

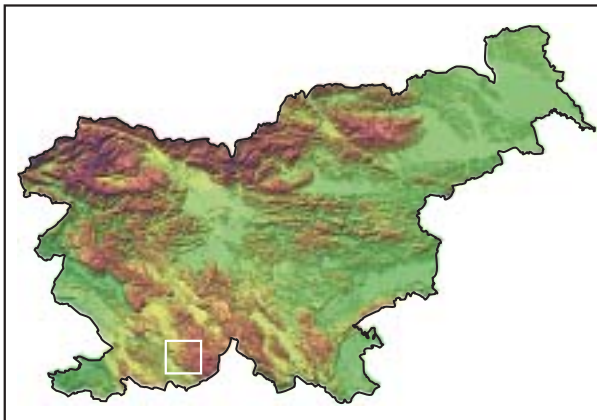
POPLAVA NA OBMOČJU BAČA, KNEŽAKA IN KORITNIC NÓVEMBRA 2000

FLOODING IN THE AREA OF KNEŽAK, BAČ AND KORITNICE IN NOVEMBER 2000

Gregor Kovačič



Karst groundwater erupting from a borehole in the vicinity of Bač indicates that the water table on Upper Pivka lies rather close to the surface, which causes flooding during extreme high waters (photography: Gregor Kovačič, 30. 12. 2004). Bruhanje kraške podtalnice iz vrtnice v bližini Bača kaže, da leži gladina podtalnice na Zgornji Pivki blizu površja, kar povzroča v času ekstremno visokih voda poplave (fotografija: Gregor Kovačič, 30. 12. 2004).



Flooding in the area of Knežak, Bač and Koritnice in November 2000

UDC: 911.2:556.166(497.4)"2000"
502.58:556.166(497.4)"2000"
COBISS: 1.01

ABSTRACT: In November 2000 a flood occurred in karst polje between the settlements Bač, Knežak and Koritnice in the municipality of Ilirska Bistrica. The continuous surface of the flood extended to 59 hectares. The flood mostly affected Bač, where 23 residential and some other buildings, an industrial facility and road infrastructure suffered damage.

KEYWORDS: flood, karst groundwater, Upper Pivka, Ilirska Bistrica.

The editorial ship received this paper for publishing on May 20, 2005.

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1 Introduction

The article discusses the reasons and consequences of high waters in November 2000 in the region of the settlements Bač, Knežak and Koritnice in the municipality of Ilirska Bistrica. The discussed area belongs to the south-eastern part of Upper Pivka and is presented by predominantly flat surface of poor fertile fields, which extend in the triangle between the settlements Koritnice, Bač and Knežak and moderately flatted surface western of Bač and Knežak. The area together extends approximately over 2.7 km², 0.59 km² of which was flooded.

Beside flash floods, lowland flooding and marine floods in Slovenia, Gams (1973) also distinguishes floods on karst poljes, which are especially characteristic for the karst poljes in the background of the Ljubljana river (Cerknica polje, Planina polje). Amongst the flooding areas in karst regions belongs also the river basin of the Pivka river in its upper and karstified part, where floods affect 6.4 km² of the area (Kranjc 1985). The largest portion of the flooded surface belongs to regularly flooded areas along the regulated Pivka riverbed. The floods usually occur in autumn and winter periods. Local people had adapted to above-mentioned floods without any difficulties by setting up the settlements on higher-positioned margins. Therefore floods are not particularly hazardous and do not cause damage.

The data of precipitation in the discussed area in autumn 2000 are taken from the precipitation station Ilirska Bistrica, which is located approximately 6 km south and 200 m lower from the discussed area and from the precipitation station Jurišče, which lies 5 km north from Knežak and about 100 m higher.

In November 2000, field mapping of the flooded areas extents in the discussed area was performed, in addition, also the water levels of particular closed flooded surfaces were measured. The extent of the flood was verified with the help of photographic documentation. On the basis of the measured water levels and with the help of *Golden software* programme tools and basic topographic maps at the scale 1 : 5,000, the surfaces and volumes of the particular closed flooded areas in the vicinity of Bač, Knežak and Koritnice were calculated. On the basis of field mapping and the data about the flood damage report, which is kept in the archive of the Municipality Ilirska Bistrica, a map presenting parts of the settlement Bač affected by the flood was prepared. In Bač the consequences of the flood, which otherwise extended to a much greater surface, had reflected in the damage to residential and other buildings and also to the rest of the infrastructure.

2 Outline of geological, geomorphological and hydrological setting

The region along the Pivka river upstream from the settlement Prestranek is called Upper Pivka. The region is mainly developed in Upper Cretaceous limestones, the bottom of the Pivka riverbed and the bottoms of larger karst depressions are covered with fine-grained river sediments. On the south and east Upper Pivka borders to Snežnik plateau and Javorniki plateau, on the southwest and west it is bounded by the Tabor ridge, which extends from the settlement Šembije on the south, to the settlement Pivka on the north.

Geological structure of the discussed area is shown on figure 1. With the exception of a small area situated west from Knežak, where flysch rocks outcrop to the surface in a tectonic window (Pleničar 1959), the margins of the depression between the settlements Bač, Knežak and Koritnice and the hills within its flatted bottom are built mostly of medium to well permeable Cretaceous and Paleogene limestones, characterised by karstic and karst-fissured porosity (Šikić et al. 1972; Šikić and Pleničar 1975; Krivic et al. 1983).

Flooding area between the settlements Bač, Knežak and Koritnice is covered with unconsolidated rubble and gravel-like clastic sediments, which are the product of Pleistocene torrents processes, when a great

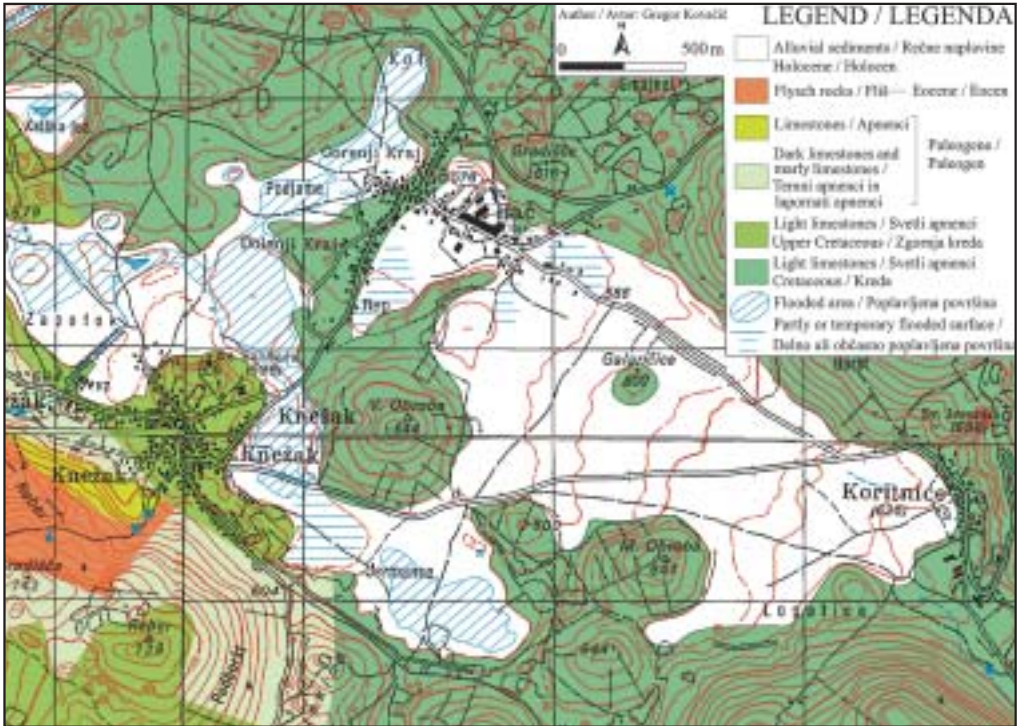


Figure 1: Geological map of the area around Bač, Knežak and Koritnice and the extent of the flood in November 2000.

amount of slope rubble had accumulated in the background of the then Pivka river (mountain valley situated southeast from the settlement Koritnice), which the Pivka river later transported downstream and accumulated it at the exit of the mountain valley in a form of an alluvial fan in a depression between Koritnice, Knežak and Bač (Melik 1955, 71–74) and onwards to the northwest. The depth of the accumulated material, which covers the karstified bottom of the depression, reaches up to 10 m (Krivic et al. 1983). The remnants of the riverbed give evidence of the surface flow of the onetime Pivka river. At the settlement Koritnice the riverbed has a shape of a narrow gorge, proofing a high erosional strength of the Pleistocene Pivka river (Melik 1955, 74). From Koritnice towards the northwest the riverbed is becoming more and more shallow. A dry riverbed is well expressed in meanders underneath the »Boršč« at Koritnice on the right side of the road Koritnice–Bač. In November 2000, the dry riverbed filled up and a surface stream occurred, which flowed into the settlement Bač.

In opposite to the deeply karstified region of the Snežnik plateau, which is a catchment area of the discussed area, relatively shallow karst aquifer is developed on Upper Pivka. One of the reasons for its formation is probably the presence of underlying flysch rocks, which lie rather close to the surface. In the tectonic sense, the Eocene flysch is a fraction of the recumbent fold of the Komen thrust sheet, which lies underneath the overthrust of the Snežnik thrust sheet, built mostly of Upper Cretaceous limestones (Placer 1981). Flysch is preventing the underground runoff towards the Reka river valley and directs the karst groundwater flow towards the north and east.

The discussed area is a part of the nearest catchment area of the Pivka river, which springs out at Zagorje in the Pivšce karst spring. The water table within the karst polje between Koritnice, Knežak and Bač is usually 30–40 m below the surface. The water table is inclined towards the northwest and ranges from 560 m asl at Koritnice to 540 m asl on the western part of Bač (Krivic et al. 1983).

3 High waters in November 2000, extension and duration of the flood

Data from the precipitation stations Jurišče and Ilirska Bistrica show that in the discussed region the total amount of precipitation in September, October and November 2000 nearly two times exceeded the mean value in the period 1961–1990 for the same months. Heavy precipitation reached its maximum in November when there were only six days without rain recorded at the precipitation station Ilirska Bistrica and a day more at precipitation station Jurišče. The first continuous period of rainfall was recorded from October 30 to November 11 (275.8 and 332.6 mm), the second from November 13 to 22 (191.2 and 217.5 mm) and the third from November 25 to 26 (78 and 53.2 mm) (Zupančič 1995; ARSO 2000).

In November 2000, the amount of precipitation in the discussed region exceeded more than three times the average monthly amount in the period 1961–1990 and amounted at the precipitation station Ilirska Bistrica 544 mm and 602 mm at the precipitation station Jurišče (ARSO 2000). Extraordinary high precipitation in autumn resulted in the intense rise of the water table in the area of Bač, Knežak and Koritnice. Water was outflowing to the surface through many holes and fissures. Specially on the southern edge of the karst polje between Knežak, Bač and Koritnice several small karst springs emerged at the bottom, north-west from the settlement Koritnice also a dry riverbed of the onetime Pivka river filled up.

In November 2000, in the discussed flooding area karst groundwater table rose for 20–35 m. First of all, waters appeared on the fields in the vicinity of Knežak, where they regularly occur during long-lasting raining periods, but in a much lesser extent. Later water began to stagnate also on other areas, where until the year 2000 floods had never been recorded before. Flooded surface was not concluded, therefore the water levels of the individual closed flooded parts reached different elevations (Figure 1 and 2). The water

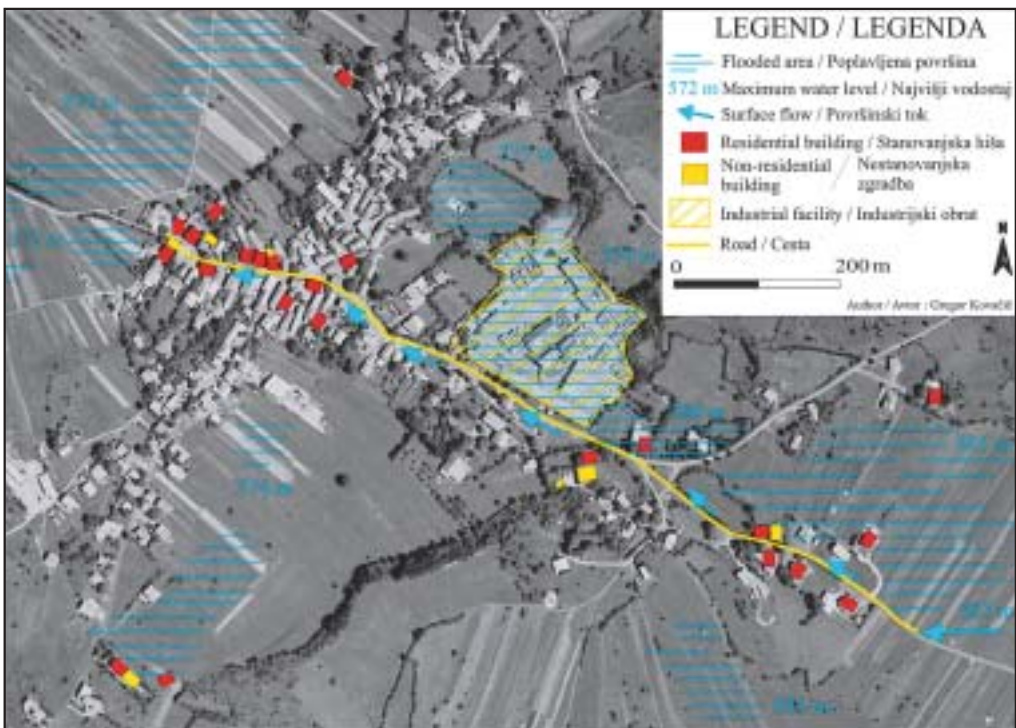


Figure 2: The level of flooding and the damage reported in the settlement Bač in November 2000 (Register of House Numbers 1999; Digital orthographic photographs 2000; Arhiv 2001).

reached its highest level in the area of Dolge njive (576.5 m asl), southeast from Knežak. At its maximum, a flooded surface extended to 13.2 hectares and did not exceed the depth of 3 m, the volume of the water amounted to 157,600 m³. North from the flooded area water inundated a small doline (0.1 hectares). The largest concluded flooded area with the surface of 46 hectares (Habič 2005) extended in three branches in the concave surface between Knežak and Bač, the water level of this inundated area reached the elevation of 571 m asl.

The volume of the water in the flooded surface totalled approximately 435,000 m³, the maximum depth was 2.5 m. The shallow depressions named Jermance, Zelniki and Pod Obrobo were filled with the water from the southeastern branch, but the road connecting Knežak and Koritnice remained above the water surface, hence the flooded areas Zelniki and Pod Obrobo stayed separated. The northeastern branch flooded Robidnice, Podjame, Pod Pezalco, partly Dolenji Kraj, Zelniki and Kot to the north of Bač. Concluded flooded area of Kot was separated from the rest of the flooded surface by a cart track, which had been constructed on a small dike. Therefore the water level of the above-mentioned flooded area was one meter higher than in the remaining part. The flood in the Kot area extended to 7.4 hectares, the volume of the water amounted to 104,500 m³. The maximum depth of the water in the flooded depression was 3.5 m. Water separately emerged also in a shallow depression between Rebernik and Konce (0.4 hectares). The northwestern branch extended in a narrow zone from Robidnice towards Ozke njive, Zapotok and Ponikve. The areas of Zapotok and Ponikve were separated from Ozke njive by an artificial ditch, which draws off a stream originating from a flysch tectonic window lying westwards from Knežak. At the end of the ditch the stream sinks into the ponor Ponikve and springs out in the Videmšca spring at Zagorje and runs onwards surficially towards the Pivka river (Habič 1975). North from Ozke njive water inundated also one small doline (0.2 hectares).

For a few days in November water was very shallow, flooding also some other areas in the vicinity of Knežak and Bač. In opposite to the permanently flooded areas, water occurred on the surface only for a short period. I establish that the difference in flood height between the higher positioned eastern part of Bač and the lower positioned western part was 10 m. A surface stream flowing along the local road directly to the settlement Bač additionally contributed to the flooding of its eastern part (580 m asl). Here, the most extensive temporary flooded areas during the floods of November 2000 occurred.

Water temporary flooded also the area between the flooded areas Zelniki and Dolge njive southeast from Knežak, where no flood damage was caused. Some flooding also occurred in the area of Bač named Rep, where cellars of the nearby houses were flooded. Flood also occurred in Gorenji kraj.

4 Consequences of flooding

According to the data from the Local administration for civil protection of the Municipality Ilirska Bistrica (Arhiv 2001), the flood damage of high waters was reported only in the settlement Bač, which lies on the lowest elevation among the all three settlements of the discussed area. Regarding the data of reported damage, flood affected 23 residential buildings and 7 other buildings (stables, woodsheds, workshops). All together 15% of all residential buildings in the settlement suffered flood damage. First cellars in Bač were flooded by the rising groundwater already on November 9 2000, in a greater extent on November 14 2000, when the water entered the majority of the cellars in the village. The water table reached the highest elevation on the eastern part of Bač, where cellars were flooded up to the ceilings and so the damage occurred also in the ground floors of the residential buildings (Figure 4). Here the flood height reached an elevation of 580 m asl. In other parts of the settlement the water flooded cellars to various heights (30–100 cm). Local people managed to retain low water levels in their cellars with the usage of water pumps, which were operating uninterruptedly.

Beside the increased water table of groundwater, a surface stream, which had activated in the dry bed of the former Pivka river between Koritnice and Bač, additionally intensified the effect of the flood. At the eastern part of the settlement water was directly flowing to the village, and the road through the settle-



Figure 3: Floods around Knežak and Bač in November 2000 (photography Špela Habič, 29. 11. 2000).



Figure 4: Flooded cellar in the residential house on the eastern part of Bač (Arhiv 2001).



Figure 5: Surface flow through the settlement Bač in November 2000 (Arhiv 2001).

ment transformed into some kind of a riverbed in the length of a few 100 m (Figure 5). Underground sewers of meteor waters, built along the main road through the settlement, changed into the system of small ponors and boiling streams. In some of the sewers' shafts water was sinking, while in the others was again springing out to the surface. An industrial facility of *Javor stolarna* company also suffered flood damage.

The total estimated flood damage on all of the buildings in the settlement Bač accounted to 20,861,616 SIT (Arhiv 2001), the majority of which (15,327,790 SIT) accumulated to the damage of the non-production days of the aforementioned company.

Heavy rains with the flood caused the biggest damage on road infrastructure. The main road through Bač suffered the most serious damage. Due to the continual inflowing of surface stream and clogged sewer of meteor waters in the settlement, the roadway was damaged. Flooded roadway hindered the traffic in the direction from Bač to Koritnice. A few days in November, when a part of Bač named Rep was flooded, a ditch was dug through the road connecting Knežak and Bač in order to faster drainage of the water towards the west. Due to the extensive flood the abovementioned road was impassable for several days in November (Figure 6). Several other cart tracks and field roads also suffered damage. The total estimated flood damage on the road infrastructure accounted to 30.748,000 SIT (Arhiv 2001).

The flood caused some damage also on agricultural and forested land. Some of the damage was reported on the crops, especially on the land planted with wheat and turnip. In total the damage in agriculture accounted to 604,542 SIT (Arhiv 2001).

5 Conclusion

Similar to the rest of Slovenia, also in the region of Upper Pivka the record amount of precipitation was recorded in November 2000. As its hinterland also the bottom of the depression between Koritnice, Bač and Knežak is karstified. Therefore residents of the aforementioned settlements did not have any special experiences with the floods, though similarly high waters emerged in the region around 70 years ago. Extraordinary rise of the karst groundwater table caused inundation of approximately 59 hectares of the surface, some of the higher positioned areas were also temporarily flooded. The flood caused direct dam-



Figure 6: Flooded road between Knežak and Bač (Arhiv 2001).

age above all in the settlement Bač. What is concerning is the fact that also the new buildings and the foundations of the houses, which were under construction at that time, were also under the water.

It is necessary to construct a flood-prone area map of the karst depression between Koritnice, Bač and Knežak, where the mapped flooding areas marked on the figures 1 and 2 should be classified as potentially flood-threatened areas. In these areas the construction of new buildings should be restricted, although the return period of the extremely high waters is very long.

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Poplava na območju Bača, Knežaka in Koritnic novembra 2000

UDC: 911.2:556.166(497.4)"2000"

502.58:556.166(497.4)"2000"

COBISS: 1.01

IZVLEČEK: Ob novembrskih padavinah 2000 je na kraškem polju med naselij Bač, Knežak in Koritnice v občini Ilirska Bistrica prišlo do poplave, ki je sklenjeno obsegala 59 ha. Poplava je najbolj prizadela Bač, kjer so zabeležili škodo na 23. stanovanjskih in nekaj drugih objektih, v industrijskem obratu ter na cestnem omrežju.

KLJUČNE BESEDE: poplava, kraška podtalnica, Zgornja Pivka, Ilirska Bistrica.

Uredništvo je prejelo prispevek 20. maja 2005.

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1 Uvod

Članek obravnava vzroke in posledice visokih vod novembra leta 2000 na območju naselij Bač, Knežak in Koritnice v občini Ilirska Bistrica. Obravnavana pokrajina je jugovzhodni del Zgornje Pivke. Gre za večinoma raven svet slabo rodovitnih polj, ki se razteza v trikotniku med Koritnicami, Bačem in Knežakom, ter dokaj uravnan svet zahodno od Bača in Knežaka. Območje skupaj obsega približno 2,7 km², od tega je bilo poplavljen 0,59 km².

Gams (1973) poleg hudourniških, nižinskih in morskih poplav v Sloveniji razlikuje tudi poplave na kraških poljih, ki so značilne predvsem za kraška polja v zaledju Ljubljane (Cerkniško polje, Planinsko polje). Med poplavna območja na krasu sodi tudi porečje Pivke v njenem zgornjem kraškem delu, kjer poplave prizadenejo 6,4 km² ozemlja (Kranjc 1985). Največji delež odpade na redno poplavljen površine ob regulirani strugi Pivke. Do poplav ponavadi prihaja v jesenskem in zimskem obdobju. Domačini so se omenjenim poplavam zlahka prilagodili tako, da so se iz naselij umaknili na višje obrobje, zato niso posebej nevarne in ne povzročajo škode.

Podatki o padavinah na obravnavanem območju v jeseni 2000 so povzeti s padavinske postaje Ilirska Bistrica, ki leži približno 6 km južneje in 200 m nižje od območja ter padavinske postaje Jurišče, ki leži 5 km severno od Knežaka in dobrih 100 m višje.

Novembra 2000 je bilo opravljeno terensko kartiranje obsega poplavnih površin na obravnavanem območju, izmerjeni so bili tudi vodostaji posameznih zaključenih poplavnih površin. Obseg poplave je bil preverjen tudi s pomočjo fotografske dokumentacije. Na podlagi izmerjenih vodostajev so bile s pomočjo programov *Golden Software* ter temeljnih topografskih načrtov v merilu 1 : 5.000 izračunane površine in prostornine posameznih zaključenih poplavnih območij v okolici Bača, Knežaka in Koritnic. Na osnovi terenskega kartiranja in podatkov o prijavljeni škodi, ki jih hranijo v arhivu Občine Ilirska Bistrica, je bila izdelana karta, ki prikazuje prizadete dele naselja Bač, kjer so se učinki poplave, ki je sicer zajela veliko večje območje, odrazili v neposredni škodi na bivalnih in gospodarskih objektih ter na ostali infrastrukturi.

2 Oris geoloških, reliefnih in hidroloških razmer

Pokrajino ob Pivki gorvodno od naselja Prestranek imenujemo Zgornja Pivka. Izoblikovana je pretežno v zgornjekrednih apnencih, dno ob strugi Pivke ter dna večjih kraških kotanj pa prekrivajo drobnozrnati rečni nanosi. Zgornja Pivka meji na jugu in vzhodu na Snežniško planoto in Javornike, na jugozahodu in zahodu pa jo omejuje Taborski hrbet, ki se razteza med naseljema Šembije na jugu in Pivko na severu.

Geološko zgradbo obravnavanega območja prikazuje slika 1. Razen manjšega območja zahodno od naselja Knežak, kjer izdajajo v tektonskem oknu na površje flišne kamnine (Pleničar 1959), sestavljajo obrobje kotanje med naselji Bač, Knežak in Koritnice ter osamelce znotraj njenega uravnanega sveta pretežno srednje do dobro prepustni apnenci kredne in paleogenske starosti s kraško in kraško-rzopoklinsko poroznostjo (Šikić s sodelavci 1972; Šikić in Pleničar 1975; Krivic s sodelavci 1983).

Poplavno območje med naselji Bač, Knežak in Koritnice prekrivajo nesprijeti gruščnato prodnati klastični sedimenti, ki so rezultat delovanja pleistocenskih hudourniških vod, ko se je v povirnem delu takratne Pivke (gorska dolina jugovzhodno od naselja Koritnice) nabiralo veliko pobočnega materiala, ki ga je Pivka transportirala po toku navzdol in ga odložila v obliki vršaja ob izhodu iz gorske doline v kotanjo med Koritnicami, Knežakom in Bačem (Melik 1955, 71–74) ter dalje proti severozahodu. Debelina nasutega gradiva, ki prekriva zakraselo dno kotanje, doseže tudi 10 m (Krivic s sodelavci 1983). O površinskem toku nekdanje Pivke pričajo ostanki struge, ki ima pri naselju Koritnice obliko ozkega korita, kar priča o veliki erozijski moči pleistocenske Pivke (Melik 1955, 74). Od Koritnic proti severozahodu postaja struga vedno bolj plitva. Zlasti je lepo izdelana suha struga pod Borštom pri Koritnicah, ki se v meandrih vije desno od ceste Koritnice–Bač. Novembra 2000 jo je voda napolnila in pojavil se je vodotok, ki je odtekal v naselje Bač.

Slika 1: Geološka karta območja Bača, Knežaka in Koritnic ter obseg poplave novembra 2000. Glej angleški del prispevka.

V nasprotju z globoko zakraselim območjem Snežniške planote, ki je hidrografsko zaledje omenjenega območja, se je na Zgornji Pivki izoblikoval sorazmerno plitev kraški vodonosnik. Eden izmed vzrokov nastanka plitvega krasa so spodaj ležeče flišne kamnine, ki so dokaj blizu površja. V tektonskem smislu je eocenski fliš del prevrnjene gube Komenske narivne grude, ki leži pod narivom Snežniške narivne gube, zgrajene pretežno iz zgornjekrednih apnencev (Placer 1981). Fliš onemogoča podzemeljski odtok voda v smeri doline Reke ter usmerja odtok kraške vode proti severu in vzhodu.

Obravnavano območje pripada bližnjemu zaledju reke Pivke, ki izvira pri Zagorju v izviru Pivšce. Gladina podtalnice v kraškem polju med Koritnicami, Knežakom in Bačem je običajno približno 30–40 m pod površjem. Gladina podtalnice je nagnjena proti severozahodu in sega od 560 m n. v. pri Koritnicah do 540 m n. v. na zahodnem delu Bača (Krivic s sodelavci 1983).

3 Visoke vode v novembru 2000, obseg in trajanje poplave

Podatki s padavinskih postaj Jurišče in Ilirska Bistrica kažejo, da je skupna količina padavin na obravnavanem območju v septembru, oktobru in novembru 2000 skoraj za dvakrat preseгла dolgoletno povprečje (1961–1990) za enako tromesečje. Obilne padavine so dosegle višek novembra, ko so na padavinski postaji Ilirska Bistrica zabeležili samo šest dni brez padavin, na padavinski postaji Jurišče pa dan več. Prvo neprekinjeno obdobje s padavinami je bilo med 30. oktobrom in 11. novembrom (275,8 in 332,6 mm), drugo med 13. in 22. novembrom (191,2 in 217,5 mm) in tretje med 25. in 26. novembrom (78 in 53,2 mm) (Zupancič 1995; ARSO 2000).

Novembra 2000 je količina padavin na obravnavanem območju več kot trikrat preseгла povprečno količino padavin za obdobje 1961–1990 in je na padavinski postaji Ilirska Bistrica znašala 544 mm, na padavinski postaji Jurišče pa 602 mm (ARSO 2000). Izjemna količina jesenskih in še posebej novembrskih padavin se je odrazila v izrazitem dvigu podtalnice na območju Bača, Knežaka in Koritnic. Voda je izvirala na površje iz številnih špranj in razpok. Tako so se zlasti na južnem robu kraškega polja med Knežakom, Bačem in Koritnicami pojavili številni manjši talni kraški izviri, zapolnila pa se je tudi suha struga nekdanje Pivke severozahodno od naselja Koritnice.

Novembra 2000 se je na obravnavanem poplavnem območju gladina kraške podtalnice dvignila za 20–35 m. Najprej so se vode pojavile na poljih v okolici Knežaka, kjer se v manjšem obsegu ob dolgotrajnejših deževnih obdobjih praviloma vedno pojavljajo. Kasneje je voda začela zastajati tudi na drugih območjih, kjer poplav do leta 2000 še ni bilo. Poplavna površina ni bila sklenjena, zato so vodostaji posameznih zaključenih poplavnih območij dosegli različne nadmorske višine (sliki 1 in 2). Vodna gladina je segla najvišje na območju Dolgih njiv, jugovzhodno od Knežaka in sicer do 576,5 m n. v. Ojezerjeno območje je v času najvišjega vodostaja obsegalo 13,2 ha in ni presegló globine 3 m, prostornina vode v njem je znašala 157.600 m³. Severno od poplavljenega območja je voda zalila manjšo vrtačo s površino 0,1 ha. Največje sklenjeno poplavljenno območje s skupno površino 46 ha (Habič 2005) pa se je raztezalo v treh izrazitih krakih na kotanjastem površju med Knežakom in Bačem, vodostaj ojezerjene površine je segal do 571 m n. v.

Skupna prostornina vode na poplavljeni površini je znašala približno 435.000 m³, največja globina pa je bila 2,5 m. Jugovzhodni krak je poplavljal Jermance, Zelnike in Pod Obrobo, pri čemer cesta Knežak–Koritnice ni bila poplavljená, tako da sta bili poplavljeni območji Zelniki in Pod Obrobo med seboj ločeni. Severovzhodni krak je zalil območja Pod Pezalco, Robidnice, Podjame, deloma Dolenji Kraj ter Zelnike in Kot severno od Bača. Zaključeno poplavno površino v Kotu je od drugega sklenjenega poplavnega območja ločeval kolovoz, zgrajen na manjšem nasipu. Zaradi tega je bila gladina vode na omenjenem poplavljenem območju meter višja kot v drugem delu. Poplava na območju Kota je obsegala 7,4 ha, prostornina vode pa je znašala 104.500 m³. Največja globina ojezerjene kotanje je bila 3,5 m. Ločeno se je voda pojavila še v plitvi kotanji med Rebrnikom in Konkami (0,4 ha). Severozahodni krak je z območja Robidnice v ozkem pasu segal proti Ozkim njivam, Zapotoku in Ponikvam. Poplavljenno območje Ozkijh njiv je od

Zapotoka in Ponikev ločeval umetno izravnani in med nasipa ujeti jarek potoka, ki s flišnega tektonskega okna zahodno od Knežaka odteka v ponor Ponikve in podzemno v izvir Videmšce pri Zagorju ter dalje v reko Pivko (Habič 1975). Severno od Ozkih njiv je voda v površini 0,2 ha zalila tudi manjšo vrtačo.

Slika 2: Višina poplave in poplavljeni objekti ob poplavah novembra 2000 v naselju Bač (Evidenca hišnih števil 1999; Digitalni ortofoto posnetki 2000; Arhiv 2001).

Glej angleški del prispevka.

Voda je nekaj dni v novembru zelo plitvo poplavljala tudi nekatere druge predele v okolici Knežaka in Bača. V primerjavi od trajnejše poplavljenih površin, se je v večini primerov voda pojavila na površju le za krajši čas. Razlika v višini poplave med višje ležečim vzhodnim in nižjim zahodnim delom Bača je znašala 10 m. K poplavljanju vzhodne strani Bača (580 m n. v.) je pripomogel tudi površinski vodotok, ki je pritekalo po cesti neposredno v naselje. Tu so bile tudi največje občasno zalite površine v času poplav novembra 2000.

Voda je občasno zalila tudi območje med ojezerjenimi površinami Zelniki in Dolgimi njivami jugovzhodno od Knežaka, kjer ni povzročala škode, nekaj dni v novembru pa je poplavela tudi predel Bača imenovan Rep, kjer je zalilo kleti v bližnjih hišah ter tudi Gorenji kraj.

4 Posledice poplave

Po podatkih Občinskega štaba civilne zaščite Občine Ilirska Bistrica (Arhiv 2001) so visoke vode neposredno škodo povzročile le v naselju Bač, ki izmed vseh treh naselij obravnavanega območja leži najnižje. Po evidencah prijavljene škode je poplava prizadela 23 stanovanjskih in 7 drugih objektov (hlevi, drvarnice, delavnice), tako da je bilo skupno prizadetih 15 % vseh stavb s stanovanji v naselju. Prve kleti v Baču je narasla podtalnica zalila že 9. 11. 2000, v večjem obsegu pa 14. 11. 2000, ko je voda vdrla v večino kleti v vasi. Najvišje je segala v vzhodnem delu Bača, kjer je zalila kleti do stropa, tako, da je škoda nastajala tudi v pritličju stanovanjskih stavb (slika 4). Tu je dosegla višina poplave 580 m n. v. Drugod v naselju je voda zalila kleti različno visoko (30–100 cm). S pomočjo neprekinjenega delovanja vodnih črpalk je domačinom uspelo sprotno zadrževanje nizkih ravni vode v kletih.

Slika 3: Poplava v okolici Knežaka in Bača novembra 2000 (fotografija Špela Habič, 29. 11. 2000).

Glej angleški del prispevka.

K povečanemu učinku poplave je poleg narasle podtalnice prispeval tudi površinski vodotok, ki se je aktiviral v suhi strugi nekdanje Pivke med Koritnicami in Bačem. Voda se je na vzhodnem delu naselja po cesti zlivala neposredno v vas, tako da se je cesta skozi naselje na razdalji nekaj 100 m spremenila v nekakšno strugo (slika 5). Podzemni odtočni kanali meteorne vode, zgrajeni ob glavni cesti skozi naselje, so se spremenili v sistem majhnih požiralnikov in bruhalnikov, saj je voda v nekaterih jaskih ponikala v drugih pa ponovno izvirala na plano. Poplava je povzročila škodo tudi na proizvodnem obratu podjetja Javor stolarna.

Ocenjena skupna škoda na vseh objektih v naselju Bač je znašala 20.861.616 SIT (Arhiv 2001), od česar največji delež (15.327.790 SIT) zaradi izpada proizvodnje odpade na zgoraj omenjeni proizvodni obrat.

Močno deževje s poplavo je največ škode povzročilo na cestah. Najbolj je bila poškodovana glavna cesta skozi Bač, kjer je zaradi površinskega dotoka vode ter zamašitve meteorne kanalizacije v naselju prišlo do poškodbe cestišča. Zalito cestišče je oviralo promet v smeri od Bača proti Koritnicam. Nekaj dni v novembru, ko je voda za nekaj časa zalila predel Rep, so zaradi hitrejšega odvajanja vode v smeri proti zahodu celo prekopali povezovalno cesto Knežak–Bač, ki je bila zaradi obsežne poplave sicer neprevozna več dni v novembru (Slika 6). Poškodovane so bile tudi številne druge poljske in vaške poti. Skupna ocenjena škoda na cestnem omrežju je znašala 30.748.000 SIT (Arhiv 2001).

Poplava je povzročila nekaj škode tudi na kmetijskih in gozdnih zemljiščih ter kulturah, zlasti na površinah zasajenih s pšenico in repo. Skupna škoda v kmetijstvu je znašala 604.542 SIT (Arhiv 2001).

Slika 4: Poplavljeni klet v stanovanjski hiši na vzhodnem delu Bača (Arhiv 2001).
Glej angleški del prispevka.

Slika 5: Površinski tok skozi naselje Bač v novembru 2000 (Arhiv 2001).
Glej angleški del prispevka.

5 Sklep

Na območju Zgornje Pivke so bile novembra 2000 podobno kot v drugih delih Slovenije zabeležene rekordne količine padavin. Dno kotanje med Koritnicami, Bačem in Knežakom je zakraselo, kakor tudi njeno zaledje, zato prebivalci omenjenih naselji niso imeli posebnih izkušenj s poplavami, čeprav so se podobno visoke vode pojavile pred približno 70 leti. Izjemen porast gladine kraške podtalnice je povzročil ojezeritev na površini približno 59 ha, občasno pa so bili poplavljeni tudi nekateri nekoliko višje ležeča območja. Poplava je povzročala neposredno škodo predvsem v naselju Bač. Zaskrbljujoče je dejstvo, da so bile pod vodo tudi novogradnje ter temelji hiš, ki so jih v tistem obdobju šele zidali.

Za kraško kotanjo med Koritnicami, Bačem in Knežakom bi morali izdelati karto poplavnih območij ter kartirana poplavna območja, označena na karti 1 in 2 uvrstiti med potencialno ogrožena območja, kjer bi morala biti gradnja novih objektov omejena, čeprav je povratna doba izredno visokih voda zelo dolga.

Slika 6: Poplavljeni cesta med Knežakom in Bačem (Arhiv 2001).
Glej angleški del prispevka.

6 Literatura in viri

Glej angleški del prispevka.