

Recommendations by data policy discussion

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Introduction

During the implementation of the DAREFFORT project In the DAREFFORT project technical topics for exchanging hydrological and meteorological measured data via a centralized common data exchange platform (HyMeDES Environet Platform) have been already clarified in deliverable 411 Flood forecasting and IT expert recommendations.

Besides the technical topics, also data policy topics have to be addressed. The data policy sets up the legal framework, which defines the conditions and permissions which apply to use the data on the common data exchange platform.

An elaborated data policy is a prerequisite for all data providers, regardless of the country in which they operate. Different questions must be clarified, the most important ones are:

- Which data is provided?
- Should the provision of the data be unrestricted and free of charge to these groups?
- To which groups should the data be provided (general public, forecasting centres, universities, etc.)?
- Restrictions of data transfer to third parties / use in commercial products?
- Liability for the data?
- Additional conditions, like source of data has to be mentioned?

This deliverable has the aim to provide a recommendation by the project consortium on the data policy topics which should be implemented in the data policy document for the future Danube HIS implemented by ICPDR on basis of the HyMeDES Environet Platform.

To prepare this deliverable, information from past project meeting, discussion during the data providers conferences have been collected and completed by a survey based on a questionnaire among all project partners, and the national data providers, respectively. The questionnaire can be found in the annex of this document.

This document first presents and exemplarily compares existing data policy agreements for data exchange platforms, then the results of the questionnaire are presented which have been discussed in the Workshop on Data Policy Topics on 27th May 2020 during the 4th Period Project Meeting.

Finally recommendations for the data policy for the implementation of the common data exchange platform and future Danube HIS are derived from the results .

1 Comparison of existing data policy agreements

In order to get an impression of how other data policy agreements are designed, which conditions have to be fulfilled and what has to be defined in them, already existing examples of agreements of data exchange platforms are analysed:

- ICPDR: draft of Danube-HIS
- Sava-HIS
- WMO: SEE-MHEWS-A

1.1 Overview

In the following Table 1 the positions of all three examples are summarised, sorted by topic. The main topics considered here are all treated very similarly in the three data policy regulations. Differences only exist in detail.

Table 1: Comparison of three existing data policies

Policy Area	ICPDR: draft of Danube-HIS	Sava-HIS	WMO: SEE-MHEWS-A	Comment
Minimum of data to be exchanged defined	✓	✓	✓	HIS and SEE-MHEWS-A also define data covered by the policy in addition to the data to be exchanged
Free and unrestricted	✓	✓	✓	According to WMO Resolution 25 (Cg-XIII) - Exchange of Hydrological Data and Products, and Resolution 40 (Cg-XII) - Policy and Practice for the Exchange of Meteorological and Related Data and Products
Free of charge	✓	✓	✓	In general nobody is supposed to pay for the data on the international platforms
Data Transfer handled by online platform?	✓	✓	✓	All policies aim to establish their own platforms for data exchange
Metadata included with data exchange?	✓	✓	✓	All policies include metadata in the data exchange
Metadata defined?	✓	✓	✓	All policies refer to the metadata are defined in the WMO Technical Regulations
Data transfer to third parties allowed?	x	x	x	Redistribution to third parties not allowed without consent of data provider
Liability of data provider?	x	x	x	No liabilities are acknowledged in the policies; data receiver is solely responsible for appropriate data handling

1.2 More Details about existing data policies

Minimum data and data covered

The kind of data shared is dependent on the various policies themselves, however there are some commonalities to be found in the way the data is treated. All policies define themselves which data and information is to be shared by the signatories, either by supplying a complete list themselves (ICPDR DANUBE HIS and Sava HIS Data Policy) or by referring to external documents (SEE-MHEWS-A Data Policy) containing that information.

Data is covered by policy, but not provided by signatory

In case certain data and information is covered by the policies but not already provided by the respective signatories, they are encouraged to take steps in the future for collecting and providing it in time.

Charge for data allowed?

Also, all data policies encourage sharing data without charging for it. Hence charging for the data itself is not intended.

This practice is in line with Resolution 25 (Cg-XIII) - Exchange of Hydrological Data and Products, and Resolution 40 (Cg-XII) - Policy and Practice for the Exchange of Meteorological and Related Data and Products. In this resolution the World Meteorological Organization encourages its Members to provide on a free and unrestricted basis those hydrological data and products which are necessary for the provision of services in support of the protection of life and property and for the well-being of all peoples

"Free and unrestricted" means non-discriminatory and without charge.

"Without charge", in the context of this resolution means at no more than the cost of reproduction and delivery, without charge for the data and the product themselves.

Data format selected by policy?

The regulations concerning the data format differs in the policies. Either they are yet to set (ICPDR DANUBE HIS and SEE-MHEWS-A Data Policy) or there no formats given by the policy in the first place (Sava HIS Data Policy).

Data Transfer

The transfer is usually handled by an online platform operated by an institution or by email¹. In any case the data transfer is handled exclusively digital.

Is Metadata included with data exchange and is Metadata defined?

Concerning the metadata all data policies refer to the WMO Technical Regulations (WMO-No. 49). These contain a detailed list of metadata, however only some variables are mandatory. These minimal entries for metadata are listed in Table 2.

¹ It has to be mentioned that in case of real time measured data exchange by e-mail is not a practical solution because of the high update intervall.

Table 2 Categories of the mandatory metadata according to the WMO Technical Regulations

Name/role name	Definition	Obligation/Condition M: mandatory	Maximum occurrence	Data type
MD_Metadata				
fileIdentifier	unique identifier for this metadata file	M	1	Character String
contact	party responsible for the metadata	M	N	Class
dateStamp	date that the metadata was created or revised	M	1	Class
MD_DataIdentification				
citation	information about citing the resource(s)	M	1	Class
abstract	brief narrative summary of the content of the resource(s)	M	1	Character String
language	language(s) used within the dataset	M	N	Character String
topicCategory	main theme(s) of the dataset	M	N	Class
MD_Keywords				
keyword	commonly used word(s) or formalized word(s) or phrase(s) used to describe the subject	M	N	Character String

Is data transfer to third parties allowed?

All policies aim to use the data for their own purposes, in this case either publishing (ICPDR Danube HIS, Sava HIS) or generate official warnings (SEE-MHEWS-A) as well as publishing it on their respective online platforms in the cases of the ICPDR Danube HIS and Sava HIS data policies. In any case redistribution to third parties is not supposed to happen without the consent of the data provider.

Liability of data provider?

The question of liability is handled exactly the same in each policy. In each case the policy assigns the responsibility of handling the data appropriately to the data receiver. The data provider is not liable for any direct or indirect damage caused by doing otherwise. This means that no policy is acknowledging any liabilities whatsoever in case they are claimed to arise.

2 Survey among Data providers in DAREFFORT Project on Data Policy Topics

In order to gain a detailed view on data policy topics within the DAREFFORT project in March 2020 a questionnaire was sent out to the data providers of the countries to clarify various questions regarding the data policy. The current situation regarding existing data policies have been addressed in this survey as well as the perspectives for a data policy regarding the data exchange platform developed within the DAREFFORT project has been examined. Bulgaria, Croatia, Czech Republic, Germany, Hungary, Romania, Serbia, Slovakia, Slovenia, Ukraine and EFAS answered the questions. The questionnaire is attached in the appendix of this document.

2.1 Current situation regarding existing data policies

First of all, the current situation of the data providers of the countries is addressed in the survey.

Groups of data receivers addressed by data policies in the different countries are summarized in Table 3. Bulgaria, Croatia, Czech Republic, Hungary (OVF), Slovakia (SHMU), Slovenia, Ukraine and the EFAS considered all the above-mentioned groups in the data policy. Germany has also included all groups, but only bilateral contracts with companies are concluded for use and not for publication. Moldova has included hydrological forecasting centres, public authorities and general public in its data policy. Austria has only included general public, Hungary's OMSZ has not included any of the groups in its data policy. Serbia has included all groups except the hydrological forecasting centres, as they are part of the RHMS. The SWME in Slovakia uses its measured data only internally, so they have no data policy in which they take other data receivers into account. The restrictions applying to the different data receivers in each country are summarised in Table 4.

Table 3 Groups of data receivers which are addressed by existing data policy documents

	Hydrological Forecasting centres	Universities	Public research institutions	Private research institutions	Public authorities	Companies (e.g. harbours, power suppliers, shipping companies)	General public
Austria	x	x	x	x	x	x	✓
Bulgaria	✓	✓	✓	✓	✓	✓	✓
Croatia	✓	✓	✓	✓	✓	✓	✓
Czech Republic	✓	✓	✓	✓	✓	✓	✓
Germany	✓	✓	?	?	✓	✓ bilateral contract for use but no publication	-
Hungary OVF	✓	✓	✓	✓	✓	✓	✓
Hungary OMSZ	x	x	x	x	x	x	x

	Hydrological Forecasting centres	Universities	Public research institutions	Private research institutions	Public authorities	Companies (e.g. harbours, power suppliers, shipping companies)	General public
Moldova	✓				✓		✓
Romania ¹	✓	✓			✓		✓
Serbia	x hydrological forecasting centres is part of RHMSS	✓	✓	✓	✓	✓	✓
Slovakia SHMU	✓	✓	✓	✓	✓	✓	✓
Slovakia SWME	-	-	-	-	-	-	-
Slovenia	✓	✓	✓	✓	✓	✓	✓
Ukraine	✓	✓	✓	✓	✓	✓	✓
EFAS JRC	✓	✓	✓	✓	✓	✓	✓

Table 4 Restrictions apply for the different kinds of data receivers

	Answer (short)
Austria	No restrictions
Bulgaria NIMH	daily operational hydrological and meteorological data are free of charge, historical data are charged according price list of NIMH (for some free of charge, for some available for a limited time, for some charged)
Bulgaria EAEMD	Responsible for stations located along the Danube River: water levels published for the last seven days are free of charge, historical data is provided at a price list of the agency on their site.
Croatia	data is provided based on request for a certain purpose, no charge for certain groups (public authorities, public and private research institutions)
Czech Republic	in general, the restrictions consider non-commercial use and no legal liabilities
Germany	formal obligation has to be fulfilled
Hungary OVF	usage within limits of the relevant legislation, only with citation of source
Hungary OMSZ	Separate agreements apply on a case-by-case basis for different institutions
Moldova	Data selected from hydrometric stations, are presented in daily hydrological forecasting , and they are disseminated on website, so everybody have access

¹ Romania has no explicit data policy, but rules based on regulations and agreements

	Answer (short)
Romania	data from selected representative hydrometric stations, from interior rivers and the Danube, are presented in daily hydrological forecasting report, and they are disseminated on website, so everybody have access. In general, raw historical hydrometric stations data are not for sale, but processed data and estimation of different hydrological parameters are provided under commercial contracts. For universities, in general for PhD studies, we provide data for a group of selected stations, and for a limited historical period, and for selected parameters, based on a signed agreement.
Serbia	treatment very much dependent on the legal framework the data is exchanged under, If published hydrological and meteorological data and information are used, it is mandatory to cite their source. The user can sell or lend to third parties only with the consent of the RHMSS
Slovakia SHMU	in general they sell data products and services, but based on law or contracts they can cooperate or provide services for selected and defined purpose with no charge.
Slovakia SWME	restrictions on data receivers do not apply to SWME ice data
Slovenia	Open data policy, publication requires. All measured meteorological and hydrological data and basic analysis and forecast are available for any use free of charge. The source must be cited, no commercial use and no transfer to third parties is allowed and no liability for data.
Ukraine	Hydrological forecasting centres and the public- no restrictions. Others- by prior arrangement
EFAS JRC	Full open access allowing also for commercial use of archived data. Real-time forecast data is restricted to public authorities and universities.

Table 5 summarises the restrictions that apply to data receivers when using the data for personal use. Following restrictions have been mentioned several times:

- the source must be cited if data is used in products or publications (Croatia, Hungary (OVF), Serbia, Slovenia, Slovakia SHMU and Ukraine)
- no commercial use allowed (Czech Republic, Germany, Hungary(OVF), Hungary (OMSZ) and Slovakia (SHMU))
- no transfer to third parties allowed (Hungary (OVF), Slovakia(SWME, SHMU)
- no liability for data (Czech Republic, Serbia and Slovakia SHMU)

Table 5 Restrictions for data receivers in using the data for own (non-commercial / commercial) product?

	restrictions for data usage?
Austria	no
Bulgaria	~ the restrictions for data receivers are the same as in Q1.2
Croatia	✓ source of used data in their product must be specified
Czech Republic	✓ non commercial use, no guaranty for real-time data quality, no responsibility of data provider in case of misinterpretation of data

	restrictions for data usage?
Germany	✓ only non-commercial use permitted
Hungary OVF	✓ citation always necessary, public use requires written permission, no transfer to third parties
Hungary OMSZ	✓ No commercial use is allowed
Moldova	✓ Public data are free, but special information need a contract
Romania	✓ data receivers can use the received data / parameters / products only for the initial declared / agreed use / purpose.
Serbia	✓ citation always necessary, data receivers use received data and information at own responsibility / liability
Slovakia SHMU	✓ set in licence agreement
Slovakia SWME	~ data purchased by SWME from SHMI cannot be provided to third parties
Slovenia	✓ citation always necessary
Ukraine	✓ citation always necessary
EFAS JRC	no

In Table 6, Table 7 and Table 8 detailed information about which hydrological, meteorological and other products are free of charge and for whom are summarized. The following dimension of data types are considered: Hydrological measured data, Hydrological historical data (processed data/year books), Hydrological forecasts, Meteorological measured data, Meteorological historical data (processed data / year books), Meteorological forecasts, Flood warning levels, ice data.

Hydrological measured and forecasted data are available free of charge in Bulgaria, Czech Republic, Germany, Hungary OVF, Moldova, Serbia, Slovakia SHMU, Slovenia and Ukraine, partly only as online data and not for data exchange. For the other countries they are partly free of charge, depending on the user group, the stations, and the time period.

Also, historical hydrological data are free of charge in most countries under certain conditions. However, this varies greatly (details in Table 6). In Austria, Bulgaria, Croatia, Slovakia SHMU and Ukraine it depends on the user group, in the Czech Republic on the time period, in Germany, Hungary OVF, Moldova, Serbia and Slovenia they are always free of charge.

In the case of meteorological data, the regulations for the measured data and the forecast data can also be well summarised. In Bulgaria, Czech Republic, Hungary OMSZ, Moldova, Serbia, Slovakia SHMU, Slovenia and Ukraine these data are free of charge (for Slovakia, this applies only to online data, not to data exchange). In Germany and Croatia the measured data are public and free of charge. Forecast meteorological data in Croatia depends on the product, in Germany they are free of charge for forecasting centres. In Austria meteorological measured data are free of charge for public and research, meteorological forecasts are not free of charge.

Whether historical meteorological data are public and free of charge depends on the user group. More details can be found in Table 7.

The accessibility and dissemination of warning levels is handled similarly in the different countries. Except in Bulgaria where these data are not available free of charge to anyone, in Austria, Croatia, Czech Republic, Hungary OVF, Moldova, Serbia, Slovakia, SHMU, Slovenia and Ukraine the warning levels are publicly available.

The dissemination regarding ice data is more different. In some countries there is no systematic tracking of ice data (in Croatia, Czech Republic, Slovenia, Bulgaria the government takes responsibility for this), in Germany, Hungary OVF, Serbia, Slovakia SHMU, Slovenia and Ukraine it is available free of charge to all. In Austria it is not available free of charge. More details can be found in Table 8.

Data policy requirements for the frequency of data updates, liability and other issues mentioned were questioned. The update frequency requirements vary from five minutes to daily. Some countries have no restrictions on the update frequency. There are also different views on liability and in some countries, there are additional requirements. These are listed in detail in Table 9.

Table 10 summarises the restrictions that currently apply to the exchange of data with foreign countries. All countries that participated in the questionnaire state that data use is free of charge, with different additions. Data redistribution is not allowed for most countries/data providers. In Serbia it is possible in agreement with the RHMSS. At the SWME in Slovakia, ice data is disseminated through a website in the TELEDAN project. The exact requirements and additions can be reviewed in Table 10.

Table 6 Which hydrological products are free of charge and for whom?

		Hydrological measured data (near real time)	Hydrological historical data (processed data/year books)	Hydrological forecasts
Austria	free of charge?	yes	yes	yes
	for whom	public, research	public, research	public, research
	comments		Yearbook data for download on the internet	Forecasts on the internet
Bulgaria	free of charge?	yes	yes	yes
	for whom	For everybody	Public authorities	For everybody
	comments	daily operational hydrological data published on the website of the NIMH	processed hydrological data are free for public authorities; hydrological historical data in year books are free for everybody	-
Croatia	free of charge?	✓ partially	yes/no depends for whom	✓
	for whom	to all, but for different station selection	free for research and government institutions. It is charged for commercial use.	only available to forecasting centres
	comments	NRT data availability depends on its use and is considered specific to each case. For example, public has access to certain station selection and power suppliers to additional. Most of NRT data is available on public website for the last 15 days, but not for some investor stations.	-	only DHMZ and Croatian waters have access to forecasting results. Also a portion of model results goes to Sava FFWS platform for forecasting centres from other countries which have access to the platform.
Czech Republic	free of charge?	✓	✓	✓
	for whom	all users	some data are free for all users	all users
	comments	near real time data are published online	currently data series from 1981 are free of charge (daily averages); situation is changing, because an open data policy is prepared	hydrological forecasts are published online; some additional forecasts are shared only with water authority companies and some municipalities (concerns forecasts for non-official forecasting profiles, preliminary results etc.)
Germany	free of charge?	✓	✓	✓
	for whom	information free via internet and app, data on demand (depends if data exchange and publication is of public interest)	open data online free of charge for download	information published online free of charge via website and app
	comments	-	-	-

		Hydrological measured data (near real time)	Hydrological historical data (processed data/year books)	Hydrological forecasts
Hungary OVF	free of charge?	✓	✓	✓
	for whom	Everyone	Everyone	Everyone
	comments	-	-	-
Hungary OMSZ	free of charge?	-	-	-
	for whom	-	-	-
	comments	-	-	-
Moldova	free of charge?	✓	✓	✓
	for whom	Everyone	Everyone	Everyone
	comments	-	-	-
Romania	free of charge?	(✓)	-	(✓)
	for whom / comments	all the data from the hydrological network from the Romanian Water Administration branches are free of charge for the hydrological forecasting centre		Daily hydrological forecast reports and hydrological warning messages are free for everybody. Special forecasts products, hydrological parameters are provided in general under commercial contracts.
Serbia	free of charge?	✓	✓	✓
	for whom	everyone - all interested parties	everyone - all interested parties	everyone - all interested parties
	comments	data are available on RHMSS internet presentation – last 7 days.	data are available on RHMSS internet presentation – from 1990.	data are available on RHMSS internet presentation.
Slovakia SHMU	free of charge?	✓	no	✓
	for whom	the public	for the bodies of state and public administration, the court and the National Council of the Slovak Republic	the public
	comments	water levels and temperatures published online, hourly data for past 24 hours --> only reading, no download	on demand	published as graphs online
Slovakia SWME	free of charge?	x	x	x
	for whom	x	x	x

		Hydrological measured data (near real time)	Hydrological historical data (processed data/year books)	Hydrological forecasts
	comments	-	-	-
Slovenia	free of charge?	✓	✓	yes/yes
	for whom	everyone	everyone	everyone/forecasting centres
	comments	-	-	daily reports and warning products containing hydrological forecasts free of charge for everyone, numerical values from model simulations available to professional users only
Ukraine	free of charge?	✓	✓	✓
	for whom	organizations of the Hydrological Service of Ukraine, state institutions, Public	organizations of the Hydrological Service of Ukraine, public	organizations of the Hydrological Service of Ukraine, state institutions, public
	comments	others are paid	others are paid	others are paid
EFAS JRC	free of charge?	NA	NA	✓
	for whom	-	-	all
	comments	-	-	real-time forecasts restricted to public authorities and research, forecasts older than 1 month are free

Table 7 Which meteorological products are free of charge and for whom?

		Meteorological measured data (near real time)	Meteorological historical data (processed data / year books)	Meteorological forecasts
Austria	free of charge?	yes	no	no
	for whom	public, research		
	comments	Precipitation from selected measuring points		
Bulgaria	free of charge?	yes	yes	yes
	for whom	For everybody	Public authorities	For everybody
	comments	daily operational meteorological data published on the website of the NIMH	processed meteorological data are free for public authorities; meteorological historical data in year books are free for everybody	-
Croatia	free of charge?	✓	yes/no depends for whom	yes/no
	for whom	public	free for research and government institutions. It is charged for commercial use.	some weather forecasts are published for public, but some are made specifically for contracted parties.
	comments	data from automatic meteorological stations is published on DHMZ website	-	special weather forecast is made for i.e. transportation authorities.
Czech Republic	free of charge?	✓	✓	✓
	for whom	public, forecasting centres	some data are free for all users	forecasting centres, public
	comments	data from meteorological stations and from meteorological radars are published online; direct data transfer with other forecasting centres established	currently data series from 1981 are free of charge (daily averages); situation is changing, because an open data policy is prepared	-
Germany	free of charge?	✓	✓	✓
	for whom	information free of charge via internet DWD (s. DWD) and LfU (hnd.bayern.de)	open data DWD (s. DWD) and LfU (Gkd.bayern.de)	free of charge for forecasting centres
	comments	shared data DWD/LfU	shared data DWD/LfU	for public request via DWD

		Meteorological measured data (near real time)	Meteorological historical data (processed data / year books)	Meteorological forecasts
Hungary OVF	free of charge?	-	-	-
	for whom	-	-	-
	comments	-	-	-
Hungary OMSZ	free of charge?	✓	✓	✓
	for whom	public	public	public
	comments	14 station's hourly data	6 station's daily data	products on the website
Moldova	free of charge?	✓	✓	✓
	for whom	everyone	everyone	everyone
	comments	-	-	-
Romania	free of charge?	(✓)	-	(✓)
	for whom / comments	meteorological data and meteorological forecasts needed for real-time activities from the National Meteorological Administration are free of charge for the hydrological forecasting centre		
Serbia	free of charge?	✓	✓	✓
	for whom	everyone - all interested parties	everyone - all interested parties	everyone - all interested parties
	comments	data are available on RHMSS internet presentation.	data are available on RHMSS internet presentation – from 1990.	data are available on RHMSS internet presentation.
Slovakia SHMU	free of charge?	✓	no	✓
	for whom	the public	for the bodies of state and public administration, the court and the National Council of the Slovak Republic	the public
	comments	graphs and tables in selected station --> for personal use only	on demand	graphs online --> for personal use only
Slovakia SWME	free of charge?	x	x	x
	for whom	x	x	x
	comments	-	-	-
Slovenia	free of charge?	✓	✓	✓
	for whom	everyone	everyone	everyone

		Meteorological measured data (near real time)	Meteorological historical data (processed data / year books)	Meteorological forecasts
	comments	-	-	-
Ukraine	free of charge?	✓	✓	✓
	for whom	organizations of the Hydrological Service of Ukraine, state institutions, public	organizations of the Hydrological Service of Ukraine, state institutions, public	organizations of the Hydrological Service of Ukraine, state institutions, public
	comments	others are paid	others are paid	others are paid
EFAS JRC	free of charge?	NA	NA	NA
	for whom	-	-	-
	comments	-	-	-

Table 8 Which other products are free of charge and for whom?

		Flood warning levels	Ice data	Others (please specify)
Austria	free of charge?	-	no	-
	for whom	-	no	-
	comments	Warnings on the internet	no	-
Bulgaria	free of charge?	no	-	-
	for whom	For everybody	-	-
	comments	-	executive agency for exploration and maintenance of the Danube river (EAEMD) reports ice events in observer stations (described by recommendations of the Danube Commission)	-
Croatia	free of charge?	✓	x	-
	for whom	public	there is no systematic tracking of ice data on Croatian rivers	-
	comments	they can be found in documents regarding flood defence plans published on the website of Croatian Waters.	only some ice events are registered, some not in digital form.	-

		Flood warning levels	Ice data	Others (please specify)
Czech Republic	free of charge?	✓	-	-
	for whom	public, local authorities	-	-
	comments	warnings available online; flood committees and others interested in flood protection are also informed through sms and email	-	-
Germany	free of charge?	✓	✓	-
	for whom	information published online free of charge via website and app	provided by elwis	-
	comments	-	-	-
Hungary OVF	free of charge?	✓	✓	-
	for whom	Everyone	Everyone	-
	comments	-	-	-
Hungary OMSZ	free of charge?	-	-	-
	for whom	-	-	-
	comments	-	-	-
Moldova	free of charge?	✓	✓	-
	for whom	Everyone	Everyone	-
	comments	-	-	-
Romania	free of charge?	-	-	-
	for whom	-	-	-
	comments	-	-	-
Serbia	free of charge?	✓	✓	
	for whom	everyone - all interested parties	everyone - all interested parties	
	comments	data are available on RHMSS internet presentation.	data are available on RHMSS internet presentation.	
Slovakia	free of charge?	✓	✓	✓

		Flood warning levels	Ice data	Others (please specify)
SHMU	for whom	Public, civil protection bodies and others by Act no 7/2010 Coll on Flood protection	the public	the public, civil protection bodies,?
	comments	flood warnings	daily hydrological report online	
Slovakia SWME	free of charge?	x	✓	x
	for whom	x	for example the Transport Authority of Slovakia	x
	comments	-	-	-
Slovenia	free of charge?	✓	-	-
	for whom	everyone	-	-
	comments	-	-	-
Ukraine	free of charge?	✓	✓	-
	for whom	all recipients	organizations of the Hydrological Service of Ukraine, state institutions, public	-
	comments	-	others are paid	-
EFAS JRC	free of charge?	NA	NA	NA
	for whom	-	-	-
	comments	-	-	-

Table 9 Requirements on data policy to receive data

	Frequency of data updates (e.g. hourly, daily)?	Liability topics?	Others?
Austria	Department I / 3 receives data from the hydrographic services in the federal states. The co-operation is regulated in the Water Law Act	no	
Bulgaria		WMO requirements	
Croatia	mostly hourly (for data from meteorological or hydrological stations or from hydrological model of upstream countries)	received data is used on their own responsibility and for the purpose of their own model developments	received data is not republished
Czech Republic	-	no specific requirements for data policy, data just must be somehow compatible with their own databases	data quality is important, e.g. for knowing if it can be combined with their own data
Germany	usually between 5 minutes or an hour	yes, work in progress	-
Hungary OVF	no restriction	no data transfer to third parties	-
Hungary OMSZ	as frequent as possible upon on agreement	no	-
Moldova	daily	-	-
Romania	-	-	-
Serbia	there is no restriction on the frequency of data received.	the responsibility for the use of the data is on the user's side.	-
Slovakia SHMU	hourly	-	received data is only used for official duty
Slovakia SWME	SWME obtains most of the data from SHMI. In this case, SWME uses 2 types of SHMI data: 1. Publicly available data on the SHMI website (regularly updated at specific hourly intervals) 2. Data that SWME purchases depending on the specific internal needs of the enterprise. Data are updated according to specific needs. Data cannot be provided to third parties.		
Slovenia	yes	-	-
Ukraine	results of hydrological observations at standard (manual) hydrological stations: twice a day (preferably every hour) meteorological: every three hours in terms of WMO (preferably every hour)	Ukrainian law, Water Code of Ukraine , guidelines for hydrological and meteorological observations and data processing, codes for transmitting observation results	-
EFAS JRC	at least daily	-	derived products should be freely accessible, data should have no cost

Table 10 Restrictions applying currently regarding data exchange with other countries

	Is data use free of charge?	Can data be redistributed by foreign institutions?	Are there other restrictions?
Austria	Rules for the exchange of data with the neighbouring countries are essentially laid down within the framework of the border water commissions		
Bulgaria	✓ within WMO and some stations in scope of Flood Forecasting and Early Warning System in Maritsa and Tundja catchment	x	-
Croatia	✓ data exchange with other countries is arranged in bilateral agreements with forecasting institutions from other countries free of charge	x data should be used only for their purposes	x
Czech Republic	✓	x	-
Germany	✓ Meteorology: contract with ZAMG Austria since 2020: precipitation free data exchange (no forecasts), Hydrology: free exchange between certain forecasting centres in Germany and Austria about discharge and forecasts	x	-
Hungary OVF	✓	x	-
Hungary OMSZ	✓ WMO resolution 40 essential data is free of charge	x	no
Moldova	✓ Yes, according with the bilateral agreements between countries	no	-
Romania	✓ Yes, for the data agree to be exchanged, according with the bilateral agreements	no	no
Serbia	✓ data exchange with international and regional institutions is free of charge with a previously signed memorandum of cooperation or data policy. data exchange is also free of charge, if there are bilateral agreements on interstate water cooperation or during the projects in which participates RHMSS.	✓ only with previously consent of the RHMSS	✓ for published hydrological and meteorological data and information, it is mandatory to cite the source
Slovakia SHMU	✓ if based on international contract	no	✓ data can only be used for agreed purpose
Slovakia SWME	✓ TELEDAN project provides ice data to other countries	✓ TELEDAN project disseminates ice data through project website	x
Slovenia	✓	✓	✓ if additional, value-added information is included in bilateral exchange with a foreign institute, no redistributed to 3rd parties allowed
Ukraine	✓ exchange is free; exchange of hydrometeorological observations and forecasts with neighbouring countries regulated by bilateral cooperation programs, regulations and orders of co-operative countries	✓ usage within country is allowed	-
EFAS JRC	NA	NA	NA

2.2 Perspectives of data policy for data exchange with other countries in Danube River Basin

The second part of the questionnaire emphasizes on data policy perspectives for data exchange with other countries in the Danube River Basin.

Whether the institutes could use hydrological, ice and meteorological measured data from other countries is summarised in detail in Table 11.

All institutes can use hydrological data from other countries in their daily work. Water level and discharge are mentioned as useful parameters by all countries. (OMSZ is a meteorological service in Hungary, they don't have to deal with hydrological data).

Ice data from other countries can be partly used by institutes. In Austria, Czech Republic, Germany, Moldova, Slovakia SHMU, Slovenia and by EFAS ice data from other countries would not be useful in their daily work.

Meteorological data from other countries can be used by nearly all institutes. Nearly all of them mention precipitation and some of them air temperature as parameters.

Slovakia SWME added for all three data types that they would use the data in their daily work if the data were processed uniformly from all countries involved in the project and would be sufficiently up-to-date (at specific hourly intervals).

A main topic for data policy is the question if the data should be made available free of charge. Generally speaking there is a difference between internal usage of data and redistributing data.

For internal usage, all respondents of the survey expect to receive the data free of charge based on an agreement. But most of the institutes would agree that if data is redistributed by data receivers, they could be charged. Only Slovakia SWME and Hungary OMSZ would expect that also if data is redistributed it is free of charge, if this is stated in the data policy of the other country (more details in Table 12).

Table 11 Possibility of usage of data from other countries in daily work

	Hydrological data	Ice data	Meteorological data
Austria	✓ Hydrographic runoff data	-	-
Bulgaria	✓ Water levels, water discharges	✓ Water temperature	✓ precipitation
Croatia	✓ water levels, discharges from nearby stations and hydrological model outlet results from upstream countries (all of that data is already in use)	✓ appearance of ice and ice cover type/percentage on border rivers so they can compare it to conditions at their stations	✓ near real time data from automatic weather stations: rainfall, temperature.
Czech Republic	✓ water level, water flow, hydrological forecast	x	✓ weather forecast (precipitation, station data)
Germany	✓ discharge, water-level, forecasts	x	✓ precipitation, forecasts, climate (wind, snow, air-temperature, etc.)
Hungary OVF	✓ data from neighbouring countries already in use; water level, discharge, water temperature, water level forecast and discharge forecast are usually exchanged	✓ ice conditions from other countries are used in daily work	✓ data from neighbouring countries already in use; most important exchanged parameters: precipitation, temperature, snow depth and snow water equivalent
Hungary OMSZ	-	✓ All kind of ice data	✓ All kind of meteorological data
Moldova	yes	no	yes
Romania	✓ water level, discharge	✓ Any information regarding ice on river phenomena description / characteristics	✓ precipitation, air temperature, snow depth, snow water equivalent
Serbia	✓ water level, discharge, water temperature and ice data. Also hydrological forecasts.	✓ data on ice phenomena coded in accordance with recommendations and technical regulations of the WMO; data are exchanged within the hydro bulletins - WMO GTS.	✓ precipitation, air temperature, snow depth, air humidity, air pressure, wind direction and speed, meteorological phenomena
Slovakia SHMU	✓ water level, discharges, hydrological forecasts	-	✓ hourly measured precipitation and temperature (exchange data under framework of WMO and other international organizations)
Slovakia SWME	✓ would use the data in its daily work if the data were processed uniformly from all countries involved in the project and would be sufficiently up-to-date (at specific hourly intervals)		
Slovenia	✓ discharge, water level	-	✓ precipitation, air temperature
Ukraine	✓ levels, water discharge, precipitation, water temperature, data on the Danube River transfers, daily data	✓ ice phenomena and their intensity, thickness of ice cover and height of the snow on ice	✓ all observational results are governed by WMO documents (WMO Circular Exchange)
EFAS JRC	✓ hydrological data from all countries and regions in Europe are collected	x	✓ meteorological data from all countries and regions in Europe are collected

Table 12 Would the institution expect to receive this data for free from other countries in case of internal usage or redistribution of data

	internal usage?	Redistributing this data?
Austria	yes exchanged with neighbouring countries (Germany, Italy, the Czech Republic and Switzerland)	no
Bulgaria	yes based on agreement between countries	no
Croatia	yes	no
Czech Republic	yes	no
Germany	yes	no
Hungary OVF	yes receives data free of charge from neighbouring countries through bilateral agreements	no
Hungary OMSZ	yes if other county's data policy authorises so	yes if other county's data policy authorises so
Moldova	yes	no
Romania	yes , for elaborating hydrological forecasting and warning products	no
Serbia	yes	no
Slovakia SHMU	yes	no
Slovakia SWME	yes	yes
Slovenia	yes	no
Ukraine	yes	yes
EFAS JRC	yes	no

The next topic is related to the possible future provision of data for other countries. In Table 13 it is summarised for which institutions in other countries data could be provided. In Slovakia the SWME cannot provide data for institutions in other countries, but SHMU can. Austria could not answer this question. All other institutions would provide data to hydrological forecasting centres. To universities all institutes would provide data, except SHMU and SWME in Slovakia. To public researching institutes Croatia would not provide data, SHMU in Slovakia would, but depending on the purpose. For private research institutions, public authorities, companies (e.g. harbours, power suppliers, shipping companies) and general public, Croatia, and Ukraine would not provide data, SHMU in Slovakia only own outputs in case of public authorities and general public. If SHMU in Slovakia is informed about the research and the future use and agrees with it, data can be passed on for research purposes.

The next question was whether different restrictions apply to data receivers in their own country and in other countries. Only in Bulgaria different restrictions apply. There the requirements for institutions in other countries in the Danube catchment area are based on agreements between the countries (more details in Table 14).

The last question is whether it is possible to offer the data free of charge for other countries. For most institutions it is possible. For the SHMU and SWME in Slovakia it depends on the agreement. Other institutions also have comments on this topic which can be looked up in detail in Table 15.

Table 13 To which institutions could data be provided in other countries

	Hydrological Forecasting centres	Universities	Public research institutions	Private research institutions	Public authorities	Companies	General public
Austria	-	-	-	-	-	-	-
Bulgaria	✓	✓	✓	✓	✓	✓	✓
Croatia	✓	✓	x	x	x	x	x
Czech Republic ¹	✓	✓	✓	✓	✓	✓	✓
Germany ²	✓	✓	✓	✓	✓	✓	✓
Hungary OVF	✓	✓	✓	✓	✓	✓	✓
Hungary OMSZ	✓	✓	✓	✓	✓	✓	✓
Moldova	✓	✓	✓	✓	✓	✓	✓
Romania	✓	✓	✓	✓	✓	✓	✓ mainly for hydrological forecasts and warnings
Serbia ³	✓	✓	✓	✓	✓	✓	✓
Slovakia SHMU	✓	depending on the aim of the research in consultation with the SHMU			only in own outputs	x	only in own outputs
Slovakia SWME ⁴	-	-	-	-	-	-	-
Slovenia ⁵	✓	✓	✓	✓	✓	✓	✓
Ukraine	✓	✓	✓	x	x	x	x
EFAS JRC ⁶	✓	✓	✓	✓	✓	✓	✓

¹ maybe a different conditions would be used for each kind of institution (commercial/ non-commercial/ scientific...). On the other hand, they intend to share only data, which are free of charge, so they will not insist on any restrictions.

² Open data, no restrictions via use gkd.bayern.de, nid.bayern.de, hnd.bayern.de, data provided only for non-commercial use

³ The data available on the internet presentation can be downloaded and used free of charge with the previous restrictions. If the institutions/party addresses the request and if it is necessary workers engagement for the preparation of data, in that case, data issuance are charged according to the valid regulation.

⁴ SWME ice data could probably also be made publicly available on the project's website

⁵ Slovenian hydrological and meteorological data are freely accessible to all through the web site of the Slovenian Environment Agency

⁶ They only distributing forecast data, no measured data. Forecast data can be distributed to all indicated below with the restrictions as set out above

Table 14 Do different restrictions apply for data receivers in other countries compared to data receivers in own country

	Answer
Austria	no
Bulgaria	yes
Croatia	no
Czech Republic	no
Germany	no
Hungary OVF	no
Hungary OMSZ	no
Moldova	no
Romania	Not clearly defined at this moment
Serbia	no
Slovakia SHMU	no
Slovakia SWME	no
Slovenia	no
Ukraine	no
EFAS JRC	no

Table 15 Is it possible to provide this data free of charge for other countries?

	Answer
Austria	-
Bulgaria ¹	yes
Croatia ²	yes
Czech Republic	yes
Germany	yes
Hungary OVF	yes
Hungary OMSZ ³	yes
Moldova	yes
Romania ⁴	Depending on agreement
Serbia ⁵	yes
Slovakia SHMU ⁶	yes
Slovakia SWME ⁷	yes
Slovenia	yes
Ukraine	yes
EFAS JRC	yes

¹ based on agreement between countries

² if agreed in project agreement or other kind of agreement between countries, as it is already the practice

³ if government restrictions allow

⁴ In general, providing data to other countries is done only based on the bilateral agreements, and or specific other agreements (e.g. partnership agreement within EFAS). For the meteorological data, the National Meteorological Administration have more extensive data exchange, as established mainly under WMO regulations and agreements.

⁵ under the conditions specified in the preceding answers (Table 4 and Table 10)

⁶ it would depend on the agreement

⁷ based on the experience from the TELEDAN project, ice data from SWME could probably be provided free of charge for other countries

2.3 Other topics of data policy which should be addressed

Following comments have been made additionally regarding data policy:

Bulgaria: The institute is in the process of “open data” implementation. Things are changing in the institute and with that some of the answers to the questionnaire could change in the future. But the impacts on DAREFFORT project will be only positive, which means more data can be shared in the future.

Germany: Data transfer and any data presentation on- and offline requires the user to cite the data source in a distinct manner as follows: Data source: Bayerisches Landesamt für Umwelt, www.lfu.bayern.de

EFAS JRC: EFAS provides General Terms and Conditions for data usage online: <https://www.efas.eu/terms-and-conditions> and <https://www.efas.eu/en/data-access>. Please note that EFAS is in the phase of updating the specific data access.

ICPDR plans to implement a user registration for Danube HIS to have an overview/control over the data receiver.

From the experience of WMO in negotiations of data policy documents following additional topics should be considered for the implementation of the data policy of the common data exchange platform:

- In addition to the list of minimal parameters, an option of additional parameters should be considered
- Although there are different kinds of restrictions for forecasts and for measurements, it could be helpful to consider also forecasted data in addition to measured data in the data policy
- In some countries there may be third party providers of the data, which are not considered yet
- In the ongoing process of implementing the data policy after the project, higher level authorities should be involved at an early stage. For some countries even involving the government might necessary.

3 Recommendations

From the discussions in the Workshop on Data Policy Topics on 27th May 2020 during the 4th Period Project Meeting, based on the survey among data providers, and from the analysis of data policies in the field of hydrological and related meteorological data exchange, data policy recommendations have been elaborated. These recommendations on the specific content for the data policy of the common data exchange platform DAREFFORT Environet which is developed in DAREFFORT project, and is foreseen to be the basis for future Danube HIS are presented in the following.

Availability of data

It is recommended to make the data of the common data exchange platform available unrestricted and free of charge. Annotation: SHMU (Slovakia) would like to restrict this to the partners in the Dareffort project. Those are foremost the hydrological forecasting centers and data providers in Danube catchment.

This is in line with the WMO Resolution 25 (Cg-XIII) – “Exchange of Hydrological Data and Products”, and WMO Resolution 40 (Cg-XII) – “Policy and Practice for the Exchange of Meteorological and Related Data and Products”.

In these resolution WMO encourages its Members to provide on a free and unrestricted basis those hydrological data and products which are necessary for the provision of services in support of the protection of life and property and for the well-being of all peoples

"Free and unrestricted" means non-discriminatory and without charge.

"Without charge", in the context of this resolution means at no more than the cost of reproduction and delivery, without charge for the data and the product themselves.

Specific usage like using the data in commercial products or redistribution the data to third parties can be restricted, depending on the purpose and/or user group (see below).

Provision of data

A minimum set of parameters should be defined. Following parameters can be regarded as commonly agreed within the DAREFFORT consortium regarding measured data: water level, discharge, water temperature as hydrological real time parameters and precipitation as meteorological real time parameter.

In addition to the minimal set of parameters it can be recommended to foresee an option to expand this list by additional parameters in the future.

A common update time interval of the parameters which the data providers provide the data to the platform should be defined, at least as a recommendation. For real time measured data this could be hourly, and for historical data daily (updated once a year).

The monitoring stations for which the data providers provide the data to the platform should be defined in the data policy, and could correspond to the list of hydrological stations and meteorological stations earlier in the DAREFFORT project. This list should be made adjustable in the future (e.g. by placing it into the appendix of the data policy).

The data format in which data is provided to the data receivers should be defined, and is WaterML 2.0.

Following groups should be considered as data receivers:

Hydrological forecasting centers: Access should be unrestricted and free of charge for internal usage. This is agreed by all participants of the survey.

Universities / Public research institutions: Access should be unrestricted and free of charge for internal usage. In case of publications and research projects the data source has to be cited, SHMU (Slovakia) in addition would like to be asked for agreeing from case to case.

Private research institutions: Access should be unrestricted and free of charge for internal usage. In case of publications and research projects the data source has to be cited, SHMU (Slovakia) in addition would like to be asked for agreeing from case to case. In case of commercial use of the data please see below.

General public: Access should be unrestricted and free of charge for private usage.

Companies (e.g. Harbors, Power suppliers, shipping companies): Access should be unrestricted and free of charge for internal usage. This is agreed by most countries, SHMU (Slovakia) asks for agreement with the national data providers from case to case. In case of commercial use of the data please see below.

Restrictions of data transfer to third parties / use in commercial products

Re-distribution of the data by third parties should be prohibited or only allowed by written permission of the data provider.

Usage of the data in commercial products could also be prohibited or only allowed by written permission by the data provider, and could be charged.

Usage of the data in non-commercial products could allowed by written permission of the data provider.

Because all the countries have already different regulations regarding re-distribution or commercial use, it could be necessary to also receive written permission from the countries from which the data is used.

Liability for the data

It is recommended to make the data receiver responsible for appropriate data handling, and interpretation of the data. The data provider should not be made liable for the accuracy of the real time and other data provided. Data providers should not be liable for any loss or damage, cost or claims arising directly or indirectly from the use of the data.

Additional recommendations

The origin of the data should be cited in any case when using the data. This is common practice.

In the ongoing process of implementing the data policy after the project, higher level authorities should be involved at an early stage.

It is also recommended to use the already existing data policies (see chapter 1) as a template / to orientate towards them, as they are very similar in structure and thus seem to be common practice.

It is recommended to implement a flexible data policy solution, which enable data provider to handle with the different groups according to the different national data policies and reflect possible changes of the national data policy.

Appendix Questionnaire Data Policy Issues

1 Current situation regarding data policy

1.1. Which categories of data receivers are addressed by existing data policy documents of your institution?

<i>categories of data receivers</i>	<i>covered by data policy? (yes / no)</i>
<i>Hydrological Forecasting centres</i>	
<i>Universities</i>	
<i>Public research institutions</i>	
<i>Private research institutions</i>	
<i>Public authorities</i>	
<i>Companies (e.g. harbours, power suppliers, shipping companies)</i>	
<i>General public</i>	
<i>Others (please specify)</i>	

1.2. Which restrictions apply for the different kinds of data receivers, mentioned above?

1.3. Are there restrictions for data receivers in using the data for own (non-commercial / commercial) product?

1.4. Which products of your institution are free of charge within your country, and for whom?

<i>Product</i>	<i>free of charge? (yes / no)</i>	<i>for whom (e.g. public, research, forecasting centres)?</i>	<i>comments</i>
<i>Hydrological measured data (near real time)</i>			
<i>Hydrological historical data (processed data/year books)</i>			
<i>Hydrological forecasts</i>			
<i>Flood warning levels</i>			
<i>Ice data</i>			
<i>Meteorological measured data (near real time)</i>			
<i>Meteorological historical data (processed data / year books)</i>			
<i>Meteorological forecasts</i>			
<i>Others (please specify)</i>			

1.5. If your institution receives data, which requirements do you have on data policy?

- Frequency of data updates (e.g. hourly, daily)?
- Liability topics?
- Others?

1.6. Which restrictions apply currently regarding data exchange with other countries?

- Is data use free of charge?
 - o Comments:
- Can data be redistributed by foreign institutions?
 - o Comments:
- Are there other restrictions?

2 Perspectives of data policy for data exchange with other countries in Danube River Basin

Receiving data from other countries

2.1. Could your institution use data from other countries in daily work?

- Hydrological data
 - o Which kind of data?
- Ice data
 - o Which kind of data?
- Meteorological data
 - o Which kind of data?

2.2. Would you expect to receive this data for free from other countries in case of

- internal usage?
- redistributing this data?

Providing data to other countries

2.3. To which kind of institutions could data be provided in other countries?

- *Hydrological Forecasting centres*
- *Universities*
- *Public research institutions*
- *Private research institutions*
- *Public authorities*
- *Companies (e.g. harbours, power suppliers, shipping companies)*
- *General public*
- *Others (please specify)*

2.4. Do different restrictions apply for data receivers in other countries compared to data receivers in own country (see question 1.2)?

2.5. Is it possible to provide this data free of charge for other countries?

2.6. If it is not possible to provide this data free of charge, please comment:

3 Other topics of data policy which you would like to address?

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