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PECULIARITIES OF FLOODS ON THE TERRITORY OF POKUT CARPATHIANS

The article analyzes the peculiarities of floods in Pokut Carpathians. It is determined that the main causes of floods are the amount and intensity of precipitation, features of geomorphology and hydrography of the study area. The peculiarities of the geomorphological structure of the territory, the differences of geomorphology between the middle and low mountain parts of Pokut Carpathians are found out. The middle mountains are characterized by significant vertical and horizontal dissection of the terrain, the predominance of narrow and deep river valleys, the presence of large catchments in the upper reaches of rivers. The lowlands are represented by symmetrical ridges with wide ridges, steep and sloping slopes, which are divided by relatively wide river valleys. Determining the steepness of Pokut Carpathian slopes, it was found that steep and very steep slopes occupy more than 18% and are located in the upper reaches of rivers, and steep slopes occupy almost half of the study area and this criterion increases the possibility of sudden floods. Analyzing the geomorphology of Pokut Carpathians, it was found that the formation and development of floods largely depends on the geomorphological features of the territory. The dependence of floods on the hydrographic features of rivers and their basins has been established. It has been found that rivers are characterized by a branched river system in the upper and middle reaches, and the lower reaches are mainly one artery, where all the water accumulates during floods. In addition to the above-mentioned, the formation and development of floods are also influenced by soils, which in mountain conditions are formed on hard geological rocks and are often poorly permeable and have a small depth of soil profile, which in turn do not absorb much moisture. As for the forest cover of the study area, it is determined that it is more than 57 %, but even such a percentage of forests in the event of a sudden and large rainfall can not contain excess water. We present the results of meteorological indicators, including rainfall and heavy rains over 15 years, at two observation points- Variatyn Hydropower and Hutsulshchyna National Nature Park Meteorological Posts. It was found that heavy floods usually occur in June-July, the amount of precipitation at VariatynHydropower Plant is always higher than at Hutsulshchyna NNP meteorological point. After analyzing the course of intense rains over fifteen years at two observation points, it was determined that VariatynHydropost is characterized by heavy rainfall more often than Hutsulshchyna NNP meteorological point. According to the analysis of the data of VariatynHydropost and Hutsulshchyna NNPMeteorological Station for the period 2005–2020, 65 and 53 days were recorded, respectively, with heavy rains. It has been studied that the greatest and largest floods during the observation period in Pokut Carpathians were recorded on Cheremosh, ChornyiCheremosh, Rybnytsia, Pistynka, Liuchkarivers on July 24–28, 2008, July 7–8, 2010 and June 23, 2020.

Keywords: flood, precipitation, river, meteorological indicators, hydropost, meteorological post, relief, Pokut Carpathians.

Relevance of research. The studied region is characterized by a unique history of development, geological structure, geomorphological features, surface waters and diversity of natural landscapes. This combination of natural conditions is favorable for the development of physical and geographical processes. One of them is hydrometeorological phenomena, in particular – floods, which are characteristic of all major rivers of Pokut Carpathians. Floods are mainly characterized by short-term increases in costs and water levels caused by heavy rains or melting snow. Mostly, there are floods due to heavy rains in summer. In addition to the amount and intensity of precipitation on the formation of floods have a significant impact on the geological structure and geomorphological features of the territory, the structure of the river basin and vegetation. In addition, floods contribute to the development of erosion processes, landslides, landslides. Floods can also result in changes in the landscape structure of the territory, the disappearance of some landscape complexes and the emergence of others, for example, during a flood changes the riverbed, water can destroy the first floodplain terrace and in its place pave the riverbed, the whole slope can be neutralized floodplain terraces due to the incision of the channel into the depth, etc. In addition to changes in landscape complexes, floods cause significant damage to infrastructure (destruction and damage to houses, roads, bridges, coastal fortifications, power lines, tourist infrastructure), agriculture (destruction and damage of agricultural plantations, hayfields and plantings). Therefore, there is a need for research on the causes of floods, their prediction, passage and measures to minimize their impact on the community.

Analysis of recent research and publications. Pokut Carpathians is one of the regions of the Ukrainian Carpathians, where the research of surface waters of the studied region was carried out the least. Studies of the river network of this territory were performed in the context of either the Ukrainian Carpathians or individual regions *(Voropai, Kunytsia, 1966; Herenchuk, Koinov, Tsys, 1964; Herenchuk, 1968; Herenchuk, 1973; Vashchenko, Yevtushko, Brytan, 2003; Litopys pryrody Hutsulshchyna NNP; 2004); Stefurak, Brusak, Derzhypilskyi (Eds.) 2013).* Prerequisites for the formation, dynamics and course of floods in Pokut Carpathians were studied by Hostiuk Z. V., Lavruk M. M., Pelypeyko I. A.and others (*Hostiuk 2014; Lavruk, 2005).* Particular attention was paid to the study of the consequences of floods by Fedunkiv Z.B., local press and Internet sources (*Fedunkiv, 2010*). Despite the favorable conditions of floods in Pokut Carpathians, the study of the hydrological regime of rivers is practically not carried out, except for Variatyn River, Chornyi Cheremosh creek, where Variatyn Hydropower Stationwhich is subordinated to Carpathian Selestokov Station (Yaremche) located *(Hidrolohichni shchorichnyky Karpatskoi selestokovoi stantsii 2005–2020).*

Purpose of the study. The purpose of this study is to identify the main causes of floods in Pokut Carpathians, the

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possibility of their prediction, forecast the dynamics of the passage and minimize the consequences.

Methods and methodology. The main approach we used in the study was systematic – a combination of several research methods to achieve this goal. In addition to the approaches, a number of methods were used: landscape, basin, geoinformation, aerospace, descriptive and statistical. To begin with, we processed literature sources and used geoinformation, aerospace, basin and landscape approaches on the basis of which we created a geoinformation database, including geological structure, river network and its basins, slope steepness, forest cover, etc. We have repeatedly conducted our own field research during heavy rains, which resulted in floods. Materials of meteorological indicators of VariatynHydropost and Hutsulshchyna NNP were collected, where the statistical method was used to analyze the relevant indicators.

Resultsof research. As already mentioned, the main causes of floods are the amount and intensity of precipitation, geomorphological features, the structure of the river basin and the presence of certain vegetation.

Pokut Carpathians are located in the southeast of Skyb Carpathians. In the northeast they border the outer zone of the Precarpathian Depression, in the southeast – with the Bukovyna Carpathians, the southwestern border is consistent with the border of Krosne zone andSkyb cover, in particular, the boundary of Parashka part, and in the north-west the boundary runs along transverse tectonic faults fixed by Volovyi, Pistynka, Sukhyi, and Lyuchka rivers (*Vashchenkoetal., 2003, "Zakhidukrgeologiya" archive materials of the State Enterprise (1968–1985), Hostiuk, 2021).*

Analyzing the geomorphological features of Pokut Carpathians, we can conclude that they are somewhat different from each other. For the middle mountains, which are formed on Skyb cover, they are characterized by asymmetry of mountain ranges (steep northeastern and sloping southwestern slopes), significant vertical and horizontal dissection of the terrain, the predominance of narrow and deep river valleys, the presence of large peaks rivers. The relief of Pokut lowlands is formed on Boryslav-Pokut cover of the Inner Zone of Precarpathian Depression (*Herenchuk, Koinov, Tsys, 1964; Kravchuk, 2005; Liashchuk, 1963; Tsys, 1956).* Pokut lowlands are symmetrical ridges with wide ridges, steep and sloping slopes that stretch from northwest to southeast and are divided by relatively wide river valleys.The ridges are characterized by absolute heights of 700–1000 m above sea level. They form several low-mountain ranges: Lebedyn-Kamenystyi, Karmatura-Khomynskyi, Brusnyi-Sokilskyi-Rozhen, Ploskyi-Hlynystyi, Maksymets (Kravchuk, 2005). The valleys of the transverse rivers Pistinka, Rybnitsa, Cheremosh divide the ridges into separate segments. They are deeply incised and have up to five terraces, often in the channels of these years the native rocks come to the surface, forming waterfalls and gullies (Fig. 1).

Analyzing the steep slopes of Pokut Carpathians, it was found that the largest area is occupied by slightly sloping slopes, sloping slopes, and steep slopes – 42 % and very gentle ones, gentle – 37 %, much less – steep and very steep slopes – 18 % and the smallest areas are steep slopes – 3 % (Fig. 1) *(Hostiuk, 2021).* The peculiarity is that large catchments are located at the top of rivers among steep and very steep slopes and during heavy rains water in large volumes, at high speed and in a short period of time flows into the middle and lower reaches of rivers, where it forms large floods in the main waterways.

The surface waters of Pokut Carpathians are mainly represented by rivers belonging to Prut basin. The largest rivers in the study area are Cheremosh, Chornyi Cheremosh, Berezhnytsia, Rybnytsia, Pistynka, Liuchka, which have mixed nutrition with a predominance of rainwater (Fig. 1). The river valleys of Pokut Carpathians are characterized by a significant thickness of alluvium in the floodplain and on all basement terraces *(Herenchuk (Eds.) 1973; Liashchuk, 1963).* Almost all rivers have an extensive tree-like river system and flood mode with sharp fluctuations in water runoff, sediments, intensity of channel processes, unstable and short-term icefall on rivers, possible congestion. Almost all river basins of the studied region have a tree-like structure.

Analyzing the availability of forest cover, we found that forests in Pokut Carpathians occupy 57.9 %, meadows – 22.7 % and residential areas are 19.3 %. Analyzing the distribution of land in Pokut Carpathians in the middle and low mountain landscapes, which cover an area of 209.2 km^2 and 453.6 km^2, respectively, it was found that forests in the middle mountains cover an area of 70.5%, while in the lowlands. and – 52.7 %. Meadow areas occupy almost the same area, as in the middle mountains 22.1% and in the lowlands 22.2 %. There is a significant difference between the areas of settlements, as in mid-mountain landscapes they are 7.3 %, and in low-mountainous – 24.9 %, respectively, from the area of mid-mountain and low-mountain *(Hostiuk, 2021).* Despite the relatively high percentage of forest cover in the study area, when a large amount of precipitation falls, neither the forest nor the soil can absorb too much water, the excess of which in the form of small streams flows to the main rivers.

Since the occurrence of hydrometeorological phenomena mainly depends on climatic conditions, we conducted a detailed analysis of certain meteorological indicators at two observation points located in Variatyn river basin (Variatyn Hydropost) and Rybnytsia river basin (Hutsulshchyna NNP Meteorological Station) during fifteen years (2005–2020). Variatyn Hydropower Station is subordinated to the Carpathian Celestial Station (Yaremche), founded in 1965 on Variatyn River in Chornyi Cheremosh Basin, located in the middle mountains of Pokut Carpathians at an altitude of 596.4 m above sea level. Hutsulshchyna NNP Meteorological Station was established in 2005 and is located in the area of the low-mountainous Pokut Carpathians in Rybnytsia River valley at an altitude of 370.8 m above sea level *(Hidrolohichni shchorichnyky Karpatskoi selestokovoi stantsii 2005–2020; Litopys pryrody NPP "Hutsulshchyna" 2013).*

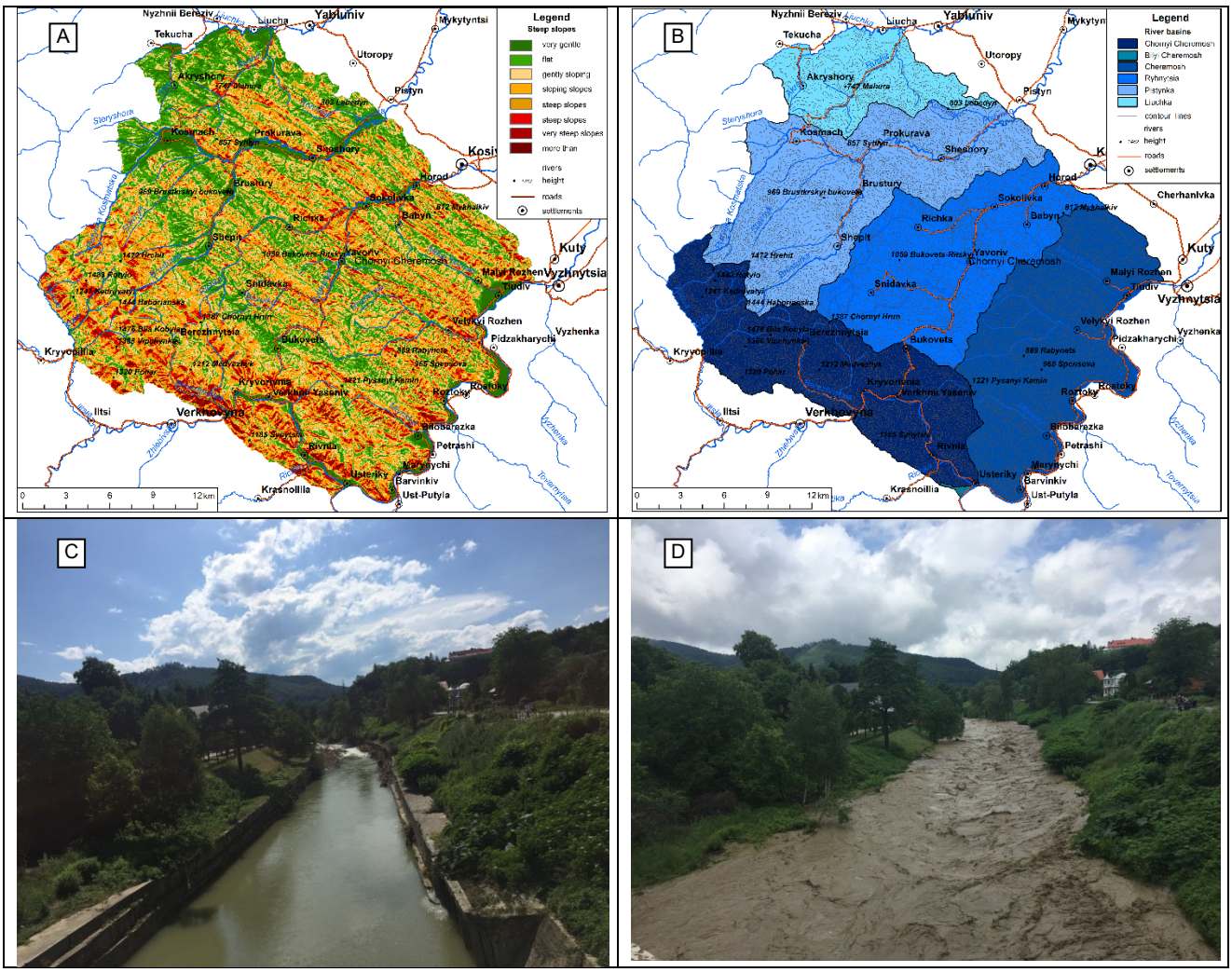

Fig. 1. A) Steepness of the slopes of Pokut Carpathians (built in ArcGIS on the basis of SRTM); B) River network of Pokut Carpathians; C, D) Periods and flood of 2020, Rybnitsa river

In general, the Pokut Carpathians region is characterized bytemperate, mountain-friendly climate with sufficient humidity – annual rainfall ranges from 700 to 1100 mm (Table 1) *(Hidrolohichni shchorichnyky Karpatskoi selestokovoi stantsii 2005–2020; Litopys prutsuly NPchy; Chronicles of Nature NPP "Hutsulshchyna" 2018; Chronicles of Nature NPP "Hutsulshchyna" 2020; Hostiuk, 2019).*

Comparing the data at the two observation points for 15 years, it was found that the amount of precipitation at Variatyn Hydropower Plant is always higher than at Hutsulshchyna NNP meteorological station (Table 1).

According to the analysis of the data of Variatyn Hydropost and Hutsulshchyna NNP Meteorological Station for the period ща 2005–2020, 65 and 53 days were recorded, respectively, with heavy rains (Table 1). Under the heavy rains we mean precipitation of 27 mm or more during the day (*Hostiuk, 2021*).

After analyzing the course of heavy rains over fifteen years at two observation points, it was found that Variatyn Hydropost is characterized by heavy rainfall more often than Hutsulshchyna NPP Meteorological Station. This is due to the difference in absolute altitudes and the peculiarity of the location of observation points (Pokut Middle Highlands is a kind of orographic barrier to the movement of moist southwestern air masses). Analyzing the dynamics of days with heavy rains over the years, it can be noted that 2007, 2012, 2017, 2018 were significantly different years, when in VariatynHydropostit was recorded significantly more days with rainfall of more than 27 mm/day than Hutsulshchyna NNP Meteorological Station *(Hidrolohichni shchorichnyky Karpatskoi selestokovoi stantsii 2005–2020; Litopys pryrody NPP "Hutsulshchyna" 2013; Litopys pryrody NPP "Hutsulshchyna" 2018; Litopys pryrody NPP "Hutsulshchyna" 2020).*

As you know, the amount of precipitation mainly depends on the water level in rivers. Thus, on the rivers of Pokut Carpathians during the study period there were quite variable fluctuations in water levels. Usually the highest water level in the spring after the snow melts and in the first half of summer during a significant amount of precipitation. At the end of August, the water level drops to normal and by the end of the year can fluctuate, usually within 10–20 cm.

Floods are typical for the terraced bottoms of the river valleys of Cheremosh, Chornyi Cheremosh, Rybnitsa, Pistynka, Liuchka and their creeks. Catastrophic floods, which are formed as a result of precipitation with a daily maximum of more than 70 mm/day, cause special damage. The greatest and largest floods during the observation period in Pokut Carpathians were recorded on July 24–28, 2008, July 7–8, 2010 and June 23, 2020 *(Hostiuk, 2021).*

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***Table* 1. Heavy rains in Pokut Carpathians during 2005–2020**
(according to Variatyn Hydropost and Hutsulshchyna NNPMeteorological Station)

(HidrolohichnishchorichnykyKarpatskoiselestokovoistantsii 2005–2020; LitopyspryrodyNPP "Hutsulshchyna" 2013; LitopyspryrodyNPP "Hutsulshchyna" 2018; Litopys pryrody NPP "Hutsulshchyna" 2020)

Variatyn Hydropost			Hutsulshchyna NNP Meteorological Station)		
Year	**Date**	**Precipitation, mm**	**Year**	**Date**	**Precipitation, mm**
2005	31.05	38,2	2005	01.06	35,5
	09.06	43,2		17.08	66,0
	07.08	27,3		19.08	76,5
	17.08	51,7		24.08	34,5
	18.08	56,0		14.09	37,5
	19.08	38,7		17.10	28,2
	24.08	29,9		20.10	33,5
	Total per year	**973,3**		**Total per year**	**635,9**
2006	15.06	37,6	2006	30.07	50,0
	26.05	37,3		05.08	34,5
	11.08	51,5		11.08	45,5
				27.08	35,5
	Total per year	**889,7**		**Total per year**	**677,2**
2007	07.05	27,6	2007	12.09	49,0
	09.05	32,8			
	25.05	44,2			
	05.07	31,0			
	11.07	28,0			
	06.09	40,4			
	12.09	36,4			
	19.09	28,0			
	Total per year	**1136,6**		**Total per year**	**751,3**
2008	24.06	42,3	2008	16.04	27,25
	15.07	28,6		23.07	37,5
	24.07	66,8		24.07	51,25
	25.07	104,7		25.07	120,0
	26.07	77,3		26.07	46,25
	27.07	46,8		27.07	31,6
	05.10	28,2		16.09	33,75
	Total per year	**1253,9**		**Total per year**	**1005,4**
2009	12.07	30,6	2009	24.06	31,5
	06.08	59,1		14.10	29,5
	13.10	38,8			
	Total per year	**753,4**		**Total per year**	**608,1**
2010	18.05	42,8	2010	18.05	32,0
	21.05	34,5		22.06	34,75
	22.06	75,4		23.06	60,0
	23.06	62,6		20.06	33,0
	26.06	31,0		28.06	60,0
	08.07	90,0		08.07	119,5
	27.07	**35,8**		27.07	34,0
				07.08	61,0
	Total per year	**1349,1**		**Total per year**	**1143,5**
2011	02.06	28,8	2011	02.06	30,5
	28.06	37,6		29.06	40,0
	26.07	28,6		11.07	29,2
				30.07	50,0
	Total per year	**693,9**		**Total per year**	**478,1**
2012	24.05	30,2	2012	-	
	05.06	38,7			
	30.07	33,0			
	Total per year	**758,4**		**Total per year**	**454,8**
2013	15.05	31,9	2013	12.09	50,75
	22.06	50,3			
	18.09	36,9			
	Total per year	**787,0**		**Total per year**	**620,2**
2014	15.05	72,6	2014	15.05	59,5
				26.07	65,0
	Total per year	**824,2**		**Total per year**	**520,6**
2015	26.05	40,6	2015	26.05	41,75
				16.06	37,25
				20.11	40,5
	Total per year	**728,3**		**Total per year**	396,0

Continuation of table 1

Variatyn Hydropost			Hutsulshchyna NNP Meteorological Station)		
Year	**Date**	**Precipitation, mm**	**Year**	**Date**	**Precipitation, mm**
2016	2.06	30,2	2016	11.10	32,2
	17.07	41,8			
	Total per year	**809,2**		**Total per year**	**625,0**
2017	20.04	29,1	2017	8.06	60
	8.06	28,4		5.09	28
	25.07	43,4			
	23.09	49,5			
	Total per year	**821,8**		**Total per year**	**601,6**
2018	18.03	27,9	2018	15.06	46,6
	24.07	49,6		1.08	43,2
	29.06	31			
	15.09	34,4			
	Total per year	**948,2**		**Total per year**	**706,0**
2019	2.05	76,1	2019	1.05	52,3
	7.06	56,3		6.06	79,5
	23.06	76,3		24.06	40,9
	24.06	32,5		27.06	37,8
	Total per year	**1176,3**		**Total per year**	**862,5**
2020	15.06	31,4	2020	13.06	29,3
	16.06	37,8		17.06	31,7
	20.06	45,9		21.06	43,2
	21.06	30,2		22.06	93,4
	22.06	68,1		23.06	58,6
	Total per year	**1218,5**		**Total per year**	**960,0**

The flood of July 23–28, 2008 covered not only Pokut Carpathians, but the entire western region of Ukraine. The floods were caused by heavy rains for five days, accompanied by thunderstorms. The highest precipitation fell on July 25, 2008 – 120 mm/day according to HutsulshchynaNNP Meteorological Station and 104.7 mm/day according to the hydropost. Due to heavy rains, the water level in the rivers rose to 4 meters and more *(Litopyspryrody NPP "Hutsulshchyna" 2013; Litopyspryrody NPP "Hutsulshchyna" 2018; Litopyspryrody NPP "Hutsulshchyna" 2020; Litopyspryrody NPP "Hutsulshchyna" 2020; Hostiuk, 2014).* Rainfall was probably much higher in the upper reaches of the rivers. As one of the consequences of the flood, physical and geographical processes began to manifest themselves intensively, in particular, many villages, landslides, and the development of lateral and bottom erosion intensified.

The flood of 2010 was local in nature, which was recorded only in two waterways of the study area – Rybnitsa and Cheremosh rivers. The water level in Rybnitsa River was higher than in 2008 and was 4.5 meters, and in some places reached six meters *(Prorochuk, Stefurak, Brusak, Derzhypilskyi (Eds.) 2013; Litopyspryrody NPP "Hutsulshchyna" 2013; Hostiuk, 2021).* On the night of July 7–8, the weather station recorded 90 mm/day, in the upper basins of Rybnitsa and Cheremosh the amount of precipitation was much higher *(Litopyspryrody NPP "Hutsulshchyna" 2013; Hostiuk, 2021).* The water level in Rybnytsia was the highest in the last half century *(Hostiuk, 2014).*

The flood of June 23, 2020 occurred due to heavy rains the day before and heavy rain at night in the upper reaches of Rybnytsia, Cheremosh, Pistynka rivers from 22 to 23 June. Heavy rain was recorded at 9.00 am for 10 minutes at the Hutsulshchyna NNP Meteorological Station with 34.6 mm/rainfall (Fig. 1). The water level in some places in Rybnytsia River rose by 4.9 m in Cheremosh – by 5 m, in Pistynka – by 4.8 m (Fig. 1).

According to the results of our own observations on June 23, the duration offlood on the Rybnytsia River was one day. According to the results of Hutsulshchyna NNP Meteorological Station, the amount of precipitation was 22.06. 2020 – 33.9 mm, 23.06.2020–34.6 mm. The intensity of water uplift during the flood was 3 m/3 hoursduring the most intense period of flood. The most intense period of the flood was from 9.00 o'clock. 23.06.2020 to 16.0023.06.2020, the peak was recorded at 12.30 23.06. 2020. The cause of the flood was heavy rains during the night of June 23, 2020 and heavy rain in the morning at 9:00. Since, in the lowlands of Pokut Carpathians, there is neither a hydro post nor a meteorological station in the upper reaches of any river, the amount of precipitation can only be predicted. The consequences of floods are bottom and side erosion, landslides and landslides, as well as damaged roads, power lines, farm buildings, agricultural land.

Conclusions. Analyzing the peculiarities of floods in Pokut Carpathians, it is established that the main reasons are the amount and intensity of precipitation, geomorphological features, features of the river hydro network, soil and vegetation, which together create ideal conditions for the formation and development of floods. Floods are mainly caused by heavy rains, which are the main cause of rising water levels in rivers during summer. Sudden rises in water levels in rivers cause more than 27 mm of precipitation per day. During the study period, 65 and 53 days were recorded at the hydroposts and meteorological stations, respectively, with heavy rains. The highest amount of precipitation during the study period was recorded on July 25, 2008 – 120 mm/day according to Hutsulshchyna NNPMeteorological Station and 104.7 mm/day according to hydro post, and on the night of July 7–8, 2010 90 mm/dayat the meteorological station. During the last 15 years, three major floods were recorded in Pokut Carpathians on July 24–28, 2008, July 7–8, 2010 and June 23, 2020 onCheremosh, Chornyi Cheremosh, Rybnytsia, Pistynka, Liuchka and others. The water level in rivers in different years, during floods, rose by 4–6 m.

Based on research, it has been found that the study of the hydrological mode of rivers is necessary both from a scientific point of view and to prevent the occurrence of dangerous phenomena for the safety of the population living

here. It is determined that, however, in Pokut Carpathians insufficient research is conducted, more accurate and systematic studies of the hydrological mode of the rivers of Pokut Carpathians can not be carried out, because there is almost no material and technical base. As already mentioned, there are no hydroposts in the low mountainous part of the study area and this area remains a kind of white spot among the Ukrainian Carpathians. The lack of hydroposts in the upper and middle reaches of rivers makes it impossible to predict floods, in particular the intensity and level of water uplift. Research institutions located in Pokut Carpathians, in particularHutsulshchyna NNP, is interested in conducting systematic hydrological research, in the future the institution is to purchase and install modern hydro posts on the largest rivers. Replenishment and renewal of material and technical base for hydrological research will ensure effective research in the field of hydrology and surface water research. One of the results of research should be the forecast of occurrence, formation of floods, the intensity of rising water levels, anticipation of damage caused by floods and previously implemented measures to reduce their destructive effects.

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ОСОБЛИВОСТІ ВИНИКНЕННЯ ПАВОДКІВ НА ТЕРИТОРІЇ ПОКУТСЬКИХ КАРПАТ

Проаналізовано особливості виникнення паводків на території Покутських Карпат. Визначено, що основними причинами цього є кількість та інтенсивність опадів, особливості геоморфології й гідрографії досліджуваної території. Представлено результати метеорологічних показників, зокрема кількості опадів і кількість інтенсивних дощів упродовж 15-ти років, на двох пунктах спостережень, гідропості "Варятин" і метеопості "Національного природного парку "Гуцульщина"". Досліджено, що великі паводки зазвичай відбуваються в червні-липні, кількість опадів на гідропості "Варятин" завжди більша, ніж на метеопості "НПП "Гуцульщина"". Проаналізувавши перебіг інтенсивних дощів упродовж 15-ти років на двох пунктах спостережень з'ясовано, що для гідропоста "Варятин" характерні частіше рясні опади, ніж для метеопоста "НПП "Гуцульщина"". Відповідно до аналізу даних гідропоста "Варятин" і метеопоста "НПП "Гуцульщина"" за період 2005–2020 рр. зафіксовано 65 та 53 дні, відповідно, із рясними дощами. З'ясовано особливості геоморфологічної будови території, відмінності геоморфології між середньогірною та низькогірною частинами Покутських Карпат і визначено її вплив на формування й розвиток паводків. Установлено залежність виникнення паводків від гідрографічних особливостей річок та їхніх басейнів. З'ясовано, що річки характеризуються розгалуженою річковою системою у верхній та середній течії, а нижня течія – це, в основному, одна артерія, де акумулюються всі води під час паводку. Досліджено, що найбільші й наймасштабніші паводки за період спостережень у Покутських Карпатах зафіксовані на річках Черемош, Чорний Черемош, Рибниця, Пістинька, Лючка 24–28 липня 2008 р., 7–8 липня 2010 та 23 червня 2020 р.

Ключові слова:паводок, опади, річка, метеорологічні показники, гідропост, метеопост, рельєф, Покутські Карпати.