

**Evaluation report of questionnaire**  
**prepared in the frame of the DAREFFORT project**  
**WP3 deliverable 3.1.3**

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## Introduction

This evaluation report presents the results of the analysis of the questionnaire prepared in the frame of the WP3 of the DAREFFORT project regarding hydrological and meteorological data and flood and ice forecasting methodologies in individual Danube countries. Additionally, some directions regarding education and training of personnel using e-learning tools are presented. All together 11 countries involved in the DAREFFORT project as well as International Sava River Basin Commission (ISRBC) fulfilled the questionnaire regarding hydrological data, meteorological data and/or national hydrological forecasting service. In addition, Moldova provided information about data and hydrological forecast by e-mail. Furthermore, it should be mentioned that Bosnia and Herzegovina as non-participating country supported the project by completing the questionnaire. Additionally, also the information regarding GIS data and the education and training of personnel using E-learning tools is added supporting WP3, WP4 and WP5 information gathering.

## 1 Hydrological data

### 1.1 Data provider information

All together 11 countries (including Bosnia and Herzegovina) and International Sava River Basin Commission (ISRBC) fulfilled the questionnaire regarding the hydrological data. Additionally, Moldova and Romania provided the information about hydrological data by e-mail. Data provider information is presented in Table 1.

Table 1: Hydrological data provider information

Country / Region	Name and e-mail	Organisation	Position
Austria (Lower Austria)	DI Franz Higer franz.higer@noel.gv.at	Department BD3 – Hydrology and Geoinformation, Office of the Lower Austrian Provincial Government	NA
Bosnia and Herzegovina	Maja Radić radic@voda.ba	Sava River Watershed Agency	Senior Associate
Bulgaria	Snezhanka Balabanova snezana.balabanova@meteo.bg	National Institute of Meteorology and Hydrology	Assoc. Prof. head of hydrological forecast
Croatia	Željka Klemar klemar@cirus.dhz.hr	Croatian Meteorological and Hydrological Service	Head of Hydrological Data Control, Archiving and Distribution Department
Czech Republic	Petr Janal petr.janal@chmi.cz	Czech hydrometeorological institute	Director of a branch in Brno

Germany	Dr. Alfons Vogelbacher alfons.vogelbacher@lfu.bayern.de	Bayerisches Landesamt für Umwelt	Leiter des Referats Hochwassernachrichtendienst, Hochwasservorhersage Donau und Inn, Gebietshydrologie
Hungary	Amarilla Mátrai matrai.amarilla@ovf.hu	General Directorate of Water Management (OVF)	Hydrological advisor
Moldova	Valeriu Cazac valeriu.cazac@meteo.gov.md	State Hydrometeorological Service	Chief of Hydrological Center
Romania	Marius Matreata marius.matreata@hidro.ro	National Institute of Hydrology and Water Management (NIHWM)	Director National Hydrological Forecast Center
Serbia	Samir Catovic samir.catovic@hidmet.gov.rs	Republic Hydrometeorological Service of Serbia	Head of the Hydrological Analysis Department
Slovakia	Marcel Zvolenský marcel.zvolensky@shmu.sk	Slovak Hydrometeorological Institute	Hydrologist
Slovenia	Mira Kobold mira.kobold@gov.si	ARSO	Head of section
Ukraine	Oleg Skoropad som@meteo.gov.ua	UHMC	Leading Specialist
International Sava River Basin Commission (ISRBC)	Mirza Sarač msarac@savacommission.org	Secretariat of International Sava River Basin Commission	Advisor for protection against detrimental effects from waters and extraordinary impacts on the water regime

## 1.2 Hydrological network

Table 2 presents information about the number of hydrological stations in operation in the Danube River Basin as well as the number of hydrological stations in operation connected on-line and the number of hydrological stations to be considered in the Danube HIS.

Table 2: Data about hydrological network

Country / Region	Hydrological stations in operation	Connected on-line	Considered in the Danube HIS
Austria (Lower Austria)	150	NA	NA
Bosnia and Herzegovina	82	82	36

Bulgaria	66	25	6
Croatia	284	172	43
Czech Republic	153	153	2
Germany	488	488	45 (Bavaria) + 3 (Baden-Wurttemberg)
Hungary	approx. 2850 (350 main stations, 1700 operating stations and 800 other stations – flood operation or study stations)	350	46
Moldova	17	12	1
Romania	Approx. 1000	Approx. 800	30
Serbia	183	96	26
Slovakia	366	306	13
Slovenia	149	139	22
Ukraine	51	2	21
ISRBC	304 (Sava HIS, meaning BA, HR, ME, RS, SI)	195 (Sava HIS, meaning BA, HR, ME, RS, SI)	If data providers (countries) decide, all could be through Sava HIS WML2.0 web service

*\*NA indicates that this information is not available (not provided in the questionnaire)*

### 1.3 Flood data

Table 3 demonstrates information about the existence of historical flood event reports, as well as existence of maps with flood contour lines, and especially the existence of maps with flood contour lines of historical flood events and the corresponding year. Information about maps with flood contour lines of design floods with corresponding return periods is presented in Table 4. Table 5 presents which other information is provided in the flood maps, namely water discharge, water level, ice impact, local flash floods or something else.

Table 3: Information about historical flood data

Country / Region	Historical flood event reports	Maps with flood contour lines	Maps with flood contour lines of historical flood events	Year
Austria (Lower Austria)	Yes	NA	Yes	2013
Bosnia and Herzegovina	Yes	Yes	Yes	2014
Bulgaria	Yes	Yes	No	NA
Croatia	Yes	Yes	Yes	2011
Czech Republic	Yes	No	No	NA
Germany	Yes	Yes	Yes	NA
Hungary	Yes	Yes	Yes	NA
Moldova	Yes	No	No	2010
Romania	Yes	Yes	Yes	NA
Serbia	Yes	Yes	Yes	2014
Slovakia	Yes	Yes	No	NA
Slovenia	Yes	Yes	Yes	NA
Ukraine	Yes	No	No	NA
ISRBC	NA	NA	NA	NA

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 4: Information about maps with flood contour lines of design floods

Country / Region	Maps with flood contour lines of design floods	Return period (10, 20, 50, 100, 500, 1000, other)						
Austria (Lower Austria)	Yes				100			
Bosnia and Herzegovina	Yes		20		100	500		
Bulgaria	Yes		20		100		1000	
Croatia	Yes				100		1000	25
Czech Republic	No							

Germany	Yes							HQhäufig, HQ100 and HQextrem (1000) according to the EU floods directive
Hungary	Yes				100		1000	33
Moldova	NA							NA
Romania	Yes	10			100		1000	
Serbia	Yes				100		1000	
Slovakia	Yes				100		1000	
Slovenia	Yes	10			100	500		
Ukraine	No							
ISRBC	NA							

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 5: Other information provided in the flood maps

Country / Region	Information provided in the flood maps (water discharge, water level, ice impact, local flash floods, other)				
Austria (Lower Austria)	water discharge	water level			
Bosnia and Herzegovina	water discharge	water level			
Bulgaria		water level			
Croatia		water level			
Czech Republic	water discharge	water level		local flash floods	
Germany					water depths
Hungary				local flash floods	water depth, flood hazard and risk
Moldova					NA
Romania					water depth

Serbia	water discharge	water level			water depth
Slovakia		water level			water velocity, water depth
Slovenia					polygons - range reached at Q100
Ukraine					NA
ISRBC					NA

\*NA indicates that this information is not available (not provided in the questionnaire)

#### 1.4 Ice data

Table 6 demonstrates the information about ice data reports, namely the existence of ice event reports and information provided concerning ice events. Table 7 shows information about the existence of ice maps and information provided in the ice maps.

Table 6: Information about ice data reports

Country / Region	Ice events reports	Information provided concerning ice events (% of surface covered by ice, thickness of ice cover, duration of ice cover, other)			
Austria (Lower Austria)	No			duration of ice cover	
Bosnia and Herzegovina	Yes	% of surface covered by ice			
Bulgaria	Yes				Type of ice event
Croatia	Yes		thickness of ice cover	duration of ice cover	
Czech Republic	No			duration of ice cover	
Germany	Yes			duration of ice cover	
Hungary	Yes	% of surface covered by ice	thickness of ice cover	duration of ice cover	
Moldova	Yes		thickness of ice cover	duration of ice cover	Type of ice event
Romania	Yes	% of surface covered by ice	thickness of ice cover	duration of ice cover	



Serbia	Yes	% of surface covered by ice	thickness of ice cover	duration of ice cover	
Slovakia	Yes	% of surface covered by ice	thickness of ice cover		
Slovenia	No				
Ukraine	Yes	% of surface covered by ice	thickness of ice cover	duration of ice cover	
ISRBC	NA				

*\*NA indicates that this information is not available (not provided in the questionnaire)*

*Table 7: Information about ice maps*

<b>Country / Region</b>	<b>Ice maps</b>	<b>Information provided about ice in maps</b> (% of surface covered by ice, duration of ice cover, other)			
Austria (Lower Austria)	No				
Bosnia and Herzegovina	No				
Bulgaria	No				
Croatia	No				
Czech Republic	No		duration of ice cover		
Germany	No				
Hungary	Yes	% of surface covered by ice			
Moldova	No				
Romania	No				
Serbia	No				
Slovakia	No				no ice data are provided in the flood maps
Slovenia	No				
Ukraine	No				
ISRBC	NA				

*\*NA indicates that this information is not available (not provided in the questionnaire)*

## 1.5 GIS system

Information about GIS systems and coordinate systems used in individual countries are provided in Tables 8 and 9. Additionally, Table 10 provides information about parameters used to describe catchments.

Table 8: Information about GIS system

Country / Region	GIS system (ArcView, QuantumGIS, MapInfo, none, other)				
	Austria (Lower Austria)				none
Bosnia and Herzegovina					Esri ArcGIS
Bulgaria	ArcView				
Croatia	ArcView	QuantumGIS			
Czech Republic	ArcView				
Germany					ArcGIS
Hungary	ArcView				
Moldova					ArcGIS
Romania	ArcView	QuantumGIS			Esri ArcGIS
Serbia	ArcView				
Slovakia	ArcView				
Slovenia	ArcView		MapInfo		
Ukraine				none	
ISRBC					NA

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 9: Information about coordinate system

Country / Region	Coordinate system (ETRS89/UTM_33N, ETRS89/UTM_34N, WGS84/Geographic, other)			
	Austria (Lower Austria)			WGS84/ Geographic
Bosnia and Herzegovina				MGI Balkans 6
Bulgaria			WGS84/ Geographic	
Croatia				HTRS96/TM

Czech Republic	ETRS89/ UTM_33N		WGS84/ Geographic	
Germany				EPSG: 31468 (DHDN/3 degree Gauss Krueger Zone 4)
Hungary			WGS84/ Geographic	
Moldova				SB
Romania			WGS84/ Geographic	Stereo 70 (National system)
Serbia		ETRS89/ UTM_34N		
Slovakia				S-JTSK Krovak East-North
Slovenia				D48/GK
Ukraine			WGS84/ Geographic	
ISRBC				NA

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 10: Information about parameters used to describe catchments

Country / Region	Parameters used to describe catchments (elevation, land cover, geology, soil, other)				
Austria (Lower Austria)	elevation	land cover			catchment area
Bosnia and Herzegovina	elevation				river hydrography
Bulgaria	elevation	land cover		soil	
Croatia	elevation	land cover			
Czech Republic	elevation	land cover	geology	soil	slope, area, length of the valley, shape
Germany	elevation	land cover	geology	soil	
Hungary	elevation	land cover		soil	slope
Moldova	elevation	land cover	geology	soil	river hydrography
Romania	elevation	land cover	geology	soil	catchment area, slope
Serbia	elevation	land cover			area

Slovakia	elevation	land cover			area
Slovenia	elevation	land cover	geology	soil	
Ukraine	elevation				
ISRBC					NA

\*NA indicates that this information is not available (not provided in the questionnaire)

## 1.6 Data management and data formats

Table 11 provides the information about operating system of the server that collects the data from the stations in individual countries in the Danube river catchment. Additionally, Table 12 shows the information about a database the hydrological data are stored in. Table 13 demonstrates the information about data formats of individual countries used to transfer the measured values and Table 14 shows the frequency of data updating on the collecting servers of individual countries and usage of automatic and/or manual data quality control procedures. Table 15 provides the information of the time zone of data provided.

Table 11: Information about operating system of the server that collects the data from the stations

Country / Region	Operating system of the server (Microsoft Windows Server, Red Hat Enterprise Linux, Ubuntu Server, SUSE Enterprise Linux Server, Oracle Linux Server, Debian Linux)					
Austria (Lower Austria)	Microsoft Windows Server					
Bosnia and Herzegovina	Microsoft Windows Server					
Bulgaria						Debian Linux
Croatia	Microsoft Windows Server					
Czech Republic	Microsoft Windows Server	Red Hat Enterprise Linux			Oracle Linux Server	
Germany			Ubuntu Server	SUSE Enterprise Linux Server		
Hungary	Microsoft Windows Server					Debian Linux

Moldova	Microsoft Windows Server					
Romania	Microsoft Windows Server	Red Hat Enterprise Linux	Ubuntu Server			
Serbia	Microsoft Windows Server					
Slovakia					Oracle Linux Server	
Slovenia					Oracle Linux Server	
Ukraine						Debian Linux
ISRBC	NA					

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 12: Information about a database

Country / Region	Database (Relational Database Management System (e.g. MS SQL Server, Oracle, PostgreSQL), other)	
Austria (Lower Austria)	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	
Bosnia and Herzegovina	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	
Bulgaria	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	
Croatia	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	
Czech Republic	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	
Germany	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	MySQL, (MariaDB), Oracle
Hungary	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	Unique Binary Database
Moldova	NA	
Romania	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	
Serbia	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	
Slovakia	Relational Database Management System (MS SQL Server, Oracle, PostgreSQL, other)	

Slovenia	Relational Database Management System (MS SQL Server, Oracle, PostGreSQL, other)	
Ukraine	NA	
ISRBC	NA	

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 13: Information about data formats used to transfer the measured values

Country / Region	Data formats (CSV, formatted TXT, HTML Document, XML, XLS, XLSX, DBF, other)							
Austria (Lower Austria)								Flat tables/binari, blobs
Bosnia and Herzegovina	CSV	formatted TXT			XLS	XLSX	DBF	
Bulgaria	CSV				XLS			
Croatia	CSV	formatted TXT						
Czech Republic	CSV	formatted TXT		XML				
Germany	CSV			XML				
Hungary	CSV	formatted TXT	HTML Document	XML			DBF	
Moldova	CSV				XLS			
Romania	CSV	formatted TXT		XML			DBF	
Serbia	CSV	formatted TXT						
Slovakia		formatted TXT						
Slovenia	CSV	formatted TXT	HTML Document	XML	XLS	XLSX	DBF	
Ukraine		formatted TXT						
ISRBC	NA							

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 14: Information about the frequency of data updating on the collecting servers and existence of quality data control procedures

Country / Region	Frequency of data updating (once per minute, once per hour, other)			Data control
Austria (Lower Austria)			once per 5 minutes	No
Bosnia and Herzegovina		once per hour		Yes
Bulgaria			continuous	Yes
Croatia		once per hour		No
Czech Republic	once per 10 minutes			Yes
Germany	once per minute			Yes
Hungary		once per hour	daily	Yes
Moldova	NA			NA
Romania	once per 10 minutes	once per hour	daily	Yes
Serbia		once per hour		Yes
Slovakia			once per 15 minutes	Yes
Slovenia			10 minutes; 30 minutes	Yes
Ukraine				Yes
ISRBC	NA			NA

Table 15: Information about the time zone of data provided

Country / Region	Time zone (UTC, CET, EET, other)			
Austria (Lower Austria)		CET		
Bosnia and Herzegovina	UTC			
Bulgaria			EET	
Croatia		CET		
Czech Republic		CET		
Germany		CET		

Hungary		CET		
Moldova	UTC			
Romania			EET	
Serbia				UTC+1
Slovakia		CET		
Slovenia		CET		
Ukraine	UTC			
ISRBC				NA

## 1.7 National Data Exchange

Table 16 shows the information about the existence of the national data exchange, information about the restrictions on data access and frequency of the data exchange. Table 17 provides the information about the existence of public website with information about water/flood data in individual countries and URL. Additionally, Table 18 demonstrates the information about the type of data provided on the public website.

Table 16: Information about the national data exchange (procedures, restrictions, frequency)

Country / Region	Existence of procedures for national data exchange	Existence of restrictions on data access	Frequency of the national data exchange (Real time, hourly, daily, other)			
Austria (Lower Austria)	Yes	Yes		hourly		15 min
Bosnia and Herzegovina	Yes	Yes	Real time			
Bulgaria	Yes	Yes				3 hours
Croatia	Yes	Yes		hourly		
Czech Republic	Yes	Yes		hourly		
Germany	Yes	No	Real time			
Hungary	Yes	Yes			daily	
Moldova	Yes	Yes			daily	
Romania	Yes	Yes	Real time	hourly	daily	



Serbia	Yes	Yes			daily	
Slovakia	Yes	Yes	Real time	hourly		
Slovenia	Yes	Yes		hourly		30 min
Ukraine	Yes	Yes			daily	
ISRBC	NA	NA				NA

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 17: Information about the existence of public websites with information about water/flood data and URL

Country / Region	The existence of the public website	URL
Austria (Lower Austria)	Yes	<a href="http://www.noel.gv.at/wasserstand/#/de/Messstellen">http://www.noel.gv.at/wasserstand/#/de/Messstellen</a>
Bosnia and Herzegovina	Yes	<a href="http://www.voda.ba/vodostaj">www.voda.ba/vodostaj</a>
Bulgaria	Yes	<a href="https://maritsa.meteo.bg/">https://maritsa.meteo.bg/</a> <a href="https://arda.hydro.bg/">https://arda.hydro.bg/</a> <a href="http://hydro.bg/">http://hydro.bg/</a>
Croatia	Yes	<a href="http://hidro.dhz.hr/">http://hidro.dhz.hr/</a> <a href="http://vodostaji.voda.hr/">http://vodostaji.voda.hr/</a>
Czech Republic	Yes	<a href="http://hydro.chmi.cz/hpps/index.php?lng=CZE">http://hydro.chmi.cz/hpps/index.php?lng=CZE</a>
Germany	Yes	<a href="https://www.hnd.bayern.de">https://www.hnd.bayern.de</a> , <a href="https://www.gkd.bayern.de">https://www.gkd.bayern.de</a>
Hungary	Yes	<a href="http://www.vizugy.hu">www.vizugy.hu</a> <a href="http://www.hydroinfo.hu">www.hydroinfo.hu</a>
Moldova	Yes	<a href="https://www.meteo.md/">https://www.meteo.md/</a>
Romania	Yes	<a href="http://www.inhga.ro">http://www.inhga.ro</a>
Serbia	Yes	<a href="https://www.hidmet.gov.rs">https://www.hidmet.gov.rs</a>
Slovakia	Yes	<a href="http://www.shmu.sk/en/?page=1&amp;id=hydro_vod_all">http://www.shmu.sk/en/?page=1&amp;id=hydro_vod_all</a> <a href="http://www.shmu.sk/en/?page=1&amp;id=ran_sprav">http://www.shmu.sk/en/?page=1&amp;id=ran_sprav</a>
Slovenia	Yes	<a href="http://www.arso.gov.si/vode/podatki/">http://www.arso.gov.si/vode/podatki/</a>
Ukraine	Yes	<a href="https://www.meteo.gov.ua">https://www.meteo.gov.ua</a>
ISRBC	NA	NA

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 18: Information about the type of data provided on the public website

Country / Region	Type of the data provided on the public website (water level, discharge, water temperature, water quality, sediment transport, ice cover)					
	water level	discharge	water temperature			
Austria (Lower Austria)	water level	discharge	water temperature			
Bosnia and Herzegovina	water level					
Bulgaria	water level	discharge				
Croatia	water level	discharge				
Czech Republic	water level	discharge	water temperature			
Germany	water level	discharge	water temperature	water quality	sediment transport	
Hungary	water level	discharge	water temperature			ice cover
Moldova	water level	discharge				ice cover
Romania	water level	discharge				ice cover
Serbia	water level	discharge	water temperature			ice cover
Slovakia	water level	discharge	water temperature			ice cover
Slovenia	water level	discharge	water temperature		sediment transport	
Ukraine	water level		water temperature			
ISRBC	NA					

\*NA indicates that this information is not available (not provided in the questionnaire)

## 1.8 International Data Exchange

Table 19 provides the information about the existence of the procedures for international data exchange, the way of the exchange and the existence of the restrictions on data access. Table 20 demonstrates the updating frequency of the international data exchange.

Table 19: Information about the existence of the procedures for international data exchange, the way of the exchange and the existence of the restrictions on data access.

Country / Region	The existence of the procedures for international data exchange	Type of international data exchange (web, email, other)			Restrictions on data access
Austria (Lower Austria)	Yes			ZRXP, csv; national hydrocodes	Yes
Bosnia and Herzegovina	Yes			FTP	Yes
Bulgaria	Yes	web		FTP	Yes
Croatia	Yes			via ftp	Yes
Czech Republic	Yes	web		FTP	Yes
Germany	Yes	web			Yes
Hungary	Yes	web	email	FTP	Yes
Moldova	Yes		email		Yes
Romania	Yes		email	FTP	Yes
Serbia	Yes			FTP	Yes
Slovakia	Yes	web		FTP server	Yes
Slovenia	Yes	web		FTP, XML	Yes
Ukraine	Yes	web	email	FTP	Yes
ISRBC	NA				

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 20: Information about the updating frequency of the international data exchange.

Country / Region	The updating frequency of the international data exchange (hourly, daily, other)		
Austria (Lower Austria)	hourly		5 min, 15 min, 6 hours
Bosnia and Herzegovina	hourly		
Bulgaria		daily	
Croatia	hourly		
Czech Republic	hourly		
Germany			15 min (if driven by user request)

Hungary		daily	
Moldova		daily	
Romania		daily	
Serbia		daily	
Slovakia	hourly	daily	
Slovenia	hourly		30 minutes
Ukraine		daily	
ISRBC			NA

\*NA indicates that this information is not available (not provided in the questionnaire)

### 1.9 Education and training of personnel (E-learning tool)

Table 21 provides the information about the education and training of personnel using e-learning tools.

Table 21: Information about the education and training of personnel using e-learning tools.

Country / Region	The usefulness of E-learning material	Recommended format for the E-learning material (standard university course format, Short synthesis presentation documents for three specific levels, other)		
Austria (Lower Austria)	NA	NA		
Bosnia and Herzegovina	Yes		Short synthesis presentation documents for three specific levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics, and which will be also made available in electronic format	
Bulgaria	Yes	Standard university course format		
Croatia	Yes		Short synthesis presentation documents for three specific levels (beginner, medium,	

			experts) with extensive collection of references to technical documents for details on different topics, and which will be also made available in electronic format	
Czech Republic	Yes		Short synthesis presentation documents for three levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics which will be also made available in electronic format	
Germany	No			
Hungary	Yes			Interactive e-learning presentation with Q&A
Moldova	No	NA		
Romania	Yes		Short synthesis presentation documents for three levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics which will be also made available in electronic format	
Romania	NA	NA		
Serbia	Yes		Short synthesis presentation documents for three levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics which will be also made available in electronic format	
Slovakia	Yes	Standard university		

		course format		
Slovenia	Yes		Short synthesis presentation documents for three specific levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics, and which will be also made available in electronic format	
Ukraine	Yes	Standard university course format		
ISRBC	NA	NA		

*\*NA indicates that this information is not available (not provided in the questionnaire)*

## 2 Meteorological data

### 2.1 Data provider information

All together 10 countries fulfilled the questionnaire regarding meteorological data. Additionally, Moldova provided the information about meteorological data by e-mail. There was no contribution regarding meteorological data from Romania. Data provider information is presented in Table 22.

Table 22: Meteorological data provider information

Country / Region	Name and e-mail	Organisation	Position
Austria (Lower Austria)	NA dion@zamg.ac.at	Zentralanstalt für Meteorologie und Geodynamik	NA
Bulgaria	Snezhanka Balabanova snezana.balabanova@meteo.bg	National Institute of Meteorology and Hydrology	Assoc. Prof. head hydrological forecast
Croatia	Željka Klemar klemar@cirus.dhz.hr	Croatian Meteorological and Hydrological Service	Head of Hydrological Data Control, Archiving and Distribution Department
Czech Republic	Petr Janal petr.janal@chmi.cz	Czech hydrometeorological institute	Director of a branch in Brno
Germany	Joachim Stoermer hnd@lfu.bayern.de	Bayerisches Landesamt fuer Umwelt (LfU)	Referat 86
Hungary	Amarilla Mátrai matrai.amarilla@ovf.hu	General Directorate of Water Management (OVF)	Hydrological advisor
Moldova	Lidia Trescilo lidia.trescilo@meteo.gov.md	State Hydrometeorological Service	Chief of Meteorological Center
Serbia	Goran Mihajlovic goran.mihajlovic@hidmet.gov.rs	Republic Hydrometeorological Service of Serbia	Assistant Director for the Meteorological Observation System
Slovakia	Marcel Zvolenský marcel.zvolensky@shmu.sk	Slovak Hydrometeorological Institute	Hydrologist
Slovenia	Miha Demšar miha.demsar@gov.si	ARSO	Head of section
Ukraine	Oleg Skoropad som@meteo.gov.ua	UHMC	Leading Specialist

## 2.2 Meteorological network

Table 23 presents information about the number of meteorological stations in operation in the Danube River Basin as well as the number of meteorological stations in operation connected on-line with a forecast centre and the number of meteorological stations to be considered in the Danube HIS. Table 24 provides meteorological data information regarding the availability and frequency of updating the gridded data. The frequency of updating the measured data on the server and the time zone the data is provided is presented in Table 25. Table 26 shows the number of meteorological stations with real evapotranspiration measurements, potential evapotranspiration measurements, snowfall measurements and snow water equivalent measurements.

Table 23: Information about the meteorological network

Country / Region	Meteorological stations in operation	Stations connected on-line	Stations considered in the Danube HIS
Austria (Lower Austria)	130	NA	NA
Bulgaria	141	116	6
Croatia	12	12	12
Czech Republic	90	90	1
Germany	84 (LfU), additional 330 (DWD)	414	414
Hungary	appr. 300 automatic stations	appr. 300 automatic stations	14
Moldova	6	6	0
Serbia	300	28	15
Slovakia	851	271	22
Slovenia	295	113	7
Ukraine	17	0	17

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 24: Information about the availability and frequency of updating the gridded data

Country / Region	Availability of meteorological data as gridded data	Frequency of updating the gridded data (once per hour, other)	
Austria (Lower Austria)	Yes		15 min
Bulgaria	No	once per hour	
Croatia	No		



Czech Republic	Yes	once per hour	
Germany	Yes		daily (with a delay of 1 to 2 days to current date)
Hungary	NA	NA	NA
Moldova	NA	NA	NA
Serbia	Yes	once per hour	
Slovakia	Yes	once per hour	
Slovenia	Yes		10 minutes
Ukraine	No	NA	NA

*\*NA indicates that this information is not available (not provided in the questionnaire)*

*Table 25: Information about the frequency of updating the measured data on the server and the time zone the data is provided*

Country / Region	The frequency of updating the measured data on the server (once per hour, other)		Time zone (UTC, CET, EET)		
Austria (Lower Austria)		5 min		CET	
Bulgaria		continuous			EET
Croatia	once per hour			CET	
Czech Republic		once per 10 min		CET	
Germany		about every 15 min		CET	
Hungary	once per hour	daily	UTC		
Moldova	once per hour		UTC		
Serbia	once per hour		UTC		
Slovakia	once per hour		UTC		
Slovenia		10 min, 30 min, 6 hours	UTC	CET	
Ukraine		once per 3 hours	UTC		

*\*NA indicates that this information is not available (not provided in the questionnaire)*

Table 26: Number of meteorological stations with real evapotranspiration measurements, potential evapotranspiration measurements, snowfall measurements and snow water equivalent measurements

Country / Region	Number of meteorological stations with measurements			
	real evapotranspiration	potential evapotranspiration	snowfall	snow water equivalent
Austria (Lower Austria)	0	0	120	NA
Bulgaria	2	20	367	4
Croatia	10	0	12	9
Czech Republic	0	10	80	80
Germany	none	none	82	82
Hungary	none	none	125	none
Moldova	0	2	6	6
Serbia	NA	NA	300	28
Slovakia	23	23	229	183
Slovenia	0	calculated for 70 stations	141	6
Ukraine	0	0	17	7

\*NA indicates that this information is not available (not provided in the questionnaire)

## 2.3 GIS system

Information about GIS systems and coordinate systems used in individual countries is provided in Tables 27 and 28. Additionally, Table 51 provides information about the availability of meteorological data in GIS.

Table 27: GIS systems used in individual countries

Country / Region	GIS system (ArcView, MapInfo, none, other)			
	Austria (Lower Austria)			none
Bulgaria	ArcView			
Croatia			none	
Czech Republic	ArcView			
Germany				ArcGIS

Hungary				HAWK (self developed)
Moldova			none	
Serbia	ArcView			
Slovakia				Visual Weather, GMT, R, Epygram, Gnuplot
Slovenia	ArcView	MapInfo		
Ukraine			none	

Table 28: Information about coordinate systems used in individual countries

Country / Region	Coordinate system (ETRS89/UTM_33N, WGS84/Geographic, other)		
Austria (Lower Austria)		WGS84/ Geographic	
Bulgaria		WGS84/ Geographic	
Croatia			NA
Czech Republic	ETRS89/ UTM_33N	WGS84/ Geographic	
Germany			EPSG: 31468 (DHDN/3 degree Gauss Krueger Zone 4)
Hungary			several, e.g. Mercator, WGS84
Moldova			SB
Serbia		WGS84/ Geographic	
Slovakia		WGS84/ Geographic	Lambert conformal projection
Slovenia		WGS84/ Geographic	D48/GK
Ukraine		WGS84/ Geographic	

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 29: Information about the availability of meteorological data in GIS

Country / Region	Meteorological data in GIS (temperature, humidity, precipitation, precip. type, snow cover, air quality, other)					other
Austria (Lower Austria)	temperature	humidity	precipitation			

Bulgaria							none
Croatia							NA
Czech Republic	temperature	humidity	precipitation		snow cover		
Germany	temperature		precipitation				
Hungary	temperature	humidity	precipitation	precip. type	snow cover	air quality	all
Moldova	temperature	humidity	precipitation	precip. type	snow cover	air quality	
Serbia	temperature		precipitation	precip. type			
Slovakia							none
Slovenia	temperature		precipitation		snow cover		
Ukraine	temperature		precipitation	precip. type	snow cover		

\*NA indicates that this information is not available (not provided in the questionnaire)

## 2.4 Data management and data formats

Table 30 presents information about the availability of data developed by meteorological numerical forecasts, how much time in advance the meteorological forecast provide data and the frequency the modelled data are updated on the server.

*Table 30: Information about the availability of data developed by meteorological numerical forecasts, how much time in advance the meteorological forecast provide data and the frequency the modelled data are updated on the server*

Country / Region	The availability of data developed by meteorological numerical forecasts	How much time in advance the meteorological forecast provide data (how many hours, how many days, other)			The frequency the modelled data are updated on the server
Austria (Lower Austria)	Yes	48h		once per hour	
Bulgaria	Yes	72h	5 days		12 hours
Croatia	Yes	72h (ALADIN)	10 days (ECMWF)		6h (ALADIN) 12h (ECMWF)
Czech Republic	Yes	72h (ALADIN)	10 days (ECMWF)		once per 6 hours (ALADIN)
Germany	Yes		15 days		2-8 times per day
Hungary	Yes	24h	10 days	once per hour	ECMWF: twice a day, AROME: four

					times a day, MEANDER: once per hour
Moldova	Yes	24h	7 days		Once per 3 hours
Serbia	Yes	72-120h			two times per day
Slovakia	Yes	78h			once per 6 hours (ALADIN)
Slovenia	Yes	72h	3 days		6 hours
Ukraine	Yes		3-5 days		

## 2.5 National Data Exchange

Table 31 shows the information about the procedures for national data exchange, information about the restrictions on data access and frequency of the data exchange. Table 32 provides the information about the existence of public website with information about meteorological data in individual countries and URL. Additionally, Table 33 demonstrates the information about the type of data provided on the public website.

Table 31: Information about the national data exchange (procedures, restrictions, frequency)

Country / Region	Existence of procedures for national data exchange	Existence of restrictions on data access	Update frequency of the data exchange (real time, hourly, daily, other)			
Austria (Lower Austria)	Yes	Yes		hourly		
Bulgaria	Yes	Yes				3 hours
Croatia	Yes	Yes		hourly		
Czech Republic	Yes	Yes		hourly		
Germany	Yes	Yes				individual solutions
Hungary	Yes	Yes		hourly	daily	
Moldova	Yes	Yes	real time			
Serbia	Yes	Yes		hourly		
Slovakia	Yes	Yes		hourly		
Slovenia	Yes	No	real time	hourly		

Ukraine	Yes	No			daily	
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Table 32: Information about the existence of public websites with information about meteorological data and URL

Country / Region	The existence of the public website	URL
Austria (Lower Austria)	Yes	<a href="http://www.noel.gv.at/wasserstand/#/de/Messstellen/Map/Niederschlag12h">http://www.noel.gv.at/wasserstand/#/de/Messstellen/Map/Niederschlag12h</a>
Bulgaria	Yes	<a href="http://hydro.bg/">http://hydro.bg/</a>
Croatia	Yes	<a href="http://meteo.hr/">http://meteo.hr/</a> <a href="http://vrijeme.hr/hrvatska1_n.xml">http://vrijeme.hr/hrvatska1_n.xml</a>
Czech Republic	Yes	<a href="https://www.chmi.cz">https://www.chmi.cz</a>
Germany	Yes	<a href="https://www.hnd.bayern.de">https://www.hnd.bayern.de</a> <a href="https://www.gkd.bayern.de">https://www.gkd.bayern.de</a>
Hungary	Yes	<a href="http://www.met.hu">www.met.hu</a>
Moldova	Yes	<a href="https://www.meteo.md/">https://www.meteo.md/</a>
Serbia	Yes	<a href="https://www.hidmet.gov.rs">https://www.hidmet.gov.rs</a>
Slovakia	Yes	<a href="http://www.shmu.sk">www.shmu.sk</a>
Slovenia	Yes	<a href="http://meteo.arso.gov.si/">http://meteo.arso.gov.si/</a>
Ukraine	Yes	<a href="https://www.meteo.gov.ua">https://www.meteo.gov.ua</a>

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 33: Information about the type of data provided on the public website

Country / Region	Type of data provided on the public website (air temp., humidity, precipitation, precip. type, snow cover, air quality, other)						
	air temp.	humidity	precipitation	precip. type	snow cover	air quality	other
Austria (Lower Austria)	air temp.	humidity	precipitation				
Bulgaria			precipitation	precip. type	snow cover		
Croatia	air temp.	humidity	precipitation		snow cover		
Czech Republic	air temp.	humidity	precipitation		snow cover	air quality	

Germany	air temp.	humidity	precipitation		snow cover		wind, global radiation, air pressure
Hungary	air temp.	humidity	precipitation	precip. type	snow cover	air quality	wind
Moldova	air temp.	humidity	precipitation		snow cover	air quality	air pressure, wind speed, wind direction
Serbia	air temp.	humidity	precipitation		snow cover		
Slovakia	air temp.	humidity	precipitation		snow cover	air quality	air pressure, precipit., wind speed, wind direction
Slovenia	air temp.	humidity	precipitation	precip. type	snow cover		
Ukraine	air temp.		precipitation	precip. type	snow cover		

\*NA indicates that this information is not available (not provided in the questionnaire)

## 2.6 International Data Exchange

Table 34 provides the information about the existence of the procedures for international meteorological data exchange, the way of the exchange and the existence of the restrictions on data access. Table 35 demonstrates the updating frequency of the international meteorological data exchange.

*Table 34: Information about the existence of the procedures for international meteorological data exchange, the way of the exchange and the existence of the restrictions on data access.*

Country / Region	The existence of the procedures regarding for international data exchange	Type of international data exchange (web, e-mail, other)			Restrictions on data access
Austria (Lower Austria)	Yes			ZRXP, csv; national hydrocodes	Yes

Bulgaria	Yes	web		FTP	Yes
Croatia	Yes		e-mail	via ftp	No
Czech Republic	Yes	web		FTP	Yes
Germany	Yes	web		File Transfer Server	Yes
Hungary	Yes			GTS	Yes
Moldova	Yes		e-mail	special conection	
Serbia	Yes			WWIS under WMO procedure	Yes
Slovakia	Yes			Global Telecommunication System (GTS) Inside RC LACE - OPLACE	Yes
Slovenia	Yes	web		GTS	No
Ukraine	Yes		e-mail		Yes

*\*NA indicates that this information is not available (not provided in the questionnaire)*

*Table 35: Information about the existence of the procedures for international meteorological data exchange, the way of the exchange and the existence of the restrictions on data access.*

Country / Region	Updating frequency of the meteorological data exchange (hourly, daily, other)		
	hourly	daily	other
Austria (Lower Austria)	hourly		5 min, 15 min
Bulgaria		daily	
Croatia	hourly		
Czech Republic	hourly		
Germany			real time using data download and individual solutions
Hungary	hourly	daily	
Moldova		daily	
Serbia	hourly		
Slovakia	hourly		atm. precipitation - 5 min. inside INCA bilateral agreement, others met. variable 1h - GTS
Slovenia	hourly		
Ukraine		daily	

*\*NA indicates that this information is not available (not provided in the questionnaire)*



## 2.7 Education and training of personnel (E-learning tool)

Table 36 provides the information about the education and training of personnel using e-learning tools.

Table 36: Information about the education and training of personnel using e-learning tools

Country / Region	The usefulness of E-learning material	Recommended format for the E-learning material (standard university course format, short synthesis presentation documents for three specific levels, other)		
Austria (Lower Austria)	No			
Bulgaria	Yes	standard university course format		
Croatia	Yes		Short synthesis presentation documents for three specific levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics, and which will be also made available in electronic format	
Czech Republic	Yes		Short synthesis presentation documents for three levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics which will be also made available in electronic format	
Germany	No			
Hungary	Yes			Interactive e-learning presentation with Q&A
Moldova	NA			NA
Serbia	No			
Slovakia	Yes	standard university		

		course format		
Slovenia	Yes		Short synthesis presentation documents for three specific levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics, and which will be also made available in electronic format	
Ukraine	Yes	standard university course format		

*\*NA indicates that this information is not available (not provided in the questionnaire)*

### 3 National hydrological forecasting service

#### 3.1 Contact of national hydrological forecasting service

All together 12 countries (including Bosnia and Herzegovina) fulfilled the questionnaire regarding national hydrological forecasting service. Additionally, Moldova provided the information about hydrological forecasting service by e-mail. Data provider information is presented in Table 37.

Table 37: Hydrological forecasting service information

Country	Name and e-mail	Organization	Position
Austria (Lower Austria)	Dipl.-Ing. Franz Higer franz.Higer@noel.gv.at	Office of the Lower Austrian Provincial Government, 3.1.2. Department BD3 – Hydrology and Geoinformation	NA
Bosnia and Herzegovina	Milan Blagojevic m.blagojevic@rhmazrs.com	Republic Hydrometeorological Institute Republic of Srpska	Hydrologist
Bulgaria	Snezhana Balabanova snezana.balabanova@meteo.bg	National Institute of Meteorology and Hydrology	Assoc. Prof. head hydrological forecast
Croatia	Dijana Oskoruš oskorus@cirus.dhz.hr	Croatian Meteorological and Hydrological Service	Head of Hydrological Research, Analysis and Forecasting Department
Czech Republic	Petr Janal petr.janal@chmi.cz	Czech hydrometeorological institute	Director of a branch in Brno
Germany	Dr. Alfons Vogelbacher Alfons.Vogelbacher@lfu.bayern.de	Bayerisches Landesamt fuer Umwelt (LfU)	Hochwassernachrichtenzentrale, Hochwasservorhersage Donau und Inn, Gebietshydrologie
Hungary	Amarilla Mátrai matrai.amarilla@ovf.hu	General Directorate of Water Management (OVF)	Hydrological advisor
Moldova	Valentina Ceres valentina.ceres@meteo.gov.md	SHS	Chief of Hydrological Forecasting Department
Romania	Marius Matreata marius.matreata@hidro.ro	National Institute of Hydrology and Water Management (NIHWM)	Director National Hydrological Forecast Center
Serbia	Dejan Vladikovic dejan.vladikovic@hidmet.gov.rs	Republic Hydrometeorological	Coordinator of hydrological

		Service of Serbia	forecasts and early warnings
Slovakia	Marcel Zvolenský marcel.zvolensky@shmu.sk	Slovak Hydrometeorological Institute	hydrologist
Slovenia	Janez Polajnar janez.polajnar@gov.si	Slovenian Environment Agency (ARSO)	Head of Hydrological Forecasting Section
Ukraine	Oleg Skoropad som@meteo.gov.ua	UHMC	Leading Specialist

\*NA indicates that this information is not available (not provided in the questionnaire)

### 3.2 Collaboration with the national meteorological forecasting service

Table 38 presents data provided by the national meteorological forecasting service. Table 39 provides the information about the frequency the data are provided and the information about the availability of all-meteorological data for hydrological forecasting.

Table 38: Data provided by the national meteorological forecasting service

Country	Data provided by the national meteorological forecasting service (precipit., air temperat., humidity, snow cover depth, snow water equivalent, wind, other)						
	precipit.	air temperat.	humidity	snow cover depth	snow water equivalent	wind	
Austria (Lower Austria)							
Bosnia and Herzegovina							
Bulgaria							
Croatia							
Czech Republic							
Germany							global radiation, sunshine duration
Hungary							
Moldova							solar radiation

Romania	precipit.	air temperat.		snow cover depth	snow water equivalent	wind	
Serbia	precipit.	air temperat.		snow cover depth		wind	
Slovakia	precipit.	air temperat.	humidity	snow cover depth	snow water equivalent	wind	all other meteorol ogical variables
Slovenia	precipit.	air temperat.	humidity	snow cover depth		wind	solar radiation
Ukraine	precipit.	air temperat.		snow cover depth	snow water equivalent	wind	

Table 39: Data provided by the national meteorological forecasting service

Country	Frequency of the meteorological data provided for hydrological forecasting (real time, hourly, daily, other)				Availability of all-meteorol. data for hydrological forecasting
	real time	hourly	daily	12 hours	
Austria (Lower Austria)	real time				No
Bosnia and Herzegovina	real time	hourly	daily		
Bulgaria				12 hours	Yes
Croatia		hourly			No
Czech Republic	real time	hourly			Yes
Germany	real time				Yes
Hungary			daily		Yes
Moldova		hourly	daily		Yes
Romania	real time				Yes
Serbia	real time		daily		Yes
Slovakia	real time	hourly	daily	depends on variable and/or station	Yes

Slovenia	real time				Yes
Ukraine			daily		Yes

### 3.3 Collaboration with the neighbouring countries and international sources

Table 40 provides information about the existence of data from neighbouring countries used in the national hydrological forecasting model, the procedures for international data exchange, the frequency of data exchange and the information about the usage of data from international data sources.

Table 40: Information about the international data exchange for hydrological forecasting.

Country	The existence of data from neighbouring countries used in the national forecasting model	The existence of the procedures for data exchange	The frequency of data exchange (real time, hourly, daily, other)				Usage of data from internat. data sources
Austria (Lower Austria)	No						No
Bosnia and Herzegovina	Yes	Yes	real time	hourly	daily		Yes
Bulgaria	Yes	Yes				3 hours	Yes
Croatia	Yes	Yes		hourly			Yes
Czech Republic	Yes	Yes		hourly			Yes
Germany	Yes	Yes		hourly			Yes
Hungary	Yes	Yes			daily		Yes
Moldova	Yes	Yes			daily		NA
Romania	Yes	Yes	real time		daily		Yes
Serbia	Yes	Yes	real time		daily		Yes
Slovakia	Yes	Yes		hourly			Yes
Slovenia	Yes	Yes		hourly			Yes
Ukraine	Yes	Yes					Yes

### 3.4 Dissemination of hydrological forecasts and warnings

Table 41 shows the information about the way the national hydrological forecasts are disseminated. Table 42 provides the information about the availability of a public website to provide information about hydrological forecasts and URL of the website. The frequency the hydrological forecast information is disseminated is presented in Table 43. Table 44 shows institutions having access to hydrological forecasts in each individual country. Responsibility of forecast service to proclaim emergency and the existence of estimation of forecast and warnings efficiency is provided in Table 45.

Table 41: Information about the way hydrological forecasts are disseminated.

Country	The way the hydrological forecast is disseminated (On-line, e-mail, other)		
	On-line	e-mail	other media
Austria (Lower Austria)	On-line	e-mail	
Bosnia and Herzegovina	On-line	e-mail	
Bulgaria	On-line	e-mail	
Croatia	On-line		
Czech Republic	On-line	e-mail	other media
Germany	On-line		other media
Hungary	On-line	e-mail	other media
Moldova	On-line	e-mail	other media
Romania	On-line	e-mail	other media
Serbia	On-line	e-mail	other media
Slovakia	On-line		other media
Slovenia	On-line	e-mail	other media
Ukraine	On-line	e-mail	other media

Table 42: Information about the availability of a public website to provide information about hydrological forecasts and URL of the website

Country	The availability of a public website about hydrological forecasts	URL
Austria (Lower Austria)	Yes	NA

Bosnia and Herzegovina	Yes	<a href="http://www.rhmzrs.com">www.rhmzrs.com</a>
Bulgaria	Yes	<a href="http://hydro.bg/">http://hydro.bg/</a> <a href="https://arda.hydro.bg/">https://arda.hydro.bg/</a> <a href="https://maritsa.meteo.bg/">https://maritsa.meteo.bg/</a>
Croatia	No	NA
Czech Republic	Yes	NA
Germany	Yes	<a href="https://www.hnd.bayern.de">https://www.hnd.bayern.de</a>
Hungary	Yes	<a href="http://www.hydrionfo.hu">www.hydrionfo.hu</a> <a href="http://www.vizugy.hu">www.vizugy.hu</a>
Moldova	Yes	<a href="http://www.meteo.md/index.php/hidrologie/">http://www.meteo.md/index.php/hidrologie/</a>
Romania	Yes	<a href="http://www.inhga.ro">www.inhga.ro</a>
Serbia	Yes	<a href="https://www.hidmet.gov.rs">https://www.hidmet.gov.rs</a>
Slovakia	Yes	<a href="http://www.shmu.sk/sk/?page=1&amp;id=hydro_vod_all">http://www.shmu.sk/sk/?page=1&amp;id=hydro_vod_all</a>
Slovenia	Yes	<a href="http://www.arso.gov.si/vode/napovedi/">http://www.arso.gov.si/vode/napovedi/</a>
Ukraine	Yes	<a href="https://meteo.gov.ua/ua/">https://meteo.gov.ua/ua/</a>

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 43: The frequency the hydrological forecast information is disseminated

Country	The frequency of the forecast information dissemination (hourly, more than once a day, daily, other)				Availability of data exchange server	Restrictions on accessing forecast data
Austria (Lower Austria)				6 hours	No	No
Bosnia and Herzegovina			daily		Yes	Yes
Bulgaria		more than once a day			Yes	No
Croatia	hourly	more than once a day			Yes	Yes
Czech Republic		more than once a day			Yes	Yes
Germany	hourly				No	Yes
Hungary			daily		Yes	Yes
Moldova			daily		Yes	Yes
Romania		more than once a day	daily		No	No



Serbia			daily		Yes	Yes
Slovakia		more than once a day			Yes	Yes
Slovenia			daily		Yes	Yes
Ukraine		more than once a day			Yes	Yes

Table 44: Institutions having access to hydrological forecasts

Country	Institutions having access to hydrological forecasts (Hydrological, meteorological and water management services, HPP operators, civil protection, rescue units and others, data are publicly available, other)					
Austria (Lower Austria)	Hydrological, meteorological and water management services		civil protection	rescue units and others	data are publicly available	
Bosnia and Herzegovina	Hydrological, meteorological and water management services					
Bulgaria	Hydrological, meteorological and water management services	HPP operators	civil protection	rescue units and others	data are publicly available	
Croatia	Hydrological, meteorological and water management services		civil protection			Agency for Inland Waterways
Czech Republic	Hydrological, meteorological and water management services	HPP operators	civil protection	rescue units and others	data are publicly available	
Germany					data are publicly available	
Hungary					data are publicly available	
Moldova	Hydrological, meteorological and water		civil protection	rescue units and others	data are publicly available	

	management services					
Romania	Hydrological, meteorological and water management services	HPP operators	civil protection	rescue units and others		
Serbia	Hydrological, meteorological and water management services	HPP operators	civil protection	rescue units and others		
Slovakia	Hydrological, meteorological and water management services	HPP operators	civil protection	rescue units and others	data are publicly available	
Slovenia	Hydrological, meteorological and water management services	HPP operators	civil protection	rescue units and others		
Ukraine	Hydrological, meteorological and water management services		civil protection	rescue units and others		

Table 45: Responsibility of forecast service to proclaim emergency, the existence of estimation of forecast and warnings efficiency

Country	Responsibility of forecast service to proclaim emergency	The existence of estimation of forecast efficiency	The existence of estimation of warnings efficiency
Austria (Lower Austria)	No	No	Yes
Bosnia and Herzegovina	Yes	No	No
Bulgaria	No	No	Yes
Croatia	No	No	No
Czech Republic	No	Yes	Yes
Germany	No	Yes	Yes
Hungary	No	Yes	No

Moldova	Yes	Yes	Yes
Romania	No	Yes	Yes
Serbia	No	Yes	Yes
Slovakia	No	Yes	Yes
Slovenia	No	Yes	Yes
Ukraine	No	Yes	No

### 3.5 The process of the hydrological forecasting

Table 46 shows the information about the number of models used for hydrological forecasting, collaboration with other regions and/or countries regarding Danube-related hydrological forecasting and information about additional information used in hydrological forecasting practices in individual countries.

*Table 46: Information about the process of the hydrological forecasting*

Country	No. of models used for hydrological forecasting	Collaboration with other regions and/or countries regarding Danube-related hydrological forecasting	Additional information used in hydrological forecasting practices
Austria (Lower Austria)	2	Yes	No
Bosnia and Herzegovina	3	Yes	Yes
Bulgaria	6	Yes	Yes
Croatia	5	Yes	No
Czech Republic	3	Yes	Yes
Germany	3 (LARSIM, WAVOS, FLUX FLORIS)	Yes	Yes
Hungary	5 (OLSER, DIWA, IPOLY, RÁBA, MURA)	Yes	Yes
Moldova	0	Yes	Yes
Romania	3 - 5	Yes	Yes
Serbia	7	Yes	Yes
Slovakia	2 rainfall runoff models, 1 hydraulic	Yes	Yes

	model		
Slovenia	5	Yes	Yes
Ukraine	9	Yes	Yes

### 3.6 Relations with stakeholders

Table 47 provides the information about the involvement of stakeholders in flood (and ice) management, preparation of the reports for the stakeholders and on which legal basis. Information about the existence of general and special requirements to fill in the reports and additional requirements/needs/wishes to be considered in the future development are presented in Table 48.

*Table 47: Information about the involvement of stakeholders in flood (and ice) management, preparation of the reports for the stakeholders and on which legal basis*

Country	The involvement of stakeholders in flood (and ice) management	Preparation of the reports for the stakeholders	Legal basis (by law, internal regulation, commercial arrangements)		
			by law	internal regulation	commercial arrangements
Austria (Lower Austria)	Yes	Yes		internal regulation	commercial arrangements
Bosnia and Herzegovina	Yes	Yes	by law		
Bulgaria	No	Yes	by law		
Croatia	Yes	Yes		internal regulation	
Czech Republic	Yes	Yes	by law		commercial arrangements
Germany	Yes	No			
Hungary	Yes	Yes	by law	internal regulation	commercial arrangements
Moldova	Yes	Yes	by law	internal regulation	commercial arrangements
Romania	Yes	Yes	by law	internal regulation	commercial arrangements
Serbia	Yes	Yes	by law		
Slovakia	Yes	Yes	by law		commercial arrangements
Slovenia	Yes	Yes		internal regulation	commercial arrangements
Ukraine	Yes	Yes		internal regulation	commercial arrangements

Table 48: Information about the existence of general and special requirements to fill in the reports and additional requirements/needs/wishes for the future development

Country	The existence of general and special requirements to fill in the reports	The existence of additional requirements/needs/wishes for the future development
Austria (Lower Austria)	Yes	NA
Bosnia and Herzegovina	Yes	Yes
Bulgaria	Yes	Yes
Croatia	Yes	Yes
Czech Republic	Yes	Yes
Germany	NA	NA
Hungary	Yes	Yes
Moldova	Yes	Yes
Romania	No	Yes
Serbia	Yes	Yes
Slovakia	Yes	No
Slovenia	Yes	Yes
Ukraine	No	No

\*NA indicates that this information is not available (not provided in the questionnaire)

### 3.7 Flood data

Table 49 provides the information about the existence of historical flood event reports, the existence of maps with flood contour lines, especially for historical events and for which year. Table 50 demonstrates information about the existence of maps with flood contour lines of design floods and return periods. Other information provided in the flood maps is presented in Table 51.

Table 49: Information about the existence of historical flood event reports, the existence of maps with flood contour lines, especially for historical events and for which year

Country	Historical flood event reports	Maps with flood contour lines	Flood contour lines of historical flood events	Year
Austria (Lower Austria)	Yes	Yes	Yes	2013
Bosnia and Herzegovina	Yes	Yes	Yes	2014

Bulgaria	Yes	Yes	No	NA
Croatia	Yes	Yes	Yes	NA1964, 1998, 1999, 2000, 2007, 2008, 2009, 2010, 2012, 2013, 2014
Czech Republic	Yes	No	No	NA
Germany	Yes	Yes	Yes	events of 2013, 2005, 2002, 1999 and others depending from river reaches
Hungary	Yes	Yes	Yes	NA
Moldova	Yes	Yes	No	1960 and other years
Romania	Yes	Yes	Yes	2005, 2008
Serbia	Yes	Yes	Yes	2014
Slovakia	Yes	No	No	NA
Slovenia	Yes	Yes	Yes	2010
Ukraine	Yes	No	No	NA

\*NA indicates that this information is not available (not provided in the questionnaire)

Table 50: Information about the maps with flood contour lines of design floods and return periods

Country	The existence of maps with flood contour lines of design floods	Return period (10, 20, 50, 100, 500, 1000, other)						
Austria (Lower Austria)	Yes				100			
Bosnia and Herzegovina	Yes	10	20	50	100	500		
Bulgaria	Yes		20		100		1000	
Croatia	Yes				100		1000	25
Czech Republic	No							
Germany	Yes							HQhäufig, HQ100 and

								HQextrem (1000) according to the EU floods directive
Hungary	Yes				100		1000	30
Moldova	NA							NA
Romania	Yes	10			100		1000	
Serbia	Yes				100		1000	
Slovakia	Yes	10		50	100		1000	5
Slovenia	Yes	10			100	500		
Ukraine	No							

Table 51: Other information provided in the flood maps

Country	Other information provided in the flood maps (water velocity, water depth, other)		
Austria (Lower Austria)	NA	NA	NA
Bosnia and Herzegovina	water velocity	water depth	
Bulgaria		water depth	
Croatia		water depth	
Czech Republic	NA	NA	NA
Germany		water depth	
Hungary		water depth	
Moldova	NA	NA	NA
Romania		water depth	
Serbia		water depth	
Slovakia	water velocity	water depth	contour lines of design flood, flood risk
Slovenia	water velocity	water depth	
Ukraine	NA	NA	NA

\*NA indicates that this information is not available (not provided in the questionnaire)

### 3.8 Perspective in development

Table 52 demonstrates the information about plans regarding modification or development of the IT system or data formats in the near future (next 3 years) as well as data measurement and collection for forecasting purposes and the information about wishes or suggestions for additional or improved cooperation with other countries.

Table 52: Information about perspectives and development

Country	Plans to modify or develop the IT system or data formats	Plans to modify or develop the data measurement and collection for forecasting purposes	Wishes or suggestions for additional or improved cooperation with other countries
Austria (Lower Austria)	Yes	Yes	No
Bosnia and Herzegovina	Yes	Yes	Yes
Bulgaria	Yes	Yes	Yes
Croatia	Yes	Yes	Yes
Czech Republic	Yes	Yes	Yes
Germany	Yes	Yes	No
Hungary	Yes	Yes	Yes
Moldova	Yes	Yes	Yes
Romania	Yes	Yes	Yes
Serbia	Yes	Yes	Yes
Slovakia	No	No	No
Slovenia	No	No	No
Ukraine	Yes	Yes	Yes

### 3.9 Education and training of personnel

Table 53 provides the information about the usefulness of online learning tools in order to solve some of the problems related to the personnel training and recommended format/structure of E-learning material.



Table 53: Information about the usefulness of online learning tools and recommended format/structure

Country	The usefulness of online learning tools	Recommended format/structure of E-learning material (standard university course format, short synthesis presentation documents for three specific levels, other)		
Austria (Lower Austria)	Yes	NA	NA	NA
Bosnia and Herzegovina	Yes	standard university course format	short synthesis presentation documents for three specific levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics, and which will be also made available in electronic format	
Bulgaria	Yes	standard university course format		
Croatia	Yes		short synthesis presentation documents for three specific levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics, and which will be also made available in electronic format	
Czech Republic	Yes		short synthesis presentation documents for three levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics which will be also made available in electronic format	
Germany	No			
Hungary	Yes			Interactive e-learning presentation with Q&A
Moldova	NA	NA	NA	NA
Romania	Yes		short synthesis presentation documents for three specific levels (beginner, medium, experts) with extensive collection of references to technical documents for details on	

			different topics, and which will be also made available in electronic format	
Serbia	Yes		short synthesis presentation documents for three levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics which will be also made available in electronic format	
Slovakia	Yes	standard university course format		
Slovenia	Yes		short synthesis presentation documents for three specific levels (beginner, medium, experts) with extensive collection of references to technical documents for details on different topics, and which will be also made available in electronic format	
Ukraine	Yes	standard university course format;		

*\*NA indicates that this information is not available (not provided in the questionnaire)*

#### **4 Attachment - Questionnaire**