THE MAXIMUM QUANTITIES OF RAIN-FALL IN 24 HOURS IN THE CRIŞUL REPEDE HYDROGRAPHIC AREA

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Abstract

The object of the present study is the expression of the maximum rain-fall quantities in 24 hours in comparison with the multi-annual average of the respective month. These observations are analyzed during a period of 36 years in Crisul Repede hydrographic area.

Key words: *maximum, rain-fall, quantities*, annual, Crişul Repede hydrographic basin.

INTRODUCTION

The practical importance of rain-fall is observed every day in economic sectors such as: agriculture, forestry, construction, transport, tourism activities, planning and organizing the territory, etc, especially when there are large quantities of rain-fall in a short time, or when they don't occur at all or in very small quantities for long periods of time. The abundance of rain-fall in short periods of time can cause floods, overflowing, excess of humidity in the concavities of relief, an accelerated erosion of slopes used in agriculture or destroying the dwelling places and various infrastructural components, victims from wild animals, domestic animals and people; the lack of rain-fall causes dryness and drought, and if they persist for a longer period they can bring significant damages to agriculture and generally to economy and of course to the people's health.

The clouds, as a basic source of rain-fall, are produced by the general circulation of air masses, the thermic convection, the regional physical-geographical factors (especially the relief with its characteristics: altitude, form, orientation, exposition, etc) influencing the distribution in time and space of the quantities of liquid or solid rain-fall coming from the cloudy masses of different origins.

In time and space, on short periods of time and in small spaces, the rain-fall has an aleatory evolution and distribution, but its analysis on longer periods of time, on larger areas in relation to the rain-fall quantities in the neighboring geographical areas, can lead us to observe some regulations of relative stability.

The regime of the atmospheric rain-fall depends in a large extent on the particularities of the general circulation of air above Romania and implicitly above Crisul Repede hydrographic area.

MATERIAL AND METHODS

In order to emphasize the maximum rain-fall quantity in 24 hours I used the data from the period 1970 – 2005, obtained in the observations I made at five meteorological stations in Crisul Repede hydrographic area (Oradea, Săcueni, Borod, Huedin, Stâna de Vale), situated both in the field or mountainous area, so that they cover the investigated area.

From the observations performed I take the data with maximum rain-fall quantities in 24 hours every month, expressed in millimeters.

RESULTS AND DISCUSSIONS

The maximum rain-fall quantities in 24 hours that generally come from advections of humid air from the western sector in the hot season, from the Mediterranean area in cold season, to which the frontal and orographical convection produced during the whole year is added and also the thermic convection that behaves better in the hot period especially during summer months. But, in summer months, when the air has a greater capacity to store water vapors, when the atmospheric fronts that come from the Atlantic and cross Europe in West-East have behind them masses of hot and instable air, and when the thermic-dynamic convection reaches the highest values, the biggest rain-fall quantities are produced in 24 hours during the year.

The production of maximum rain-fall quantities in 24 hours differ very much from a point to another, fact that emphasizes the strictly local feature of every point of meteorological observation.

The maximum daily rain-fall quantities are lower in cold season because of the continental anti-cyclonic regime when the air masses have a reduced content of air vapors, and the thermic convection is very weak. In the hot period the rain-fall quantity in 24 hours reaches the greatest values because of the intensification of frontal processes (especially of cold fronts) and of the convective ones.

The greatest rain-fall quantities in 24 hours are recorded in summer months when they have a character of averse and can produce damages to vegetation and soil.

There are various situations when the rain-fall quantity in 24 hours is bigger than the multi-annual average of the respective month, for example at Săcueni on 22.08.2004 in a single day it was recorded 73,3 mm of rain-fall, in comparison to 57,5 mm, that is the multi-annual average of this month (fig.1); another example is at Săcueni on 02.09.1976 when the rain-fall quantity in 24 hours was 76,6 mm and the multi-annual average of the respective month is 50,5 mm (fig.1). At Săcueni station, the lowest station

in the area, the most cases were recorded (4 cases in February, March, August, September) when the rain-fall quantity in 24 hours is bigger than the multi-annual average of the respective month.

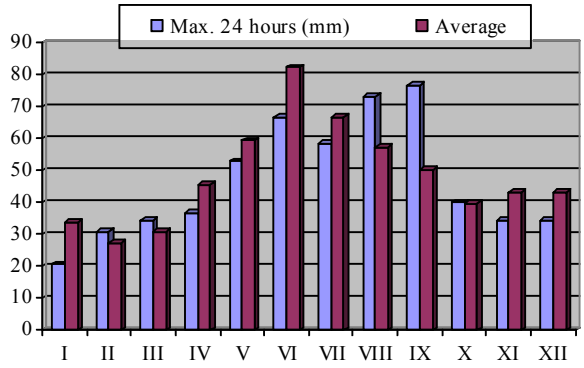

Fig.1 The maximum rain-fall quantities in 24 hours (mm) and the average monthly quantities at Săcueni meteorological station (1970 – 2005)

In Oradea there is only one case when the rain-fall quantity in 24 hours is bigger than the multi-annual average of the respective month, on 25.03.2004 the rain-fall quantity in 24 hours is 41,9 mm compared to 34,7 mm the multi-annual average (fig.2).

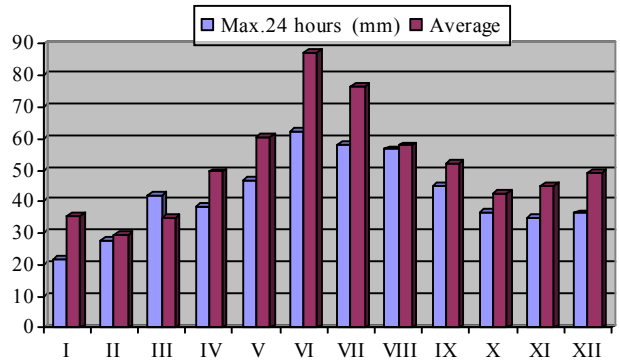

Fig.2 The maximum rain-fall quantities in 24 hours (mm) and the average monthly quantities at Oradea meteorological station (1970 – 2005)

At Borod there are two cases when the rain-fall quantity in 24 hours is bigger than the multi-annual average of the respective month, on 23.08.1974 the rain-fall quantity in 24 hours is 96,0 mm and the multi-annual average is 78,8 mm and on 19.10.1996 the rain-fall quantity in 24 hours is 54,5 mm and the multi-annual average 47,5 mm (fig.3).

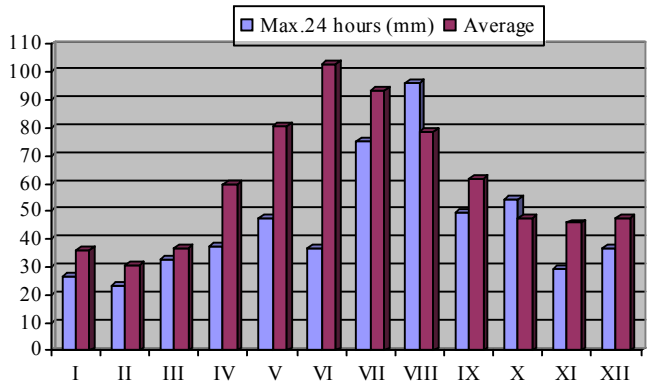

Fig.3 The maximum rain-fall quantities in 24 hours (mm) and the average monthly quantities at Borod meteorological station (1970 – 2005)

At Huedin there are three cases in February, March and November, on 10.02.1984 the rain-fall quantity in 24 hours is 39,2 mm and the multi-annual average of the respective month is 24,7 mm; on 28.03.1988 the rain-fall quantity in 24 hours is 34,4 mm and the multi-annual average is 30,2 mm; on 06.11.1995 the rain-fall quantity in 24 hours is 34,3 mm and the multi-annual average of the respective month during the 36 years is 33,9 mm (fig.4).

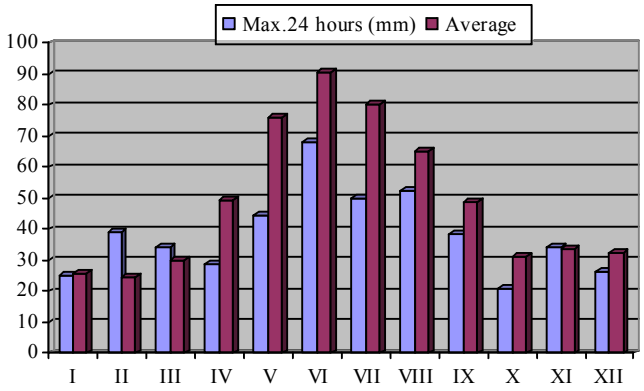

Fig.4 The maximum rain-fall quantities in 24 hours (mm) and the average monthly quantities at Huedin meteorological station (1970 – 2005)

At Stâna de Vale, the highest station in the area, there is only one case on 19.10.1996 when the rain-fall quantity in 24 hours is 128,0 mm and the multi-annual average of the respective month is 119,2 mm (fig.5).

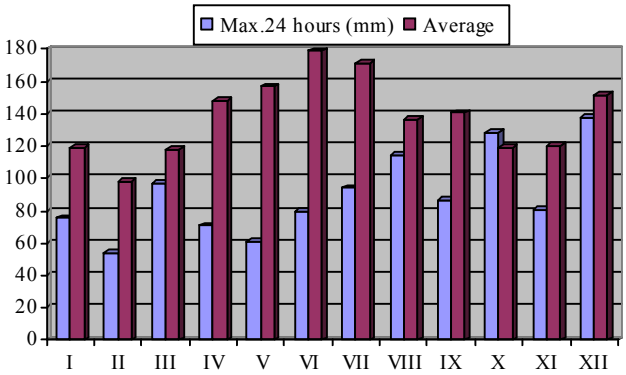

Fig.5 The maximum rain-fall quantities in 24 hours (mm) and the average monthly quantities at Stâna de Vale meteorological station (1970 – 2005)

CONCLUSIONS

During the 36 years of study, the greatest rain-fall quantity in 24 hours was observed at Stâna de Vale on 24.12.1995, a quantity of 137,6 mm, followed in decreasing order by the stations: Borod with 96,0 mm on 23.08.1974, Săcueni with 76,6 mm on 02.09.1976, Huedin with 68,1 mm on 24.06.1973 and Oradea with 62,4 on 30.06.1986.

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