	646,4				- 20,0
1987	701,1	646,4		8,4		
1988	684,1	646,4	40,3	6,2		
1989	685,2	646,4	38,8	6		
1990	504,1	646,4			-142,3	- 22,0
1991	836,8	646,4		29,4		
1992	443,2	646,4			-203,2	- 31,4
1993	512,5	646,4			-133,9	- 20,7
1994	531,6	646,4			-114,8	- 17,7
1995	786,4	646,4	140	21,6		
1996	867,8	646,4	221,4	34,2		
1997	929,4	646,4	283	43,7		
1998	709,1	646,4	62,7	9,6		
1999	788,5	646,4	142,1	21,9		
2000	376,4	646,4			-270	- 41,7
2001	799,6	646,4	153,2	23,7		
2002	463,6	646,4			-182,8	- 28,2
Departure (%)	**+**			**52,6**		
	-					**47,4**

The positive diversions are more frequent and the years they occurred are: 1984, 1985, 1988, 1989, 1991, 1995, 1996, 1997, 1998, 1999 şi 2001.

According to the table we can see the average values are the less registered each year records diversions from the annual average values.

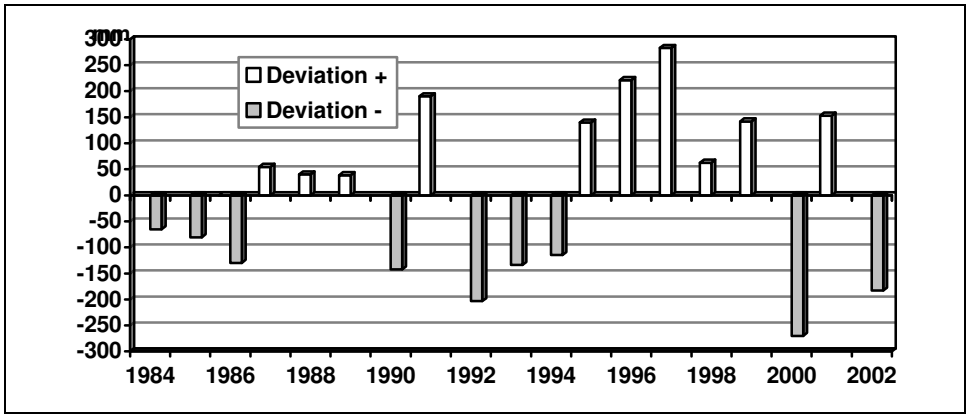

Fig.3 Quantity digression of precipitations at Şiria Cetate station

At Siria Cetate, the diversions are more reduced, but their frequency is as big as it is at Dumbravita de Codru. The positive diversions occurred in: 1987, 1988, 1989, 1991, 1995, 1996, 1997, 1998, 1999, 2001.

Negative diversions occurred in: 1984, 1985, 1986, 1990, 1992, 1993, 1994, 2000 şi 2002. The most significant negative diversion, from a quantitative point of view, occurred in 2002, like at Dumbravita de Codru.

General conclusion is that the unperiodically variations of atmospheric precipitations determined by the different circulations of mass air, are not very pronounced. The rainiest years were: 1997 and 2001.

The maximal quantity of precipitation in 24h is an important aspect witch needs to be analyzed.

Max quantity of precipitation in 24h in Holod **Table 4**

Month	Max în 24 hours	Year	Monthly average	Relevance express in % regard monthlz average
I	22,2	1981	54,1	41,0
II	28,5	1999	113,2	25,1
III	28,0	1987	61,4	45,6
IV	35,7	2001	105,4	33,8
V	80,1	1985	190,2	42,1
VI	83,7	1981	141,2	59,2
VII	51,8	1991	135,2	38,3
VIII	45,6	1991	79,6	57,2
IX	40,4	1979	60,7	66,5
X	36,7	1991	115,5	31,7
XI	31,0	1972	78,3	39,5
XII	33,1	1984	59.0	56,1

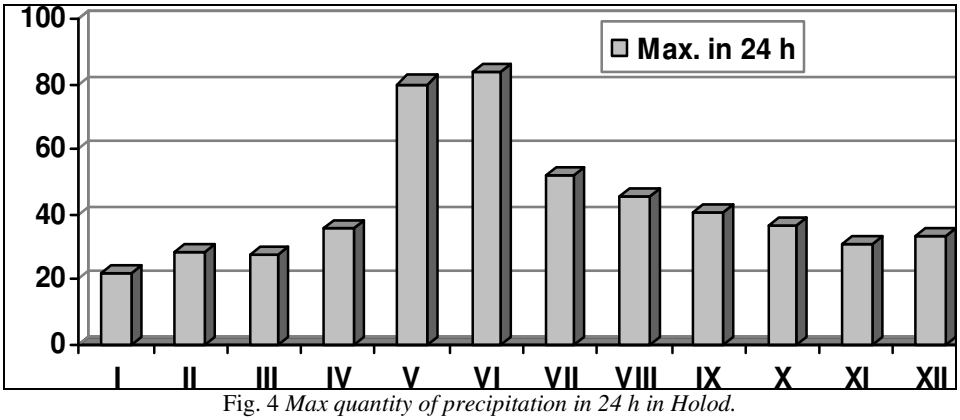

Fig. 4 *Max quantity of precipitation in 24 h in Holod.*

The maximum quantity of precipitations in 24h occured at Holod in June and July. The quantities were close in value with half of the monthly average. The lowest values of precipitations in a period of 24h are registered in January, February and March.

Max quantity of precipitation in 24 h in Dumbrăviţa Codru **Table 5**

Month	Max în 24 hours	Year	Monthly average	Relevance express in % regard monthlz average
I	30,7	2000	76,2	40,2
II	25,1	1999	131,5	19,0
III	36,6	1988	187,6	19,5
IV	53,6	2000	97,7	54,8
V	48,2	1985	163	29,5
VI	63,2	2001	180,5	35,0
VII	45,0	1988	74,9	60,0
VIII	43,5	1991	87,8	49,5
IX	37,3	1996	182,7	20,4
X	49,6	1996	75,3	65,8
XI	30,5	1989	72,4	42,1
XII	37,8	2001	57,9	65,2

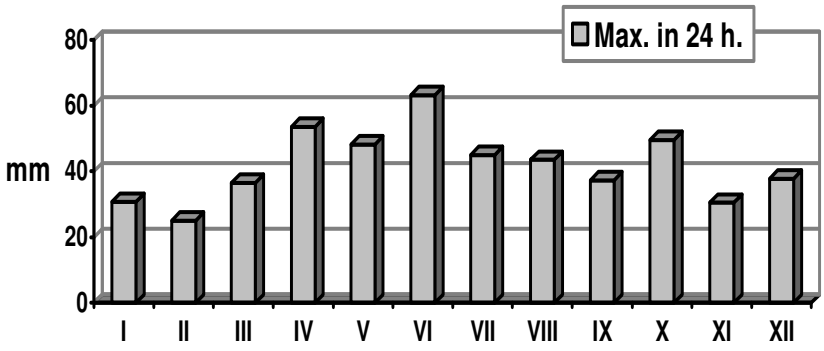

Fig. 5 Max quantity of precipitation in 24 h in Dumbrăviţa Codru

At Dumbravita de Codru, unlike Holod, the maximum quantity of precipitations in 24h are bigger. April and June are the months when these values occur. In June the quantity

of precipitations goes beyond 63 mm. In the winter months the quantity of precipitations in 24h is reduced.

Conclusions

The Western Hills situated to the Mureş Valley, respectively Crişana and Silvano-Someşene Hills, have a temperate continental moderated climate because of their position and the physical-geographic aspects.

Exceeding the medium values of climatic elements leads to the emergence of risk phenomena that affects in a negative way both the human being as a biological structure and a social element as well.

Analyzing these meteorological facts in the interval 1971- 2002, we can notice that the Crişana and Silvano-Someşene Hills aren't frequently and brutally affected by these risk climatic phenomena. Even though these phenomena happen, they are rather isolated, short; in this way, people can take precautions in order to fight them

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