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AGENCIJA REPUBLIKE SLOVENIJE ZA OKOLJE

Predstavitev projekta »Nadgradnja sistema za spremljanje in analiziranje stanja vodnega okolja v Sloveniji«

Presentation of the project »Upgrade of the system for monitoring and analyzing the water environment in Slovenia«

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AGENCIJA REPUBLIKE SLOVENIJE ZA OKOLJE

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"Stal je sred dvorišča, kot zlat rudnik"
"It stood in the heart of the yard as a goldmine"
(Ciril Zlobec)

Voda: včasih nevidna, včasih mehka kot svila in včasih trda kot kamen
Water: sometimes invisible, sometimes soft as silk, and sometimes hard as rock

BOBER
BOLJŠE OPAZOVANJE ZA BOLJŠE EKOLOŠKE REŠITVE
BETTER OBSERVATION FOR BETTER ENVIRONMENTAL RESPONSE

Naložba v vašo prihodnost
OPERACIJO DELNO FINANCIRA EVROPSKA UNIJA
Kohezijski sklad

Največji projekt za spremljanje stanja okolja v Sloveniji: »
Nadgradnja sistema za spremljanje in analiziranje stanja vodnega okolja v Sloveniji«,
poimenovan s kratico:

The most extensive project for monitoring the state of environment in Slovenia:
» Upgrading the system for monitoring and analysing the state of the water environment in Slovenia«:

BOBER

Boljše Opazovanje za Boljše Ekološke Rešitve
Better Observation for Better Environmental Response

ZAZNAJ
Zaznaj dogodek:

DETECT
Detect an event:

PROUČI
Prouči nevarnost:

ANALYSE
Analyse the danger:

OPOZORI
Obvesti in opozori:

ALERT
Inform and warn:


PITNA VODA

Uvod

Voda je glavna sestavina vseh oblik življenja ter nujna za človekovo preživetje in razvoj družbe. V naravi mora biti na voljo v zadostnih količinah in ustrezne kakovosti. Zdravo in čisto vodno okolje je želja vseh, pa vendar človek s svojimi posegi vse bolj ogroža ta zelo ranljivi naravni vir. Slovenija leži na južni strani Alp in ima zaradi svoje lege dosti padavin. Zaradi razmeroma velike količine padavin je tudi podzemnih voda, ki so glavni vir oskrbe prebivalstva s pitno vodo, dovolj. Kljub temu pa je krajevna oskrba z vodo vse pogosteje motena. V zadnjih dveh desetletjih so vse pogostejše suše, ki zmanjšujejo zaloge podzemne vode, zmanjšuje se tudi vodna količina površinskih vodotokov. Glede na trenutno vedenje o vplivih podnebnih sprememb bodo suše in poplave vse pogostejše in izrazitejše. Če k temu dodamo še onesnaževanje podzemnih voda na območjih z intenzivnim kmetijstvom, na katerih so tudi pomembni podzemni vodonosniki, se zaloge čiste vode hitro in mnogokrat nepovrnljivo zmanjšujejo. Seveda pri onesnaževanju voda tudi industrija s svojimi izpusti ni nedolžna. Če želimo vodo, ki je naša strateška dobrina, zaščititi in z njo dobro gospodariti, potrebujemo kakovostne, točne in podrobne podatke o stanju vodnega okolja v Sloveniji. Prav tako potrebujemo zanesljive podatke o padavinah in drugih parametrih ozračja v realnem času za prostorske analize trenutnega stanja. Na njihovi podlagi lahko izdelamo opozorila, kadar objektivno pričakujemo uničujoče delovanje narave, na primer ob poplavah.

Vse našteto so glavne naloge in poslanstvo Agencije RS za okolje (ARSO). Za opravljanje teh nalog ARSO vzpostavlja in vzdržuje ustrezne merilne mreže, laboratorije in računalniško infrastrukturo. Pokazalo se je, da smo v preteklosti posamezne merske postaje prepočasi obnavljali ali dodatno vzpostavljali, da bi lahko zagotavljali dovolj dobre podatke za prostorsko načrtovanje, gospodarjenje z vodami in pravočasno opozarjanje na hude ure. ARSO je zato s pomočjo sredstev Evropske unije začela izvajati velik projekt Nadgradnja sistema za spremljanje in analiziranje stanja vodnega okolja v Sloveniji.

Temeljni cilj projekta je zagotoviti zanesljive, kakovostne in prostorsko reprezentativne meteorološke in hidrološke meritve, ki bodo omogočile celovito spremljanje in analiziranje stanja vodnega okolja v Sloveniji ter natančnejše napovedovanje hidroloških izrednih pojavov. Celoten projekt je naravnan k zmanjšanju mogočega škodljivega delovanja voda ter vzpostavljanju trajnostnega razvoja vodnega okolja na ravni celotne države.

Projekt izvaja Agencija RS za okolje med letoma 2009 in 2015. Poimenovala ga je **BOBER**, kar je kratica za **B**oljše **O**pazovanje za **B**oljše **E**kološke **R**ešitve (angl. **B**etter **O**bservation for **B**etter **E**nvironmental **R**esponse).

Ocenjena vrednost projekta je skoraj **33 milijonov EUR**, od tega bo prispeval **Kohezijski sklad EU 85 %**, **proračun RS pa 15 %**.

Požirek vode - iluzija prihodnosti?
A drink of water - future illusion?

Kapljica jutranje rose - tako majhna in hkrati tako velika
A drop of an early-morning dew - so small and so big at the same time

Introduction

Water is the main element in all life forms and is essential for human survival and the development of society. In nature, it should be available in adequate quantities and quality. Everyone wants a healthy and clean water environment; however, through our interventions, people are increasingly deteriorating this highly vulnerable natural resource. Slovenia is located on the southern side of the Alps and, because of its geographical position, receives enough precipitation. Due to the relatively large amount of precipitation, the underground waters, which provide the main source of drinking water supply to the population, are also sufficient. Nevertheless, local disruptions to the water supply are on the increase. During the last two decades, droughts have become more frequent, which have reduced groundwater reserves and the quantity of surface water flows has also decreased. In the light of the current understanding of the impact of climate changes, droughts and floods will become more frequent and severe. If, in addition we also take into account underground water pollution in areas of intensive agriculture where there are also important aquifers, clean water reserves have been quickly and, in many cases, irreversibly depleted. In relation to water pollution, industry with its discharges is also, of course, not blameless. If we want to protect water, which is our strategic good, and manage it well, we need high-quality, accurate and detailed data on the state of the water environment. We also need reliable, real time data on precipitation and other atmospheric parameters to perform analyses of the current situation. On their basis, we can prepare warnings about when we can objectively expect destructive natural events, such as floods.

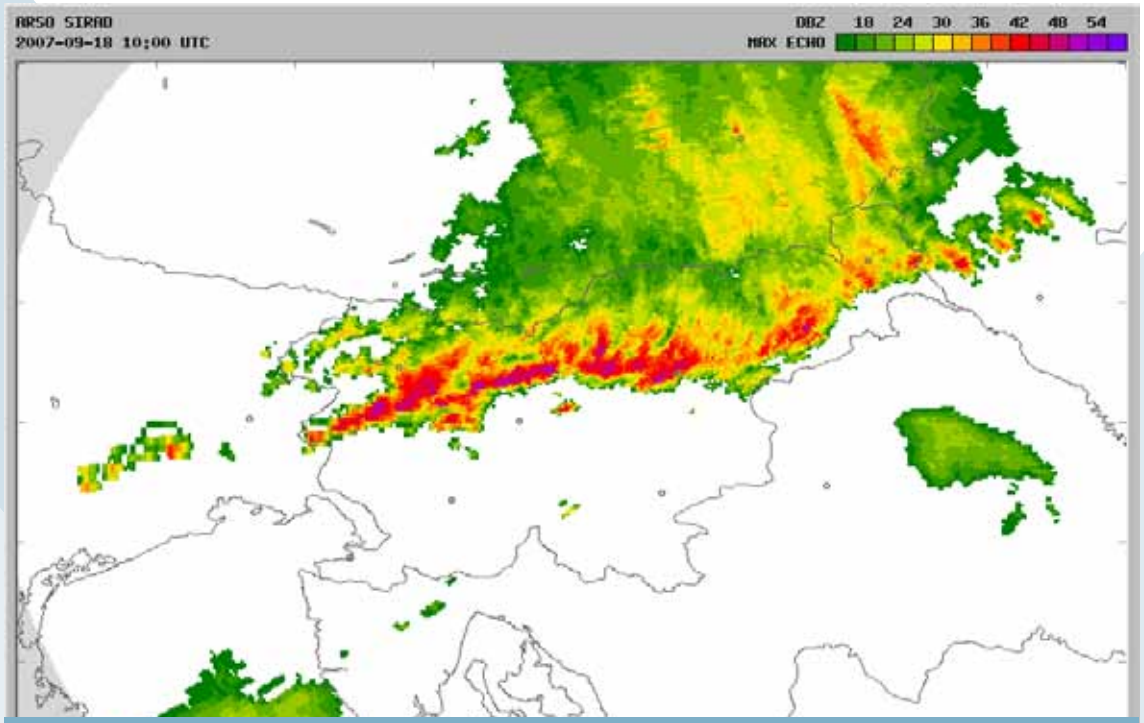
All mentioned above cover are the tasks and mission of the Environmental Agency of the Republic of Slovenia (ARSO). In order to carry out these tasks, ARSO has set up and maintains suitable measuring networks, laboratories and computer infrastructure. It appeared that upgrading or setting up additional individual measuring stations was too slow in the past to provide data of quality, high enough for spatial planning, water management and timely warning of the approaching storms. ARSO, therefore, with the assistance of EU funds, has started to implement a major project entitled »Upgrading the system for monitoring and analysing the state of the water environment in Slovenia«.

The essential objective of the project is to ensure reliable, high quality and spatially representative meteorological and hydrological measurements, which will facilitate comprehensive monitoring and analysis of the state of the water environment in Slovenia, as well as more accurate forecasting of extreme hydrological phenomena. The entire project is focused on reduction of the potential harmful impact of water and the introduction of sustainable development of the water environment at a national level.

In the 2009-2015 period, the Environmental Agency of the Republic of Slovenia is carrying out a project called **BOBER**, **which is an acronym for B**etter **O**bservation for **B**etter **E**nvironmental **R**esponse (**B**oljše **O**pazovanje za **B**oljše **E**kološke **R**ešitve).

The estimated value of the project is EUR 33 million; 85 % of which will be financed by the EU Cohesion Fund and 15 % from the budget of the Republic of Slovenia.

Meteorološka postaja na Letališču E.R. Maribor
Meteorological station at the E.R. Maribor airport



Radarska slika padavin
Radar image of the rainfall

Pričakovani rezultati projekta

- 248 nadgrajenih in novih merilnih mest po vsej Sloveniji;
- zamenjava opreme na 33 merilnih mestih;
- postavitev dodatnega vremenskega radarja;
- nova oprema za občasne hidrološke meritve in meritve dinamike morja;
- zagotovitev pogojev za delovanje Službe za morsko meteorologijo in oceanografijo;
- posodobitev računalniške infrastrukture v računskem centru ARSO;
- posodobitev in širitev kemijskoanalitskega, biološkega in umerjevalnega laboratorija;
- vzpostavitev sistemov za napovedovanje hidrološkega stanja rek Save in Soče, dinamike morja, stanja podtalnice v aluvialnih vodonosnih telesih ter spremljanje suše.

Anticipated project results

- 248 upgraded and new measuring stations throughout Slovenia;
- replacement of equipment at 33 measuring stations;
- installation of an additional weather radar;
- new equipment for periodic hydrological measurements and sea dynamics measurements;
- provision of conditions for the operation of the Maritime Meteorological and Oceanographic Service;
- upgrading the computer infrastructure in the ARSO Computer Centre;
- upgrading and enlarging chemical, analytical, biological and calibration laboratories;
- setting up systems to forecast the hydrological state of the Sava and the Soča rivers, sea dynamics, state of the underground water in alluvial aquifers and drought monitoring.

Agencija Republike Slovenije za okolje
The Environmental Agency of the Republic of Slovenia

Človekov vir življenja
Human source of life

Predstavitev projekta

Projekt Nadgradnja sistema za spremljanje in analiziranje stanja vodnega okolja v Sloveniji je del Operativnega programa razvoja okoljske in prometne infrastrukture v obdobju 2007–2013, razvojne prioritetne naloge Varstvo okolja – področje voda in prednostne usmeritve Zmanjševanje škodljivega delovanja voda. Ta skupni programski dokument Evropske unije in Slovenije predvideva, da se sredstva iz Kohezijskega sklada EU in delež lastnega sofinanciranja države Slovenije usmerijo v projekte, s katerimi želi Slovenija doseči dolgoročno okoljsko in prometno vizijo ter cilje razvoja države. To vključuje zagotovitev možnosti za rast z zagotavljanjem trajne mobilnosti, izboljšanjem kakovosti okolja in gradnjo ustrezne infrastrukture. Operativni program je Evropska unija sprejela leta 2007. S tem je bila dana podlaga za pripravo in prijavo projekta Nadgradnja sistema za spremljanje in analiziranje stanja vodnega okolja v Sloveniji.

Namen projekta v širšem smislu je povečanje zmogljivosti Agencije RS za okolje pri spremljanju, proučevanju in napovedovanju dejavnikov vodnega kroga. Pomembna sta predvsem vidik uravnoteženega prostorskega načrtovanja in tako boljšega upravljanja voda ter s tem ciljem povezana gradnja reprezentativnih merilnih mrež za ocenjevanje stanja vodnih teles. Z vidika varstva okolja ter učinkovite in trajnostne rabe naravnih virov je pomembna predvsem zaščita pitne vode. Zelo pomemben je tudi vidik zaščite zdravja in življenja ljudi ter premoženja pred posledicami naravnih nesreč (zaščita pred poplavami in sušami), ki mora temeljiti na pravilni in pravočasni meteorološki in hidrološki napovedi ter zagotavljanju podatkov v realnem času.

Soča - biser Slovenije
Soča - the Slovenian jewel

Včasih je vode tudi preveč
Excessive amount of water

Project presentation

The project “Upgrading the system for monitoring and analysing the state of the water environment in Slovenia” forms a part of the Operational Programme for Environmental and Transport Infrastructure Development 2007-2013, within the development priority “Environmental protection – waters” and priority guideline “Reduction of damage caused by water”. This joint programme document of the EU and Slovenia envisages that funds from the EU Cohesion Fund and the share of Slovenia’s co-funding shall be focused on projects through which Slovenia is striving to achieve the long-term environmental and transport vision and development objectives of the state. The above mentioned includes ensuring the possibility of growth by ensuring sustainable mobility, improvement of the quality of the environment and construction of suitable infrastructure. The European Union adopted the operational plan in 2007. This formed the basis for preparation and submission of the application for the project »Upgrading of the system for monitoring and analysing the state of the water environment in Slovenia«.

The wider purpose of the project is to increase the capacity of the Environmental Agency of the Republic of Slovenia to monitor, examine and forecast water cycle factors. Balanced spatial planning and thus improving water management and setting up the representative network of measuring stations for evaluating the state of water bodies, connected with this goal, are of particular importance. In terms of environmental protection and effective and sustainable use of water resources, protecting drinking water is especially important. The protection of human health and life against the consequences of natural disasters (protection against floods and droughts) is another very important aspect, which should be based on correct and timely meteorological and hydrological forecasts and the provision of data in real time.

Prej: Limnigraf za merjenje gladine vode
Before: Limnigraph for the recording of water-level

Potem: Radarsko merjenje gladine vode
Afterwards: Radar-based measurement of the water level

Cilji projekta

• nadgradnja in posodobitev obstoječe merilne mreže za spremljanje stanja vodnega okolja, kar bo omogočalo kakovostnejše analize preteklih razmer in poznavanje trenutnega stanja ozračja in vodnih teles, s tem pa tudi učinkovitejše napovedovanje izrednih hidroloških razmer in opozarjanje nanje ter načrtovanje okolju prijaznega upravljanja vodnih virov;

• večja poplavna varnost, varna preskrba z vodo in boljše možnosti za razvoj posameznih gospodarskih panog, kot so kmetijstvo, živilska industrija, energetika, promet. Vse to bo vodilo k trajnostni rabi vodnih virov v Sloveniji;

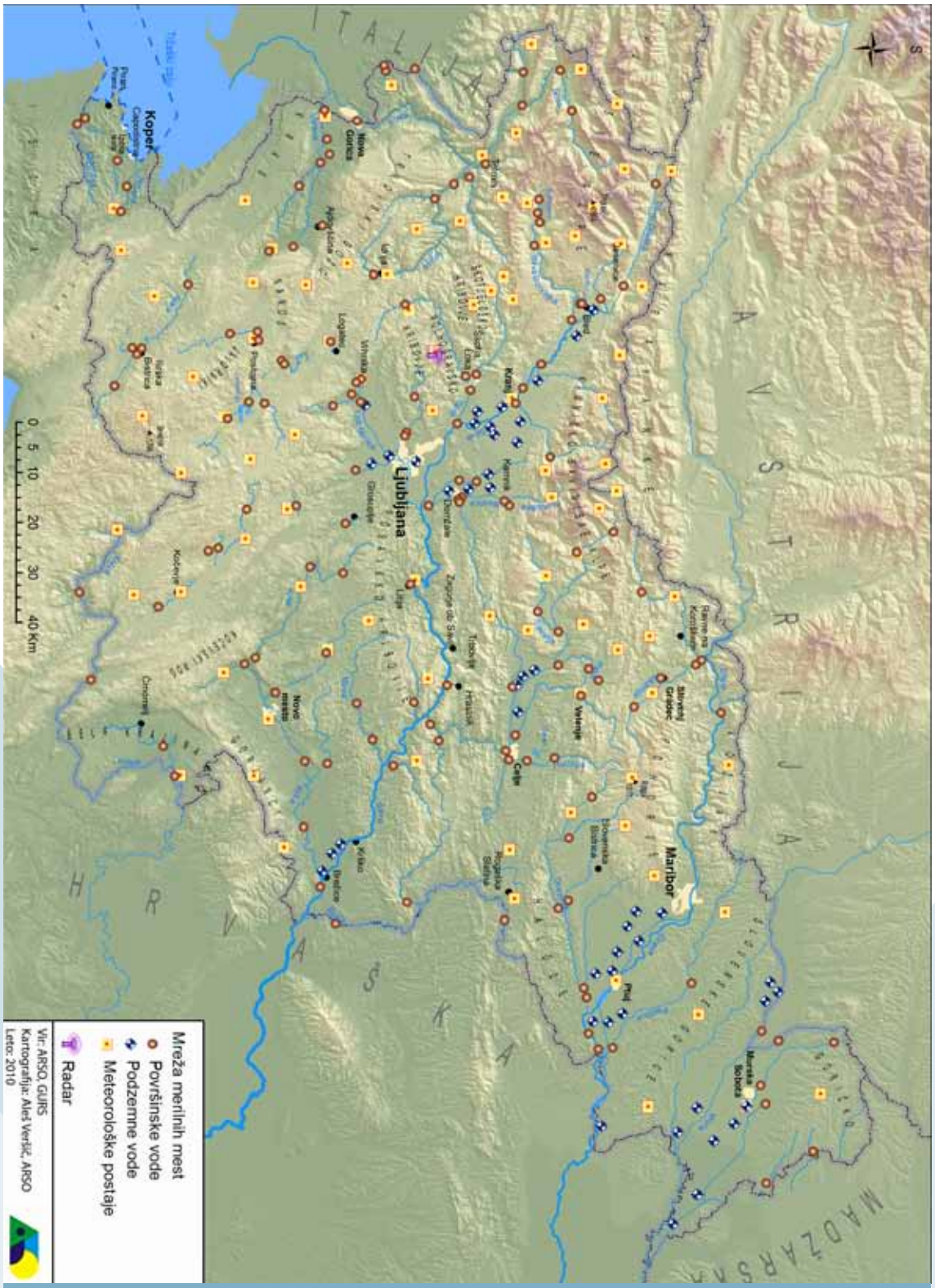
• izboljšanje poznavanja, spremljanja, analiziranja in ocenjevanja stanja vodnega okolja v celotni državi. S tem se bo izboljšala kakovost življenja ne samo sedanjih, ampak tudi prihodnjih generacij.

Project objectives

• To upgrade and update the existing measurement network for monitoring the state of water environment, which will facilitate better quality analyses of past states and knowledge of the current state of the air and water bodies and thus also more effective forecasting of hydrological conditions and giving out warnings about them and planning environmentally friendly water resource management;

• To provide better flood security, a secure drinking water supply and better possibilities for the development of individual industrial branches, such as agriculture, the food industry, power supply and transport; all of which will lead to the sustainable use of water resources in Slovenia;

• To improve understanding, monitoring, analysing and evaluating the state of the water environment over the whole country. Through this, to improve the quality of life not only of the current but also future generations.



Mreža merilnih mest za podzemne in površinske vode ter meteorološke postaje
Measuring stations network for the surface water, groundwater and prcipitation stations

Nadgradnja in posodobitev merilne mreže

Merilno mrežo za spremljanje vodnega okolja sestavljajo merilna mesta za spremljanje meteoroloških pojavov (meteorološke postaje in meteorološki radarji), merilna mesta za spremljanje stanja površinskih voda ter merilna mesta za spremljanje kemijskega in količinskega stanja podzemnih voda. Z obstoječo mrežo ni zagotovljeno celovito in zanesljivo spremljanje stanja vodnega okolja na območju celotne Slovenije. Zaradi tega jo je nujno treba obnoviti in razširiti, tako da bo zagotavljala kakovostno in trajno spremljanje stanja okolja. Pri projektu sta predvideni postavitev 248 novih in nadgrajenih merilnih mest ter zamenjava opreme na 33 obstoječih merilnih mestih. S tem bo pokritost ozemlja Slovenije z okoljskimi meritvami boljša, sodobnejša oprema in nove tehnologije prenosa podatkov pa bodo omogočale sprotno zbiranje podatkov o stanju in kakovosti voda ter pravočasno obveščanje javnosti ob izrednih razmerah.

Izjemnega pomena bo postavitev dodatnega vremenskega radarja v zahodni Sloveniji na hribovitem predelu Pasje ravni. Trenutno imamo v Sloveniji samo en vremenski radar na Lisci. Zaradi omejenega dosega in ovir, kot so predvsem hriboviti deli severozahodne in severne Slovenije, radar na Lisci ne omogoča zanesljivega spremljanja intenzitete in premikanja padavinskih pojavov na območju celotne Slovenije. Drugi vremenski radar na območju zahodne Slovenije bo tako dopolnil radarsko sliko padavin obstoječega radarja na Lisci. S tem bo omogočeno sprotno in celostno spremljanje padavinskega dogajanja nad Slovenijo. Tako pridobljeni podatki so ključnega pomena pri zelo kratkoročnem napovedovanju izjemnih vremenskih dogodkov, ki jih spremlja velika količina padavin v zelo kratkem času, kar običajno privede do poplav.

Meteorološki radar na Lisci
Meteorological radar station at Lisca

Hidrološko merilno mesto za spremljanje višine vodotoka
Hydrological measuring station for the monitoring of the watercourse-level

Upgrading and updating the measurement network

The measurement network for monitoring the water environment consists of measuring stations for monitoring meteorological phenomena (meteorological stations and meteorological radars), measuring stations for monitoring surface waters and measuring stations for monitoring the chemical state and quantity of underground waters. The existing network does not provide comprehensive and reliable monitoring of the state of the water environment over the whole territory of the Republic of Slovenia. It is therefore urgently necessary to reconstruct and enlarge it to provide high quality and continuous monitoring of the state of the environment. The project envisages setting up 248 new and upgraded measuring stations and replacing equipment at 33 existing measuring stations. This will provide better coverage of Slovenia's territory with environmental measurements, while the more modern equipment and new data transmission technologies will enable continuous collection of data on the state and quality of waters and provide timely information to the public in the case of an emergency situation.

Setting up an additional weather radar in western Slovenia, located in the hilly area of Pasja ravan will be of exceptional importance. Slovenia's single weather radar is currently located on Lisca hill. Because of its limited range and obstructions like the mountainous parts of north-western and northern Slovenia, the radar located on Lisca hill does not provide reliable monitoring of the intensity and movement of precipitation phenomena over the whole territory of Slovenia. The second weather radar, in the area of western Slovenia, will thus complement the radar image of precipitation currently provided by the existing weather radar located on Lisca hill. This will provide continuous and comprehensive monitoring of precipitation events above the territory of Slovenia. Data obtained in this manner are of key importance for very short-term forecasts of extreme weather events that are accompanied by large quantities of precipitation over a very short time period, which normally result in floods.

Prostori računskega centra ARSO z nekaj deset strežniki
Premises of the EARS computer centre, equipped with servers

Superračunalnik za numerično modeliranje vremena
Supercomputer for numerical weather modelling

Posodobitev računalniške infrastrukture

Informacijski sistem je hrbtenica vseh dejavnosti, ki se opravljajo na Agenciji RS za okolje, saj so stalna priprava, dostopnost in hiter prenos informacij o preteklem, trenutnem in prihodnjem stanju ozračja in voda ključnega pomena pri pravočasnem opozarjanju na izredne dogodke. Za stalno izračunavanje prihodnjega vremena in stanja voda s številčnimi modeli, katerih izračuni so podlaga meteoroloških in hidroloških napovedi, je potrebna zmogljiva računalniška infrastruktura. Izračuni numeričnih modelov skupaj z daljinskimi meritvami lastnosti ozračja (predvsem z vremenskimi radarji in sateliti) pomenijo ogromno količino podatkov, ki jih je treba hraniti za poznejše analize. Zaradi tega je pri projektu skupaj z novim zmogljivim računalnikom, ki bo omogočal numerične izračune, predviden tudi nakup sistema za hranjenje velikih količin podatkov ter aplikacijskih in podatkovnih strežnikov.

Modernisation of the computer infrastructure

The information system is the backbone of all activities performed by the Environmental Agency of the Republic of Slovenia, because the continuous processing, availability and quick data transfer on the past, present and future state of the air and waters are of key importance for timely warning of extreme events. Efficient computer infrastructure is needed for continuous calculation of future weather and the state of water by numerical weather models, the results of which form the basis of meteorological and hydrological forecasts. The calculations of numerical models, together with remote sensing of the air characteristics (especially with weather radars and satellites) mean an enormous quantity of data, which must be stored for later analysis. The project therefore envisage, in addition to a new efficient high performance computer, also the purchase of a system for large data storage, as well as application and data servers.

Oprema za določevanje glavnih ionov
Equipment for determination of main ions

Sistem za določevanje organskih onesnaževal
System for determination of organic pollutants

Posodobitev in razširitev laboratorijev

Pri Agenciji RS za okolje delujejo kemijskoanalitski, biološki in umerjevalni laboratorij. Ustrezno usposobljeni sodelavci in razpoložljiva laboratorijska oprema omogočajo analize fizikalno-kemijskih in bioloških parametrov voda ter zagotavljajo umerjanja merilnih instrumentov. Umerjeni merilni instrumenti so podlaga za kakovostne podatke o stanju ozračja in voda, ki se uporabljajo za analizo začetnih stanj v meteoroloških in hidroloških modelih, s pomočjo katerih izračunavamo napoved prihodnjega stanja. Podatki so potrebni tudi za klimatološke in ekološke analize, izsledke katerih uporabljajo v prometu, kmetijstvu in drugih gospodarskih panogah. Kemijskoanalitski in umerjevalni laboratorij sta akreditirana po standardu SIST EN ISO/IEC 17025. Svetovna meteorološka organizacija je leta 2005 umerjevalni laboratorij imenovala za regionalni instrumentacijski center, ki je pristojen za območje jugovzhodne Evrope. Pri projektu je predvideno prostorsko povečanje laboratorijev zaradi dopolnitve z nekaterimi novimi merilnimi instrumenti, s katerimi bo mogoče kakovostneje opravljati obstoječe meritve ter opravljati dodatne meritve in analize kemičnih in bioloških parametrov voda in zraka.

Modernising and enlarging laboratories

Chemical, analytical, biological and calibration laboratories operate within the Environmental Agency of the Republic of Slovenia. Suitably qualified staff and available laboratory equipment provide analyses of the physical, chemical and biological parameters of waters and ensure calibration of measuring instruments. The calibrated measuring instruments provide the basis for high quality data on the state of the air and waters, which are used for analyses of initial states in meteorological and hydrological models, with the assistance of which we calculate forecasts of future states. Data are also needed for climatological and ecological analyses, the findings of which are used in transport, agriculture and other industrial branches. The chemical and analytical laboratory and the calibration laboratory are accredited in accordance with the SIST EN ISO/IEC 17025 standard. In 2005, the World Meteorological Organization designated the calibration laboratory a regional instrumentation centre, competent for the area of south-eastern Europe. The project envisages enlargement of the premises of the laboratories in order to supplement them with certain new measuring instruments, which will provide improved quality of carrying out current measurements and also additional measurements and analyses of the chemical and biological parameters of the air and waters.

Zatišje pred nevihto
Lull before the storm

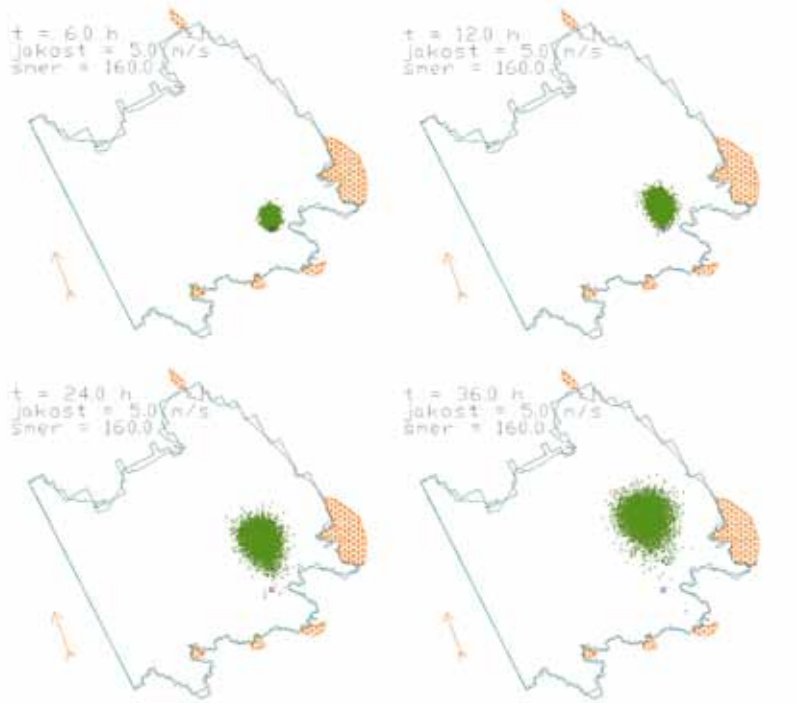
Poplavljena obalna cesta v Piranu zaradi povišanega plimovanja morja
Flooded coastal road in Piran by the increased tide

Nova Služba za morsko meteorologijo in oceanografijo

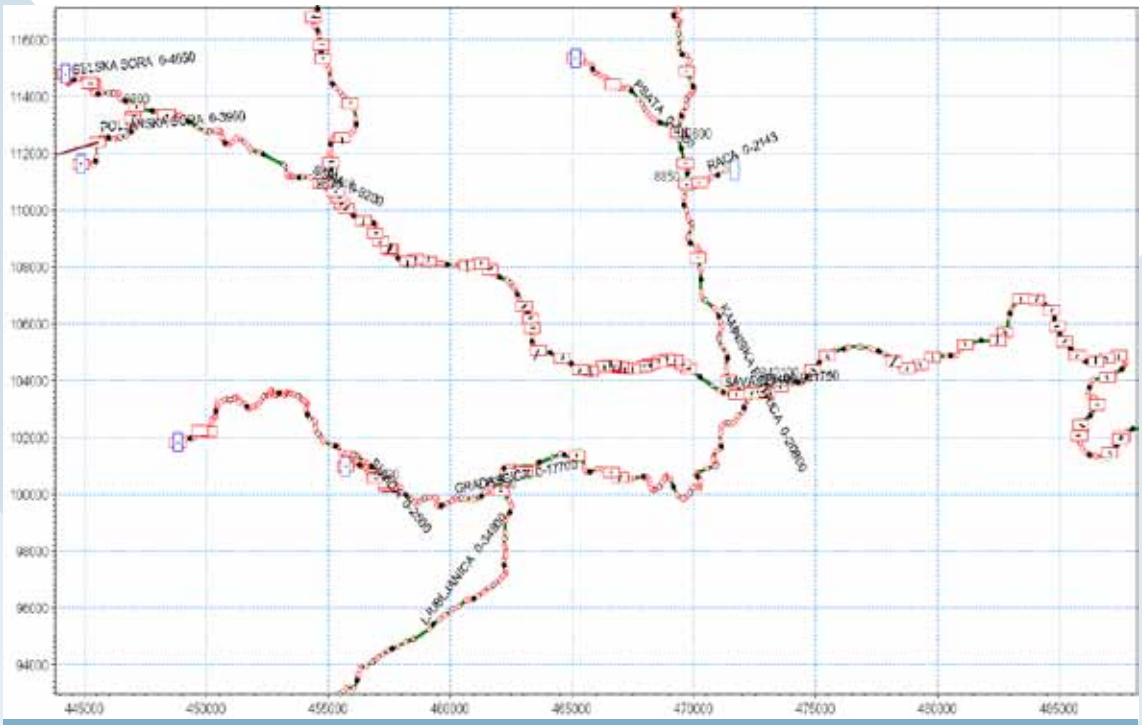
Za zagotavljanje varnosti v morskem prometu ter varnosti prebivalcev in obiskovalcev slovenske obale bo Agencija RS za okolje ustanovila Službo za morsko meteorologijo in oceanografijo. Glavne naloge službe bodo pravočasno opozarjanje na izredne meteorološke razmere na slovenskem morju in v priobalnem pasu, pravočasno zagotavljanje potrebnih informacij za ukrepanje ob izrednih razmerah in nesrečah ter enotno obravnavanje vodnega okolja v obalnem pasu. Delovanje te službe bo zaradi boljše dostopnosti do posebnih informacij, ki jih bo služba zagotavljala prometu (morski in cestni promet) ter turizmu (navtika, posebne storitve za turizem), tudi spodbudno vplivalo na gospodarstvo primorske regije. Pri projektu sta predvideni zagotovitev ustreznih prostorov za delovanje službe na slovenski obali ter vzpostavitev sistemov za spremljanje in napovedovanje stanja Jadranskega morja.

Newly established Maritime Meteorological and Oceanographic Service

In order to provide maritime transport safety and the safety of the coastal population and visitors, the Environmental Agency of the Republic of Slovenia will establish a Maritime Meteorological and Oceanographic Service. The main task of the service will be to provide timely warnings of extreme meteorological situations on the Slovenian sea and in the coastal area, timely provision of the information needed to take measures in case of emergency situations and disasters and the uniform treatment of water environment in the coastal area. The operation of this service, through improved availability of the special information provided by the service to transport (maritime and road transport) and tourism (yachting, special services for tourism) will also have a positive impact on the economy of the Primorska Region. The projects envisages the provision of suitable premises for the operation of the service on Slovenia's coast and setting up systems for monitoring and forecasting the state of the Adriatic Sea.



Simulacija za primer širjenja oljnega madeža ob južnem vetru
Simulation of the oil spillage, spreading because of the south wind



Rečna mreža v hidravličnem modelu
River network in the hydraulic model

Nova programska oprema in modeli za napovedovanje

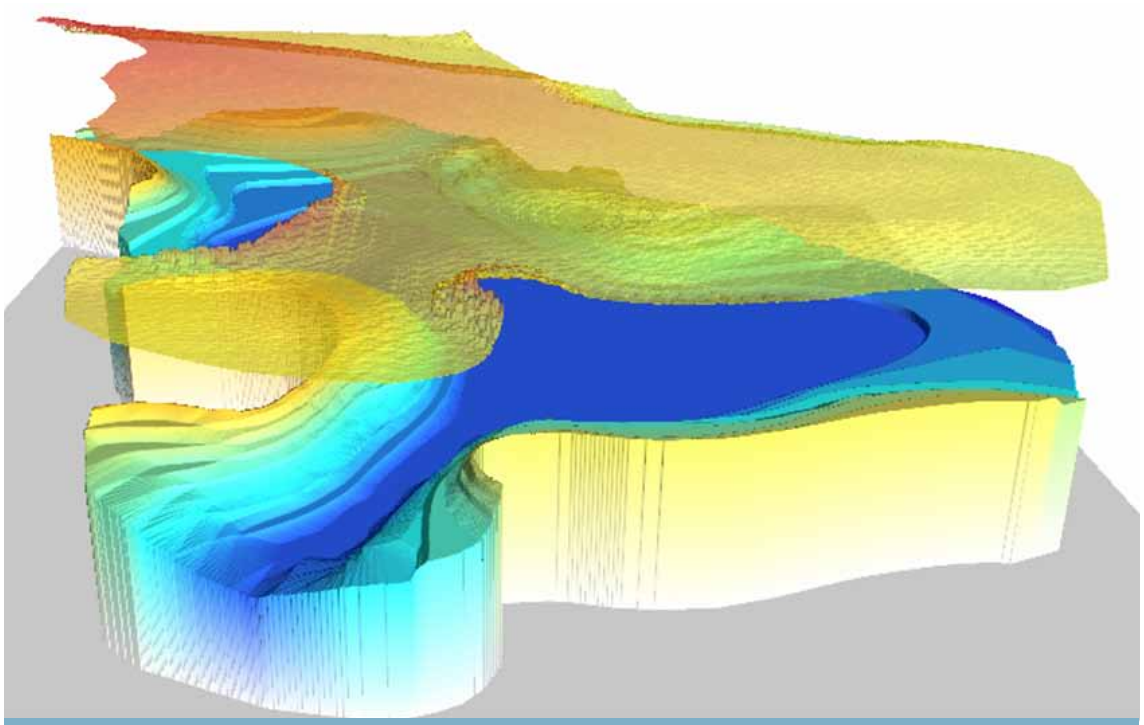
Izmerjeni in ovrednoteni podatki, pridobljeni z merilnih mrež, sicer govorijo sami zase, vendar pravo vrednost dobijo šele, ko jih vključimo v različne sisteme za podporo odločanju ter modele za napovedovanje prihodnjega stanja ozračja, površinskih in podzemnih vod.

S hidrološkimi prognostičnimi modeli Save in Soče, ki bodo razviti pri projektu, se bo izboljšala varnost prebivalstva pred hidrološkimi tveganji, izboljšale se bodo dnevne količinske napovedi pretokov rek in njunih pritokov, potrebne za optimizacijo obratovanja hidroenergetskih objektov.

Z rezultati modelov za napovedovanje dinamike morja se bo zmanjšala ogroženost okolja in ljudi zaradi izrednih stanj na morju. Pravočasne napovedi so podlaga za zmanjšanje posledic naravnih nesreč in nesreč, ki jih povzroči človek, saj so v pomoč operativnim službam na morju in obali pri odločanju, še posebej ob izrednih razmerah.

Na podzemni vodi v ravninskih prodno-peščenih vodonosnih sistemih Slovenije se bo s prognostičnimi modeli izboljšala ocena razpoložljivosti količine podzemne vode v vodnih telesih in pridobila celovitejša informacija za upravljanje virov podzemne vode.

Seveda je preobilje vode, ki povzroča poplave, le ena skrajnost, ki povzroča škodo in ogroža življenja. Prav tako je z vidika povzročene škode pomembna tudi druga skrajnost, to je pomanjkanje vode. K temu prispevajo raba vode in vremenske razmere, ki privedejo do suše. Pri projekta sta zaradi tega predvideni razširitev in nadgradnja informacijskega sistema za spremljanje vodne bilance v kmetijstvu, za analize preskrbljenosti tal in kmetijskih rastlin z vodo ter za sledenje in napovedovanje kmetijske suše. Prenovljen sistem bo omogočal povezavo in razširitev podatkovnih zbirk Agencije RS za okolje z zbirkami drugih strokovnih institucij. S tem bosta omogočena celovit vpogled v podatke o vodnih razmerah, ki so pomembne za kmetijstvo, ter učinkovit dostop do drugih meteoroloških in hidroloških podatkov.



Tridimenzionalni prikaz vodonosnika
Three-dimensional presentation of the aquifer

Razpokana tla - vode je lahko tudi premalo
Cracked soil - insufficient water amount

New software and forecasting models

The measured and processed data obtained from the measuring networks speak for themselves; however, they only reflect their true value after their inclusion in various systems for providing assistance in decision-making and in models used to forecast the future state of the air and surface and underground waters.

Through hydrological prognostic models for the Sava and Soča rivers, which will be developed within the project, the population safety against hydrological risks and daily forecasts of the amount of flow of rivers and their tributaries, which are needed for optimization of the operation of hydropower plants, will be improved.

Through the results of sea dynamics forecasting models, the risk posed to the environment and the population by extreme situations at sea, will be reduced. Timely forecasts form the basis for reducing the consequences of natural disasters and disasters caused by man, since they provide assistance to operational services at sea and on the coast in their decision-making, especially in emergency situations.

Through prognostic models, the assessment of underground water availability in gravel-sand aquifers will be improved for the flatland areas of Slovenia and more comprehensive information for underground water management will be obtained.

Excessive quantities of water resulting in floods are, of course, only one extreme that causes damage and is life-threatening. In terms of the damage caused, the other extreme, i.e., the lack of water, is also important. The use of water and weather conditions that lead to drought, contribute to this. The project therefore envisages the expansion and upgrading of the information system for monitoring the water balance in agriculture, the availability of water to the soil and to agricultural plants and agricultural drought monitoring and forecasting. The upgraded system will provide linkage and expansion regarding data sources of the Environmental Agency of the Republic of Slovenia to the data collections of other professional institutions. This will enable a comprehensive access to data on water conditions, relevant to agriculture and efficient access to other meteorological and hydrological data.

Predstavitev projekta
»Nadgradnja sistema za spremljanje in analiziranje stanja vodnega okolja v Sloveniji«

Presentation of the project
»Upgrade of the system for monitoring and analyzing the water environment in Slovenia«

AGENCIJA REPUBLIKE SLOVENIJE ZA OKOLJE

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