



REPUBLIKA SLOVENIJA
MINISTRSTVO ZA OKOLJE, PROSTOR IN ENERGIJO
AGENCIJA REPUBLIKE SLOVENIJE ZA OKOLJE

HIDROLOŠKI LETOPIS SLOVENIJE 2000

*THE 2000 HYDROLOGICAL
YEARBOOK OF SLOVENIA*





AGENCIJA REPUBLIKE SLOVENIJE ZA OKOLJE

NASLOVNICA – COVER PAGE

Cerkniško jezero pri naselju Gorenje Jezero 28. 11. 2000, ko je gladina dosegla najvišji nivo v obdobju 1954 – 2000. (foto: Marjan Bat)

Lake Cerknica near the village Gorenje Jezero on the 28th of November 2000, when the lake reached its highest level for the data period of 1954 – 2000. (photo: Marjan Bat)



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PREDGOVOR

Ob svetovnem dnevu vode leta 2000 in petdeseti obletnici Svetovne meteorološke organizacije (WMO) je generalni sekretar, profesor G.O.P. Obasi, svoje pismo vsem vladam sveta naslovil: »Voda za 21. stoletje«. V svetovnih organizacijah namreč ocenjujejo, da bo človeštvo v letu 2010 porabilo dvakrat več vode kot pred petdesetimi leti, okoli leta 2040 pa naj bi se zaradi porabe in vse večjega onesnaževanja že pojavile različne oblike »vodne krize«.

Človeštvu je za preskrbo z vodo na razpolago le 0.26 odstotka vse vode iz naravnih virov planeta. Slovenija se pri tem sicer uvršča med zelo vodnate evropske dežele, vendar pa nadpovprečna količina razpoložljive vode v prihodnje ne bo več zadosten pogoj za nadpovprečno porabo. Leto 2000 je bilo tudi v tem smislu prelomno. Z namenom celovitega upravljanja z vodami Evrope je bila ob koncu leta sprejeta Okvirna vodna smernica (2000/60/EC), ki prinaša nove usmeritve za bolj odgovorno ravnanje z vodo.

Globalno je bilo leto 2000 sedmo najtoplejše v zadnjih 140 letih in ameriški strokovnjaki National Oceanic and Atmospheric Administration so s pomočjo satelitov ocenili, da je okoli 20 odstotkov zemeljskega površja prizadela suša. V istem letu so po podatkih Dartmouth Flood Observatory preko 50 milijonov zemljanov prizadele poplave. Več kot 10 tisoč ljudi poplav ni preživelo.

Z obema hidrološkima ekstremoma smo se v letu 2000 srečali tudi v Sloveniji. V letu 2000 je po slovenskih rekah preteklo 6 odstotkov manj vode kot povprečno. Najizrazitejša odstopanja so bila pri najmanjših pretokih, ki so bili kar za 23 odstotkov manjši kot v primerjalnem obdobju 1961-1990. Tudi pri podzemnih vodah ocenjujemo leto 2000 kot hidrološko sušno, z izrazito neugodnim režimom v aluvialnih vodnosnikih severovzhodne Slovenije.

V zadnjih dveh mesecih leta 2000 so pretoki rek v nekaterih povirnih delih porečij na območju Julijskih in Kamniško Savinjskih Alp ter višine poplavne vode na nekaterih kraških poljih dosegli rekordne vrednosti. Izdatne pada-

FOREWORD

On the occasion of World Water Day in 2000 and at the 50th anniversary of the World Meteorological Organization (WMO), the title of the letter from the General-Secretary, professor G.O.P. Obasi, to all governments of the world was: »Water for the 21st century.« World organizations estimate that in the year 2010 people will use twice as much water than they did 50 years ago. Various forms of »water crisis« will occur around the year 2040, due to the consumption and increasing pollution.

Only 0.26 % of all water from Earth's natural resources is available to mankind. Slovenia is among the most water abundant European countries, but in the future, the above-average water quantity will no longer be sufficient for its above-average consumption. As far as this is concerned, the year 2000 was a turning point as well. For the purpose of an overall management of European waters, the Water Framework Directive (2000/60/EC) was adopted at the end of the year, bringing new guidelines for more responsible water management.

The year 2000 was globally the 7th warmest year in the past 140 years. The American National Oceanic and Atmospheric Administration experts have, through the study of satellite images, estimated that about 20 % of the Earth's surface was affected by drought. According to the Dartmouth Flood Observatory data, floods affected over 50 million people in the same year, and killed more than 10,000 people.

Both extreme hydrological events occurred in Slovenia in the year 2000 as well. In that year, river was about 6 % below multiannual mean. Deviations were the most explicit with the lowest discharges, which were even 23 % lower than those in the comparative period 1961-1990. Regarding groundwater, the year 2000 was also considered to be a hydrologically dry period with unfavourable regimes in the alluvial aquifers of northeastern Slovenia.

River discharges at certain headwaters of river basins at the area of the Julian and Kamniško Savinjske Alps, as well as the floodwater level at some karstic fields, reached record values in the

vine v začetku novembra 2000 so v Posočju povzročile naravno katastrofo. V povirju Koritnice se je sprožil zemeljski plaz in drobirski tok je v Logu pod Mangartom zahteval tudi smrtne žrtve.

Hidrološki letopis Slovenije poskuša podrobneje predstaviti hidrološke razmere slovenskih rek, jezer, izvirov, podzemnih voda in morja v letu 2000. Glede na predhodne številke je Hidrološki letopis Slovenije za leto 2000 nekoliko spremenjen. Skušali smo ga narediti zanimivejšega in prijaznejšega tudi širšemu krogu uporabnikov. Osnovno poslanstvo hidrološkega letopisa pa ostaja nespremenjeno. Z njim želimo predstaviti zgoščene rezultate opazovanj in meritev v letu 2000 ter povzetke analiz, ki smo jih na Agenciji RS za okolje opravili v okviru programa hidrološkega monitoringa.

mag. Jože Uhan,
vodja sektorja za hidrologijo

last two months of the year 2000. High levels of precipitation at the beginning of November 2000 caused a natural disaster in Posočje. A landslide occurred in the valley of Koritnica and a debris flow in Log pod Mangartom even caused some casualties.

The Hydrological Yearbook of Slovenia is attempting to present in detail the hydrological regime of Slovene rivers, lakes, springs, groundwater and sea in the year 2000. The 2000 Hydrological Yearbook of Slovenia is somewhat different, compared to the previous issues. We were trying to make it more interesting and »friendlier« for a wider circle of users. Nevertheless, its basic »mission« remains the same. We wish to present a summary of the observation and measurement results in the year 2000, as well as a summary of analyses, carried out by the Environmental Agency of the Republic of Slovenia, within the framework of the hydrological monitoring program.

mag. Jože Uhan,
Head of Hydrology Section

SPREMEMBE V MREŽI MERILNIH MEST HIDROLOŠKEGA MONITORINGA V SLOVENIJI LETA 2000

V mreži merilnih postaj hidrološkega monitoringa Agencije RS za okolje ni prišlo do bistvenih sprememb glede na predhodno leto. Na merilnih mestih postopoma uvajamo sodobne merilne naprave (podatkovni zapisovalniki), ki naj bi razbremenile prostovoljne opazovalce, pri hidrometričnih meritvah pa smo začeli poleg hidrometričnih kril uporabljati avtomatski dopplerjev merilnik pretoka (ADMP). V obeh primerih gre za proces posodabljanja, ki pa presega časovni okvir enega leta.

Na površinskih vodotokih in jezerih je leta 2000 delovalo 165 vodomernih postaj. Nekatere so zaradi posodobitev ali prestavitve delovale vzporedno (npr. Muta in Muta I na Bistrici, Sodna vas I in Sodna vas II na Mestinjščici, Kršovec in Kršovec I na Soči), na nekaterih so bila opazovanja motena (npr. Livold na Rinži, Vir na Rači, Žebnik na Sopotu) oz. so se med letom šele pričela (Robič na Nadiži). Zato so v Letopisu objavljeni podatki 158-ih vodomernih postaj. Na Dravinji so bila prekinjena opazovanja na postaji Videm I (šifra 2650), ki je delovala od leta 1971. Prestavljena so bila na lokacijo, kjer so opazovanja potekala pred tem, občasno že od leta 1895 (vodomerna postaja Videm, šifra 2652). Sprememba lokacije na podatke o pretoku nima pomembnega vpliva. Spet sta začeli redno delovati vodomerni postaji Kranj na Kokri (šifra 4155), ki so jo pred nekaj leti razdejali, in Borovnica na Borovniščici (šifra 5330). Prav tako so po 10-letni prekinitvi ponovno stekla opazovanja na vodomerni postaji Polže na Hudinji (šifra 6770), kar je pomembno tudi zaradi tega, ker imamo zanjo podatkovni niz, ki se začne z letom 1953.

Iz mreže za meritve podzemne vode so v letopisu objavljeni podatki 128 postaj. Prekinjena so bila opazovanja na eni od dveh postaj v Stojnicah na Ptujskem polju (0242 Stojnci), v Vrtojbi pa so se opazovanja gladine podzemne vode v prodnem vršaju Soče začela še na dodatni postaji (0241 Vrtojba). V Spodnji Senici na Sorškem

CHANGES IN THE NETWORK OF HYDROLOGICAL GAUGING STATIONS OF SLOVENIA IN THE YEAR 2000

There weren't any major changes in the hydrological monitoring network of the Environmental Agency of the Republic of Slovenia, with respect to the previous year. Modern gauging devices (data loggers), which will replace voluntary observers, are being gradually introduced at the gauging sites. As far as the hydrometric measurements are concerned, the automatic Doppler discharge measuring system came into operation, in addition to the current meter. Both cases are part of the modernisation process, which goes beyond the time framework of one year.

In the year 2000, 165 water gauge stations were operating on the surface watercourses and lakes. Some of them were operating in parallel because of modernisation or changing of location (e.g. Muta and Muta I on the river Bistrica, Sodna vas I and Sodna vas II on the Mestinjščica, Kršovec and Kršovec I on the Soča). Observations were disturbed at some stations (e.g. Livold on the river Rinža, Vir on the Rača, Žebnik on the Sopot), or they started in the middle of the year (Robič on the Nadiža). Therefore the data for 158 water gauge stations are published in the Yearbook. Observations were terminated on the river Dravinja at the Videm I station (code 2650), which had been operating since 1971. They have been replaced by observations on another location, where they had taken place before that, occasionally since 1895 (Videm water gauge station, code 2652). Change of the location has not significantly influenced the discharge data. Two water gauge stations began to regularly operate again: Kranj on the Kokra (code 4155), which had been vandalised a few years ago, and Borovnica on the Borovniščica (code 5330). After a 10-year interruption, the observations on the water gauge station Polže on the Hudinja have begun to take place again (code 6770), and that is important because of the fact that we have a series of data for this station, beginning with the year 1953.

Data for 128 stations from the groundwater measurement network are published in

polju ter v Cerkljah na Krškem polju se je spremenila pogostost opazovanj, vodomerni postaji Arja vas v Spodnji Savinjski dolini in Krška vas na Krškem polju pa sta dobili limnigraf.

Merilna mreža monitoringa izvirov se postopoma širi. V letu 2000 smo pričeli z opazovanji na kraškem izviru Pšate, vendar pa so podatki zaenkrat še pomanjkljivi in jih nismo objavili. V Letopisu sta torej tako kot leto poprej predstavljeni le dve merilni mesti.

V mreži monitoringa morja delujeta dve mareografski postaji. Naša temeljna postaja je pri Luški Kapitaniji. Zanj imamo podatke od leta 1958. V Koprskem zalivu deluje od leta 1990 tudi avtomatska mareografska postaja Luka Koper, katere višinsko izhodišče je šest centimetrov nižje od izhodišča mareografske postaje Luška Kapitanija. Podatki te postaje so v realnem času dostopni uporabnikom na spletnem portalu ARSO (<http://www.arso.gov.si>) in teletekstu.

Ker je bila v 90-ih letih postaja v Luki sodobnejša, njeno delovanje pa zanesljivejše, smo do letošnje izdaje Hidrološkega letopisa uporabljali njene podatke, vendar smo jih preračunavali na višinsko izhodišče mareografske postaje v Luški Kapitaniji. Z letopisom za leto 2000 smo ponovno začeli objavljati podatke pod imenom Luške Kapitanije. Tega leta je bil namreč sprejet načrt za temeljito obnovo postaje.

mag. Marjan Bat,
vodja službe za hidrološke baze, katastre in
bilanco

Yearbook. Observations were interrupted on one of the two stations in Stojnci at Ptujsko polje (0242 Stojnci). In Vrtojba, observations of groundwater level in the alluvial plain of Soča have begun on an additional station (0241 Vrtojba). In Spodnja Senica on Sorško polje and in Cerklje on Krško polje, the frequency of observations has changed. At the groundwater stations Arja vas in the valley Spodnja Savinjska dolina and Krška vas on Krško polje, water-level recorders were installed.

The spring monitoring network is gradually expanding. In the year 2000, observations began on the karstic spring Pšata, but due to gaps in recorded data they have not been published. Same as the previous year, only two gauging sites are presented in this yearbook.

Two mareographic stations are operating within the sea-monitoring network. Our principal station is at Luška Kapitanija (Harbour Administration). We have had data for this station from the year 1958 onwards. In the bay Koprski zaliv, an automatic mareographic station Luka Koper has been active since 1990. Its gauge zero is 6 cm lower than the gauge zero of the mareographic station at Luška Kapitanija. The data from this station are available on the web page of the Agency of the Republic of Slovenia for the Environment (<http://www.arso.gov.si>) and on teletext.

In the nineties, the station in Luka was more modern and its operation was more reliable, therefore its data were used before this year's issue of the Hydrological Yearbook, but the data were calculated for the gauge zero of the mareographic station in Luška Kapitanija. With the Yearbook for the year 2000, the data from Luška Kapitanija has begun to be published again, as a plan for the thorough reconstruction of the station was adopted that year.

mag. Marjan Bat,
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