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DEUTSCHE ZUSAMMENARBEIT

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Session 4- Working Group on:

Monitoring and Information Exchange – Flood prevention and management: Main challenges including associated knowledge gaps

Drin Basin Stakeholders Conference

Tirana, 10-11 December 2013

Jakob Doetsch

Summary Flood Protection

1. **Flood Management** is an important topic!
2. **HMS's** need to get adequate resources (technical and financial)- without adequate resources HMS's cannot fulfill their mandate
3. **Data and data management is most important**:

-Upgrade of hydrometeorological networks and IT systems

-Regular field campaigns for: flow measurements and continuous maintenance of networks

-Digitizing historic data

-making data available

-data communication/transfer between different levels and institutions are crucial→ information must reach those affected

3. **Hydropower** needs to be involved- Dam management and data exchange in countries
4. **Regional Cooperation**→ formalizing data exchange
5. Close cooperation with **Research** needed
6. Important to establish **working group** under Drin Core Group with experts from the relevant fields involved

Content

- Short Background of GIZ Project
- Study on gaps and needs in establishing flood early warning system
- Next steps and recommendations

- Guiding questions for discussion

5 December 2010 Last updated at 22:11 GMT

Albania 'hit by worst floods in living memory'

By Mark Lowen, BBC News

http://www.bbc.co.uk/news/world-europe-11923596

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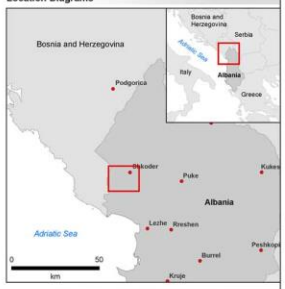
Flood 2010

SAFER Activation No. 69
Glide No. FL-2010-000248-ALB
Product No. 1

ALBANIA - Shkoder
Flood as of December 06, 2010
Disaster Extent Map - Detail
Scale: 1:25,000

Location Diagrams



Legend

Settlement | Agriculture | Forest

Infrastructure
- Road network
- Flooded road
- Settlement

Hydrology
- Water extent as of December 06, 2010
- Water extent as of April 20, 2009
- Riverbed

Interpretation

Three weeks of heavy rainfall and recent snow melt caused flooding in the northwestern regions of Albania in December 2010. More than 12,000 people have been moved from their homes. The map shows the pre- and post-event water extents around Shkoder as detected on April 20, 2009 using TerraSAR-X data and on December 06, 2010 using Radarsat-2 data. A GeoEye-1 image of April 15, 2009 serves as backdrop.
The roads do not represent the entire transport network. Please note, that the flood extent in urban areas may not be detected properly due to radar imaging geometry.

Cartographic Information

0 0,5 1 1,5 2 km

N

Local projection: UTM Zone 34N, Datum: WGS 1984
Geographic projection: Lat/Lon (DMS), Datum: WGS 84
Scale: 1:25,000 for DIN A1 prints

Data Sources

GeoEye-1	© GeoEye 2010, provided by e-GEOS S.p.A. under GSC-DA
RADARSAT-2	© MacDONALD, DETTWILER AND ASSOCIATES LTD. (2010), provided under EC/ESA GSC-DA
TerraSAR-X	© Infoterra GmbH
Vector data	© OpenStreetMap 2010, Google Earth 2010, DLR 2010

Framework

The products elaborated for this Rapid Mapping Activity are realised to the best of our ability, within a very short time frame, optimising the material available.
All geographic information has limitations due to the scale, resolution, date and interpretation of the original source materials. No liability concerning the content or the use thereof is assumed by the producer. The research leading to these results has received funding from European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 218802.
The ZKI crisis maps are constantly updated. Please make sure to visit http://www.zki.dlr.de for the latest version of this product.

Map produced December 7, 2010 by ZKI
Map updated December 9, 2010 by ZKI

zki@dlr.de
http://www.zki.dlr.de

GMES — European Commission Service and Applications For Emergency Response — Safer

Center for Satellite Based Crisis Information
-- Emergency Mapping & Disaster Monitoring --
a service of DFD

German Remote Sensing Data Center
German Aerospace Center
DLR

Flood 2013

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Climate Change Adaptation in Western Balkan 01/2012- 12/2018

Partners	**Albania, Kosovo, Macedonia, Montenegro & Serbia: Ministries of Environment, Hydrometeorological services, communes, municipalities…**
Budget	3,500,000 EUR (Energy and Climate Funds, VE 2011 & VE 2012, BMZ)
Objective	***Adaptation to climate change in the Western Balkans is particularly improved in the fields of flood and drought risk management*.**

Components:	**1. Drin-Buna Flood Early Warning System**	**2. Climate Change Adaptation Strategies**	**3. Local Flood and Drought Management Plans**	**4. Regional WRM**	**5. Climate Change Adaptation in Urban Areas**
	-flood warning system based on real-time info -hydromet equipment -Data exchange between countries	Support in drafting National or sector Climate Change Adaptation Strategies	-Development of 40 communal flood and drought management plans -implementation of defined measures	Support structures and concepts for regional IWRM (Drin Dialogue, Standing Working Group	Integrating Climate Change Adaptation in urban planning and development in Belgrade, Tirana & Podgorica

Background of establishing Early Warning System for Drin river

- Regional Round-Table on “Flood Early Warning System for lower Drin river” in Tirana September 2012

- Study on “Gaps and Needs of Hydrometeorological Institutes for establishing Early Warning System for Drin river”- including first suggestions for network and IT set-up

- Drafting of specifications for procuring Equipment

Main outputs of Gaps and Needs Study

- Inventory of the existing hydrometeorological, flood forecast and warning conditions (gaps and needs) with regard to a functioning DEWS.
- First concept of the DEWS for the (lower) Drin Basin as well as of national hydrometeorological resp. water information systems to contribute to the DEWS.
- Identification of steps to be taken for the integration of the DEWS in the European Flood Alert System (EFAS).

Components of Early Warning System

Hydrometeo-rological data	Data base management	Quantitative meteo forecast	Quantitative flood forecast	Flood early warning	Communication and review
National HMS	National HMS DEWS: all Drin	DEWS: all Drin	DEWS: all Drin (+ HMS)	National HMS Coop. with DEWS	DEWS: all Drin
Collect and transmit real-time (hazard) data to national data bases and DEWS forecast center	Operate overall Drin data base at DEWS; check and correct raw data, fill-up gaps; interaction between HMS and DEWS	Combine available international meteo forecast with regional information	Perform hydrological and hydraulic modeling of floods and inundations	Decide on flood warning, disseminate warning to crisis mana-gement groups, public etc.	Communicate with EFAS, actors and concerned communities; review EWS after flood

Example: Hydrometeorological Network Macedonia

Annex A 3.1 – Hydrometric Stations Macedonia 1 / 2

Hydro stations	Location	Location	Type	Operational period(s)	Rating curve available	No. of parameters measured	Which parameters	Transmission of data	Actual State of station	Suggested improvement with regard to EWS
	Latitude ° ' "	Longitude ° ' "					use flag *		use flag **	use flag ***
Brajcino	40° 54' 04"	21° 09' 30"	WL	Since 1964 - now	yes, but need update	3	1, 2 ,3	manual lists (via post)	+	3,4,5
Krani	40° 56' 43"	21° 07' 02"	WL	no exact info	no RC	1	2,	no observer	-	1,3,5
Resen	41° 05' 00"	21° 01' 06"	WL	since 1947 - now	old, need update	3	1,2,3	manual lists (via post)	0	4,
Leva Reka	41° 09' 55"	21° 00' 50"	WL	no exact info,1995-now	yes, but need update	3	1,2,3	manual lists (via post)	+	1,3,
Nakolec	40° 53' 28"	21° 06' 28"	WL	since 1954 - now	lake	2	1,3	manual lists (via post)	+	1,
Asamati	40° 59' 08"	21° 03' 15"	WL	since 1948-2003	lake			no observer	--	0,
Stenje	40° 57' 02"	20° 54' 24"	WL	since 1935 - now	lake	2	1,3	manual lists (via post)	+	1,3,4,5
Sveti Naum(Izvor)	40° 54' 54"	20° 44' 01"	WL	since 1950-2003	no RC	1	2,	no observer	0	1,3,4,5
Ljubanista	40° 53' 35"	20° 45' 47"	WL	no exact info	no RC	1	2,	no observer	-	1,3
Kosel	41° 10' 24"	20° 50' 29"	WL	since 1961 - now	yes	2	1,2	manual lists (via post)	+	3,4
Botun	41° 16' 39"	20° 47' 13"	WL	since 1948 - now	yes	4	1,2,3,6	manual lists (via post)	+	3,4,5
Sveti Naum(Ohrid Lake)	40° 54' 54"	20° 44' 45"	WL	since 1946-2006	lake			no observer	--	1,3,
Pestani	41° 01' 03'	20° 48' 55"	WL	since1945-2003	lake			no observer	-	0,
Ohrid	41° 06' 42"	20° 48' 21"	WL	since 1924 - now	lake	2	1,3	manual lists (via post)	+	3,4,5
Kalista	41° 08' 40"	20° 39' 22"	WL	no exact info	lake			no observer	--	0,

LEGEND

Flags

*

1	water level
2	discharge
3	water temperature
4	water quality data
5	rainfall (in addition)
6	
7	
8	
9	

**

-- / - / 0 / + / ++

***

1	renew at same location
2	renew at different location
3	upgrade to automatically working station - data logger
4	uprade to online station
5	add online rainfall recorder

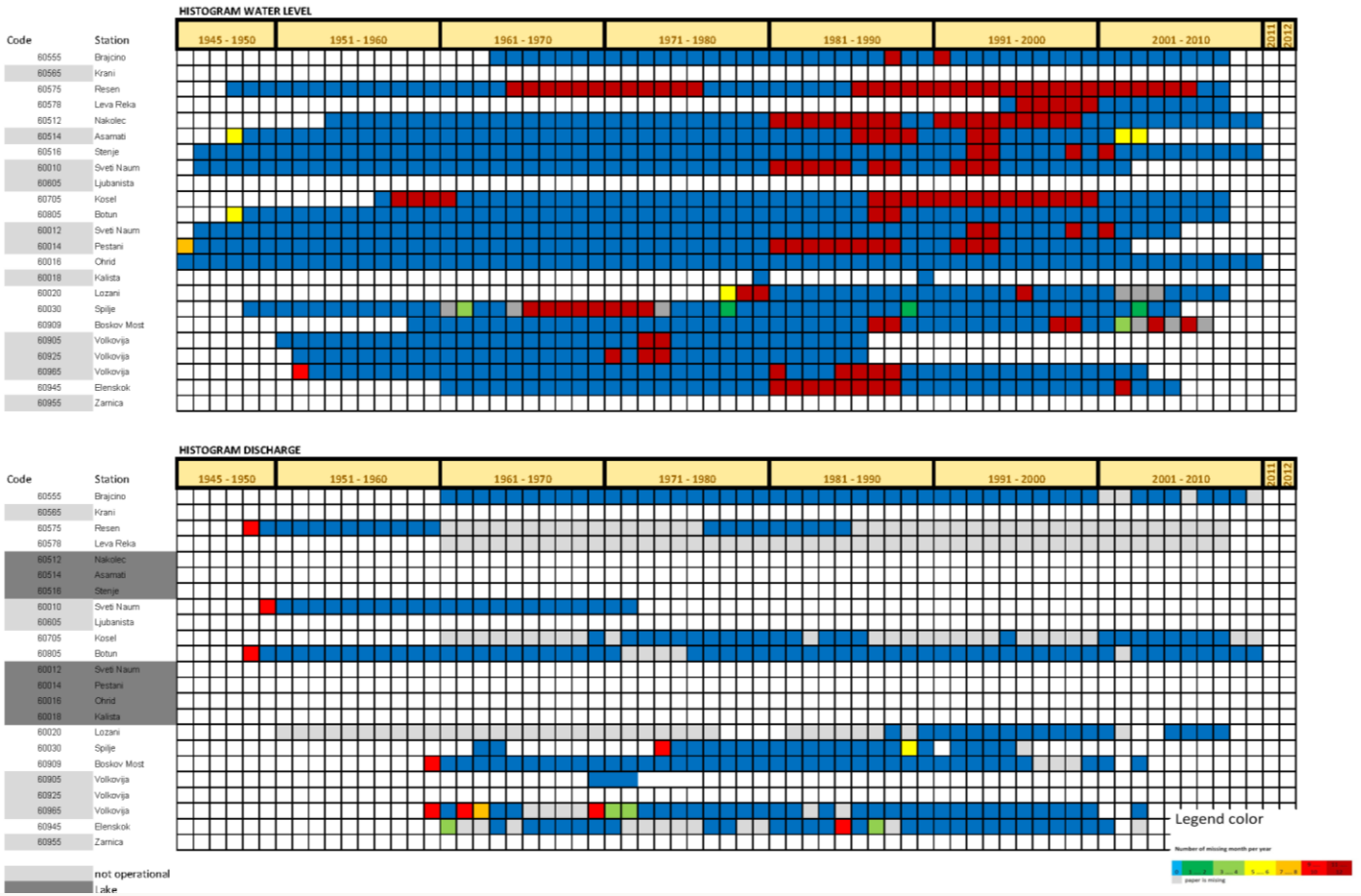
WL = Water Level

Q = Discharge

Example: Hydrometeorological Network in Macedonia

Annex A 3.2 2 / 2 Hydrometric Stations - Macedonia Histogram Water Level and Discharge

AVAILABLE ON DATABASE - PAPER



Example: Macedonia

Annex A 3.3 – Meteorologic Stations Macedonia 1 / 2

Meteo stations	Location	Location	Type	Operational period(s)	No. of parameters measured	Which parameters	Transmission of data	Actual State of station	Suggested improvement with regard to EWS
	Latitude ° ' "	Longitude ° ' "				use flag *		use flag **	use flag ***
Nakolec	40.900	21.117	P	1945-now	1	3	post	+	3
Brajcino	40.900	21.167	P	1951-now	1	3	post	+	3,4
Sveti Naum	40.917	20.750	P	1946-now	1	3	post	-	3
Stenje	40.950	20.900	P	1953-now	1	3	post	+	3
Asamati	40.983	21.050	P	1948-now	1	3	post	+	3
Pestani	41.017	20.817	P	1951-now	1	3	post	+	3
Pokrvenik	41.033	20.950	P	1951-now	1	3	post	+	3
Carev Dvor	41.050	21.017	P	1948-now	1	3	post	+	3
Resen	41.083	21.017	P	1946-1993	1	3	post	+	3
Izbishte	41.133	21.000	P	1947-now	1	3	post	+	3
Radolishte	41.167	20.617	P	1952-now	1	3	post	+	3
Openica	41.183	20.883	P	1947-now	1	3	post	+	3
Mesheishta	41.233	20.783	P	1955-now	1	3	post	+	3
Vevcani	41.233	20.600	P	1947-now	1	3	post	+	3,4
Kuratica	41.250	20.900	P	1953-now	1	3	post	+	3
Boroec	41.283	20.600	P	1947-now	1	3	post	+	3
Belcishte	41.300	20.833	P	1946-now	1	3	post	+	3
Struga	41.333	20.683	P	1945-2012	1	3	post	-	3
Izvor Kicevski	41.350	20.833	P	1952-now	1	3	post	+	3
Lukovo	41.367	20.600	P	1964-now	1	3	post	+	3
Slivovo	41.400	20.850	P	1949-now	1	3	post	+	3
Kogjagjik	41.433	20.617	P	1956-now	1	3	post	+	3

LEGEND

Flags

*

1	wind
2	temperature
3	precipitation
4	snow depth
5	radiation
6	sunshine duration
7	relative humidity
8	evaporation
9	ground Temperature

**

-- / - / 0 / + / ++

***

1	renew at same location
2	renew at different location
3	upgrade to automatically working station - data logger
4	uprade to online station
5	etc...

T - thermometric

P - pluviometric

C- climatic

M - main automatic

Overview Macedonia

Macedonia: Present Conditions with Regard to EWS

Country	Meteo-Data / Transmission	Hydrological Data / Hydraulic Data / Transmission	Database (Met&Hyd)	Num. Meteo – Forecast (focus on quant. precip.	Modeling Hydrological / Hydraulical	Flood Forecast	Flood Warning Procedure
Macedonia	About 7 meteo (=climat.) stations (part. gaps; 5 presently in operation), about 30 rain gauges (about 19 presently in operation)	About 20 - 23 stations (11 presently in operation - many located at the lakes (Ohrid & Prespa)); rating curves are missing or need update	Meteo: CliData Hydro: HydroPro (in use 2000-2005); presently data stored in EXCEL	General forecast by international forecast models (Non-hydrostatic Mesoscale Model - NMM), Global Forecast System (GFS); Europ. Centre for Medium Range Weather Forecast (ECMRW) EUMETSAT images;	No	No quantitave flood forecast, but sector of weather forecast gives "adequate" alarm	Only qualitatively by weather forecasters – based on extreme weather conditions; data send to Crisis Management Centre
Evaluation	1 - 2	1 - 2	M: 2, H: 1 - 2	1	0	1	2 - 3

0	1	2	3	4
not available / not adequate	poor	fair	good	very good

Overview Albania

Albania: Present Conditions with Regard to EWS

Country	Meteo-Data / Transmission	Hydrological Data / Hydraulic Data / Transmission	Database (Met&Hyd)	Num. Meteo – Forecast (focus on quant. precip.	Modeling Hydrological / Hydraulical	Flood Forecast	Flood Warning Procedure
Albania	About 76 meteo stations: 65 climatic / ther-mometric stations, 9 pluviometric, etc. (diff. types) Presently no online transmission, data are written into booklets; manual data transfer	Historical: 52 stations – in paper format; Presently only 1 online station, Uncomplete information about the status of stations and data trans-mission; Histogram for 1991 ff not available	Since '50 – presently no database Archived data in paper format Digitalization of period 1991 – now in process (completed) No information about rating curves	Based on intern. models – own data not in use	Hydrol. Model covering the whole Drin basin is presently built up; Hydraulic model: WB model for Lower Drin available (HECRas), own model is presently built up based on WB model	Not based on modeling, but on historical and actual data and experience	Alert levels are existing (also from experience) – Warning procedure via transmission of bulletins to ministry (2-3 times a day – in case of emergency more often)
Evaluation	1 – 2	1	2 – 3	1 – 2	1	1 -2	3

0	1	2	3	4
not available / not adequate	poor	fair	good	very good

Overview Kosovo

Kosovo: Present Conditions with Regard to EWS

Country	Meteo-Data / Transmission	Hydrological Data / Hydraulic Data / Transmission	Database (Met&Hyd)	Num. Meteo – Forecast (focus on quant. precip.	Modeling Hydrological / Hydraulical	Flood Forecast	Flood Warning Procedure
Kosovo	1 Meteo station (no online stations, 3 meas. per day) about 19 prec. stations – some have data loggers – read out once a month	In past up to about 18 stations – presently about 5 in operation - only water level – some with data logger, read out once a month; no cross sections; uncomplete rating curves (low flow only)	Meteo: Excel (2000 – 2012) Hydrol: WISKI Data base as a service – 2003 (KISTERS) currently in EXCEL, ASCII	No – general weather forecast from international models (EUMET_SAT), ETA model, MEKENZI	No	No	Only qualitatively Major flood problems in other basins
Evaluation	1	1	M: 1-2, H: 1-2	0	0	0	0

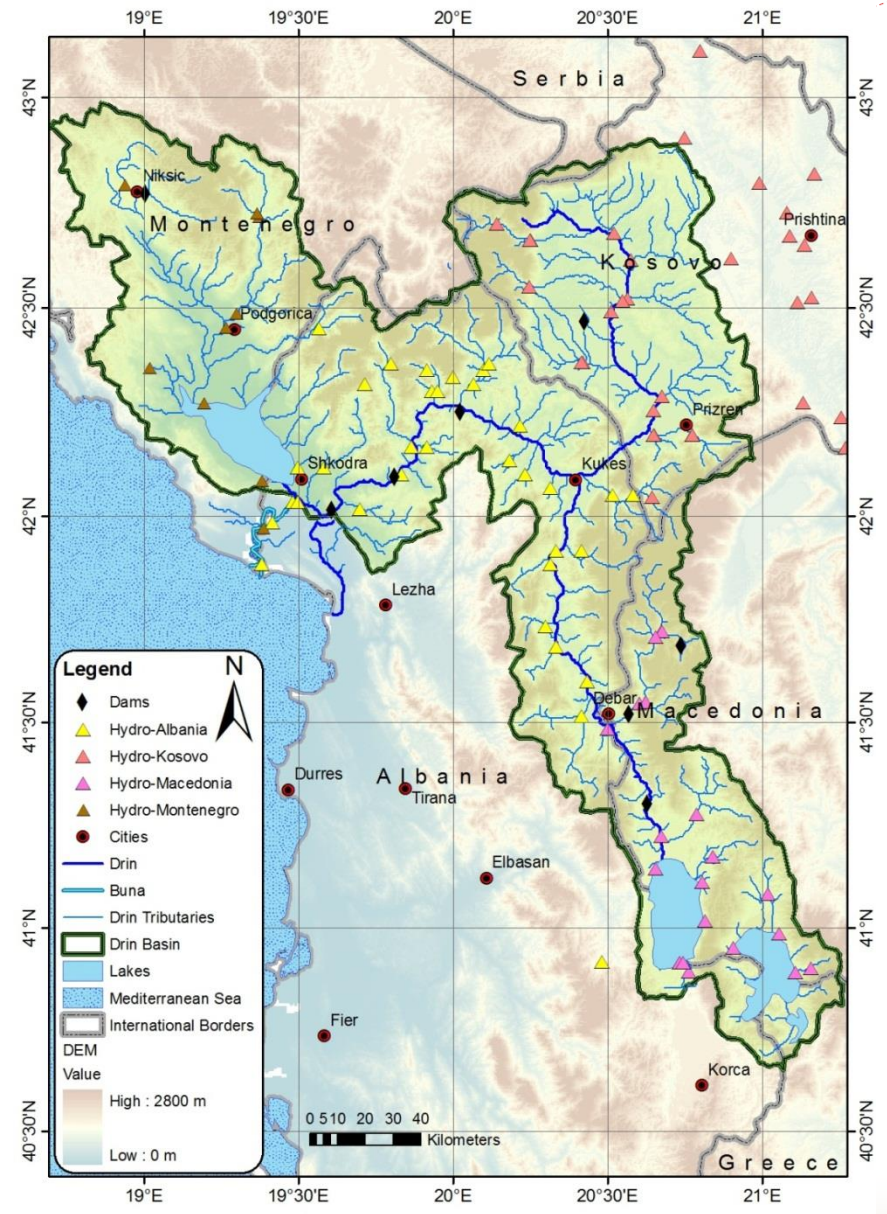
0	1	2	3	4
not available / not adequate	poor	fair	good	very good

Overview Montenegro

Montenegro: Present Conditions with Regard to EWS

Country	Meteo-Data / Transmission	Hydrological Data / Hydraulic Data / Transmission	Database (Met&Hyd)	Num. Meteo – Forecast (focus on quant. precip.	Modeling Hydrological / Hydraulical	Flood Forecast	Flood Warning Procedure
Montenegro	About 5 meteo – 2 online, 3 manually obs.; 11 rain gauging stations - manually operated and transferred by post	9 stations (all online) – but no station at Zela River Bathymetry of lake Shkoder is available (for Montenegrin part) Partially cross-sections from Buna River available	Meteo: currently CliData – since 2009; WISKI (bought 2003) but problems in applic.; EXCEL, ASCII, Hydras3 (Ott); ORACLE; Hydrol: EXCEL, ASCII and WEBSITE (online-stations); since 2002 strong decrease in data storing	Weather forecast, no numerical forecast (Non-hydrostatic Mesoscale Model; NMM ETA-model)	Currently no models in operational use In close future IHMS will receive a predictive hydrological model from Italy	Qualitative forecast based on water levels and rainfall Observations transferred to Ministry of Civil Protection (MoCP)	IHMS: Announcement to Ministry of Civil Protection (MoCP)
Evaluation	2 – 3	3	M: 3, H: 3	1	1	1	3

0	1	2	3	4
not available / not adequate	poor	fair	good	very good


Serbia
Montenegro
Kosovo
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Lakes
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International Borders
DEM
Value
High : 2800 m
Low : 0 m
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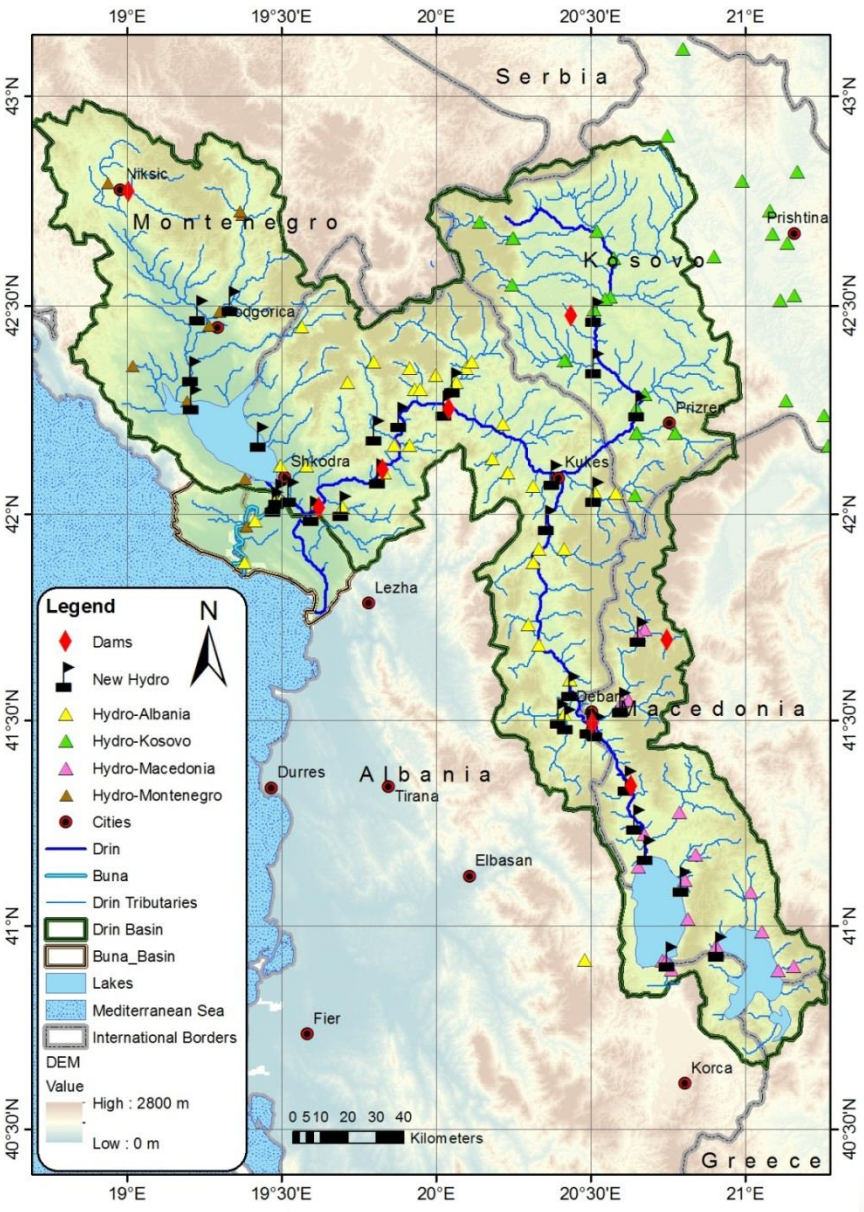
40°30'N


Serbia
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Lezha
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Durres
Tirana
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Dams
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Hydro-Kosovo
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Hydro-Montenegro
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Lakes
Mediterranean Sea
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DEM
Value
High : 2800 m
Low : 0 m
0 5 10 20 30 40
Kilometers
19°E
19°30'E
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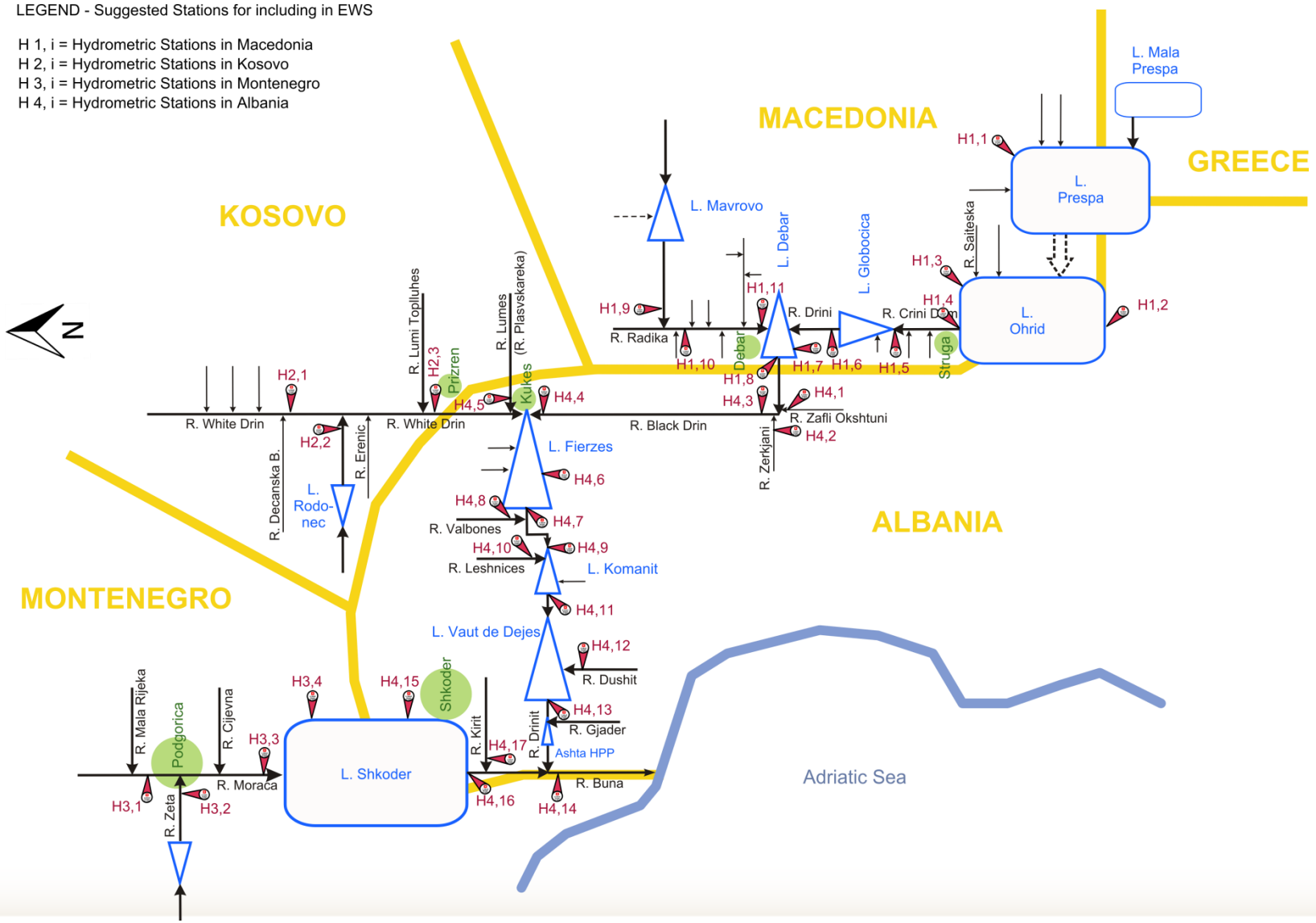
41°30'N
41°N
40°30'N


LEGEND - Suggested Stations for including in EWS
H 1, i = Hydrometric Stations in Macedonia
H 2, i = Hydrometric Stations in Kosovo
H 3, i = Hydrometric Stations in Montenegro
H 4, i = Hydrometric Stations in Albania
MACEDONIA
GREECE
KOSOVO
ALBANIA
MONTENEGRO
N
L. Mala Prespa
L. Prespa
L. Ohrid
L. Mavrovo
L. Debar
L. Globocica
R. Saiteska
R. Drini
R. Crini Drim
R. Radika
Debar
Struga
H1,1
H1,2
H1,3
H1,4
H1,5
H1,6
H1,7
H1,8
H1,9
H1,10
H1,11
R. Lumi Topliuhes
R. Lumes (R. Plasvskareka)
Prizren
Kukes
R. White Drin
R. Black Drin
R. Decanska B.
R. Erenic
L. Rodo-nec
L. Fierzes
R. Zerkjani
R. Zafli Okshtuni
H2,1
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H4,16
H4,17
R. Valbones
R. Leshnices
L. Komanit
L. Vaut de Dejes
R. Dushit
R. Gjader
R. Dinit
Ashta HPP
R. Buna
Shkoder
R. Kiri
L. Shkoder
R. Mala Rijeka
Podgorica
R. Cijevna
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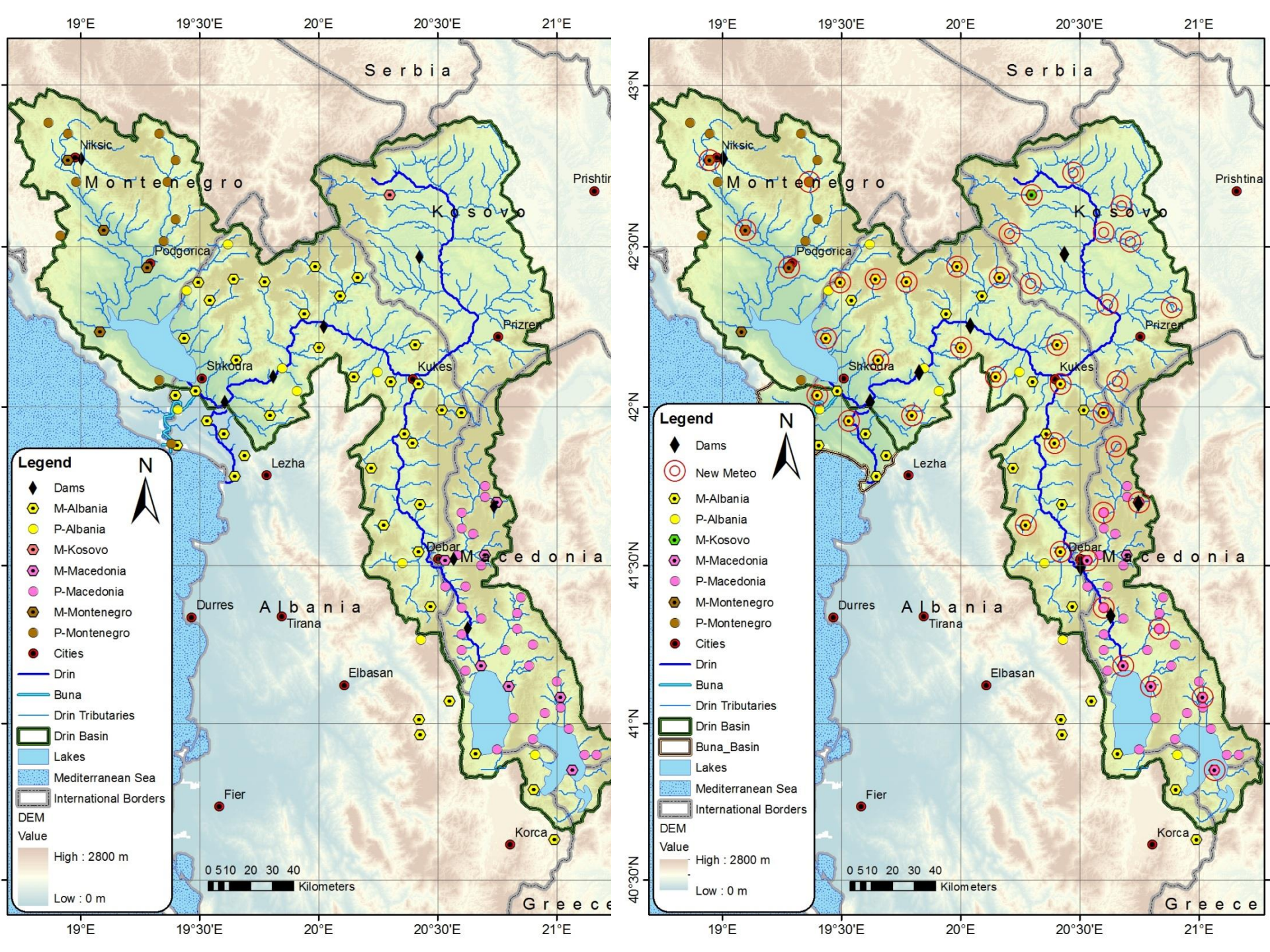
R. Zeta
H3,1
H3,2
H3,3
H3,4
Adriatic Sea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Albania
Greece
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Shkodra
Kukes
Lezha
Debar
Durres
Tirana
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Dams
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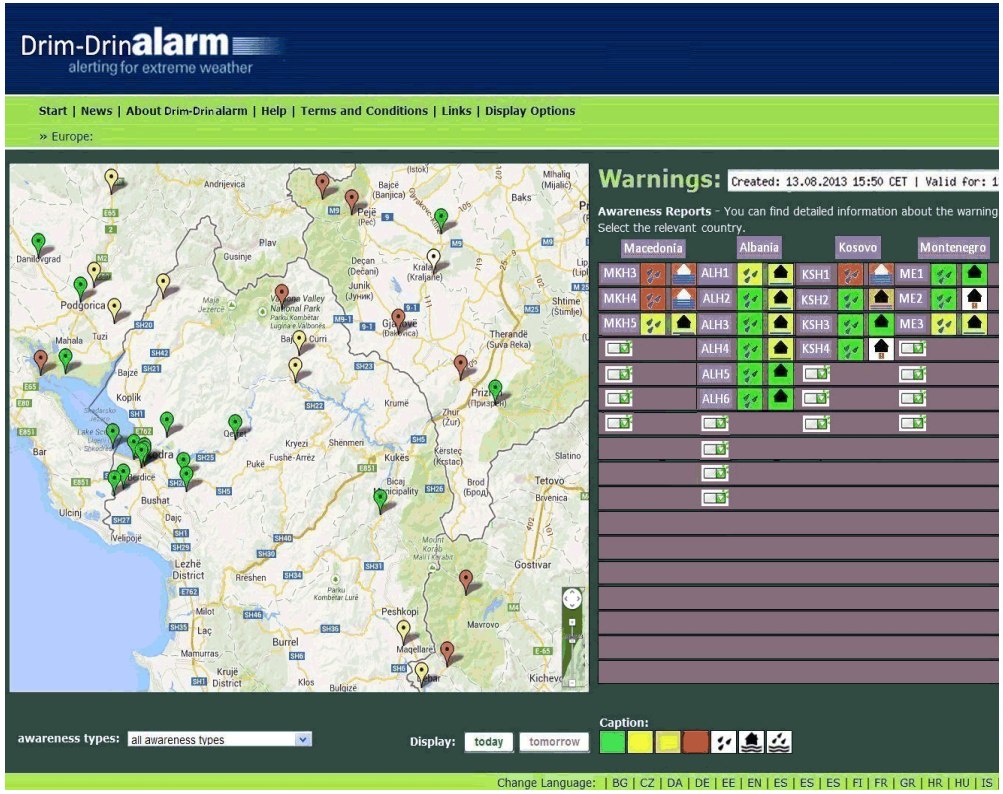
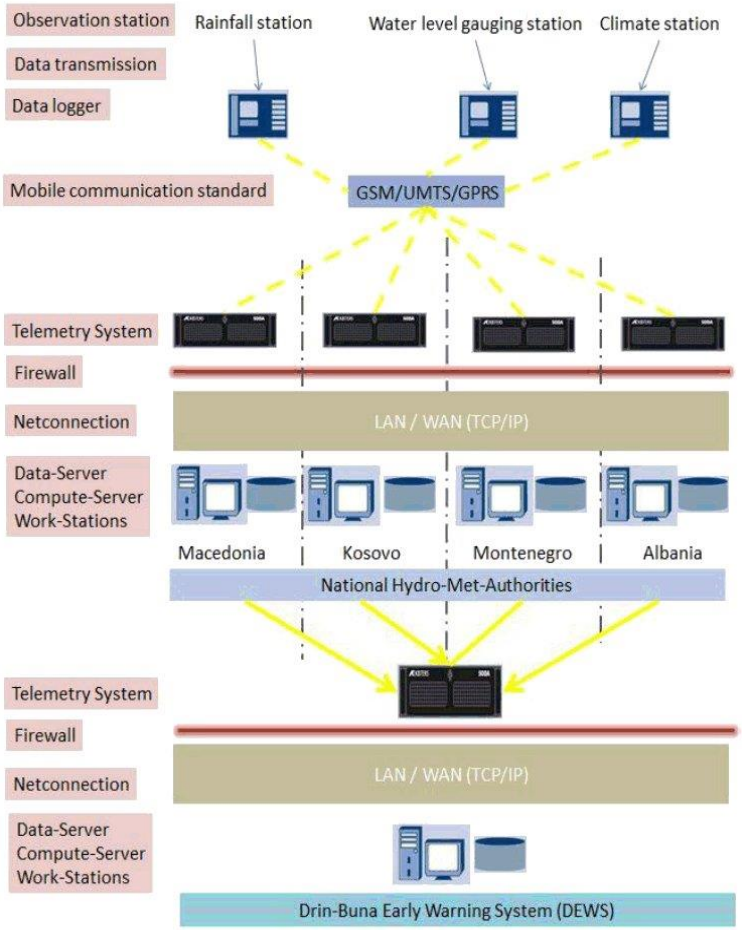
P-Albania
M-Kosovo
M-Macedonia
P-Macedonia
M-Montenegro
P-Montenegro
Cities
Drin
Buna
Drin Tributaries
Drin Basin
Buna_Basin
Lakes
Mediterranean Sea
International Borders
DEM
Value
High : 2800 m
Low : 0 m
0 5 10 20 30 40
Kilometers

Outlook- Regional IT





Next steps and recommendations

- **HMS's** need to get adequate resources (technical and financial)- without adequate resources HMS's cannot fulfill their mandate
- Upgrade of hydrometeorological networks and IT systems
- Regular field campaigns for: flow measurements and continuous maintenance of networks
- Digitizing historic data
- **Hydropower**- Dam management and data exchange in countries
- **Regional Cooperation**→ need for framework/protocol for data sharing

For discussion

1. What are further gaps on regional, national and local level?
2. What is already initiated? Overview of activities in the countries
3. How to foster regional cooperation?
4. What are next steps to be taken on national and regional level?