THE REGIME OF THE ATMOSPHERIC PRECIPITATION IN THE BARCĂU HYDROGRAPHICAL BASIN

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Abstract

River Boat basin is part of the hydrological system of the western rivers, which collects water from Transylvania and the Apuseni Mountains, the ultimate collector Tisza River. Barcău River drains an area of 6095 km², with a length of 208.5 km course, 134 km in Romania and 74.5 km in Hungary.

The analysis of the average annual rainfall regime in the Barcău Hydrographical Basin shows that there is a general increasing trend from west to east. The highest average rainfall amounts recorded in the Plopis Mountains (866 mm) and the lowest in Szeghalom (545.4 mm). The years with the highest amounts of precipitation were 1996 and 1999, when the precipitation were about 720-880 mm. Following the analysis of variance multiannual monthly rainfall can be observed an unequal and uneven distribution, with a minimum period of January-February, a progressively increase from March to June and a progressively decrease from June to December. The driest month of the year is January and the wettest month is June.

Key words: precipitation, hydrographical basin, river, climate, weather station.

INTRODUCTION

River Boat basin is part of the hydrological system of the western rivers, which collects water from Transylvania and the Apuseni Mountains, the ultimate collector Tisza River. Barcău River drains an area of 6095 km², with a length of 208.5 km course, 134 km in Romania and 74.5 km in Hungary.

The area of study included its climate Province Cf, sp. Cfbx, with the average hottest month from 20 to 22 Celsius degrees and the maximum precipitation in early summer. Only a small part of the area occupied by the basin is part sp. CFBK, with the average temperature of the hottest month from 18 to 20 Celsius degrees and cold winters. Aridity index values range between 25 and 45, values between 25 and 30 correspond to the steppe, between 30 and 35 steppe zone, and values greater than 35, corresponding to foothill and mountain areas.

MATERIAL AND METHODS

To analyze the spatial distribution of rainfall, data were used from the National Administration of Meteorology for weather stations from Oradea,
Săcuieni and Nușfalău (meteorological station of Nușfalău was closed in 2001) and data from stations Szeghalom, Ticovizig Debrecen, Berettyoujfalu and Pocșaj.

RESULTS AND DISCUSSION

The table no.1 presents average annual rainfall values from weather stations of the study area, during 1992-2010 and in figures no.1 and 2, the evolution of mean annual precipitation.

Table 1

<table>
<thead>
<tr>
<th>Station/ Year</th>
<th>Oradea</th>
<th>Săcuieni</th>
<th>Nușfalău</th>
<th>Pocșaj</th>
<th>Berettyoujfalu</th>
<th>Szeghalom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>449 mm</td>
<td>448 mm</td>
<td>580 mm</td>
<td>456 mm</td>
<td>447 mm</td>
<td>434 mm</td>
</tr>
<tr>
<td>1993</td>
<td>504 mm</td>
<td>483 mm</td>
<td>672 mm</td>
<td>490 mm</td>
<td>487 mm</td>
<td>414 mm</td>
</tr>
<tr>
<td>1994</td>
<td>532 mm</td>
<td>490 mm</td>
<td>453 mm</td>
<td>460 mm</td>
<td>390 mm</td>
<td>446 mm</td>
</tr>
<tr>
<td>1995</td>
<td>638 mm</td>
<td>612 mm</td>
<td>680 mm</td>
<td>610 mm</td>
<td>514 mm</td>
<td>514 mm</td>
</tr>
<tr>
<td>1996</td>
<td>884 mm</td>
<td>798 mm</td>
<td>834 mm</td>
<td>780 mm</td>
<td>866 mm</td>
<td>726 mm</td>
</tr>
<tr>
<td>1997</td>
<td>713 mm</td>
<td>616 mm</td>
<td>612 mm</td>
<td>573 mm</td>
<td>623 mm</td>
<td>432 mm</td>
</tr>
<tr>
<td>1998</td>
<td>786 mm</td>
<td>733 mm</td>
<td>774 mm</td>
<td>752 mm</td>
<td>762 mm</td>
<td>610 mm</td>
</tr>
<tr>
<td>1999</td>
<td>870 mm</td>
<td>780 mm</td>
<td>782 mm</td>
<td>774 mm</td>
<td>727 mm</td>
<td>738 mm</td>
</tr>
<tr>
<td>2000</td>
<td>364 mm</td>
<td>391 mm</td>
<td>410 mm</td>
<td>386 mm</td>
<td>320 mm</td>
<td>306 mm</td>
</tr>
<tr>
<td>2001</td>
<td>821 mm</td>
<td>737 mm</td>
<td>-</td>
<td>720 mm</td>
<td>764 mm</td>
<td>630 mm</td>
</tr>
<tr>
<td>2002</td>
<td>531 mm</td>
<td>563 mm</td>
<td>-</td>
<td>572 mm</td>
<td>470 mm</td>
<td>443 mm</td>
</tr>
<tr>
<td>2003</td>
<td>499 mm</td>
<td>488 mm</td>
<td>-</td>
<td>524 mm</td>
<td>440 mm</td>
<td>450 mm</td>
</tr>
<tr>
<td>2004</td>
<td>739 mm</td>
<td>799 mm</td>
<td>-</td>
<td>746 mm</td>
<td>683 mm</td>
<td>664 mm</td>
</tr>
<tr>
<td>2005</td>
<td>656 mm</td>
<td>650 mm</td>
<td>-</td>
<td>684 mm</td>
<td>780 mm</td>
<td>700 mm</td>
</tr>
<tr>
<td>2006</td>
<td>652 mm</td>
<td>592 mm</td>
<td>-</td>
<td>587 mm</td>
<td>520 mm</td>
<td>500 mm</td>
</tr>
<tr>
<td>2007</td>
<td>655 mm</td>
<td>625 mm</td>
<td>-</td>
<td>637 mm</td>
<td>590 mm</td>
<td>594 mm</td>
</tr>
<tr>
<td>2008</td>
<td>546 mm</td>
<td>721 mm</td>
<td>-</td>
<td>576 mm</td>
<td>492 mm</td>
<td>486 mm</td>
</tr>
<tr>
<td>2009</td>
<td>572 mm</td>
<td>626 mm</td>
<td>-</td>
<td>612 mm</td>
<td>562 mm</td>
<td>570 mm</td>
</tr>
<tr>
<td>2010</td>
<td>592 mm</td>
<td>647 mm</td>
<td>-</td>
<td>620 mm</td>
<td>580 mm</td>
<td>592 mm</td>
</tr>
</tbody>
</table>

Fig. 1. Graphical representation of the average annual precipitation amounts during the period 1992-2010, in the basin of Barcău
(Source: National Administration of Meteorology and Tikovizig Debrecen)
Average annual rainfall, for the period 1992-2010, are presented in figure no.2.

![Figure 2: Average annual rainfall for the period 1992-2010](Source: National Administration of Meteorology and Tikovizig Debrecen)

After analyzing the average annual rainfall regime (Fig. no.2), there is a general increasing trend from west to east. The highest average rainfall amounts recorded in the Plopis Mountains (866 mm) and the lowest in Szeghalom (545.4 mm). From the time taken in the analysis, is characterized by high precipitation 1996 (Oradea - 884 mm, Săcuieni - 798 mm, Nușfalău - 834 mm, Pocsaj - 780 mm, Berettyoujfalu - 866 mm, Szeghalom - 726 mm) and 1999 (Oradea - 870 mm, Săcuieni - 780 mm, Nușfalău - 782 mm, Pocsaj - 780 mm, Berettyoujfalu - 727 mm, Szeghalom - 738 mm).

Figure no.3 presents average annual precipitation during the period 1970-2010, in localities situated in the basin and in some localities related Barcău basin (Oradea and Debrecen). Increasing trend from west to east is heavily emphasized.

![Figure 3: Average annual rainfall for the period 1960-2010](Source: National Administration of Meteorology and Tikovizig Debrecen)

Following the analysis of variance multiannual monthly rainfall (Fig. no.4) can be observed an unequal and uneven distribution, with a minimum period of January-February and a progressively increase from March to June. It is maintained constant in September to May share in October there
is a further drop, but then December to record an increase. Within that month study highlights rich and poor rainfall in January (the driest month) and June (the wettest month).

The average number of days with the ground covered by snow, in the observation of the five plants in the study was approximately 35 days, the layer of snow having a protective role on the ground, and thus the thermal conditions influencing the biochemical processes.

By their amounts and character (long-term rainfall, torrential rainfall, rainfall by an amount that exceeds the mean), the rainfalls may produce negatively influence on the physical, chemical and biological soil properties, with direct implications for order pedological, hydrological and ecological processes.

Negative action is manifested by:
- worsening regime aerohidric;
- damage to soil structure;
- increased adhesion and plasticity of the soil material;
- the solubilization and leaching of organic and inorganic compounds of specific;
- debazificarea complex absorption;
- acidification of soil solution;
- the formation of toxic plant growth and development;
- halting aerobic microbiological activity of soil;
- onset of anaerobic digestion processes;
- blocking the respiration of plant roots.

CONCLUSIONS

The analysis of the average annual rainfall regime in the Barcău Hydrographical Basin shows that there is a general increasing trend from
west to east. The highest average rainfall amounts recorded in the Plopis Mountains (866 mm) and the lowest in Szeghalom (545.4 mm). The years with the highest amounts of precipitation were 1996 and 1999, when the precipitation were about 720-880 mm.

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REFERENCES