

The Danube River Basin

Mitja Brilly

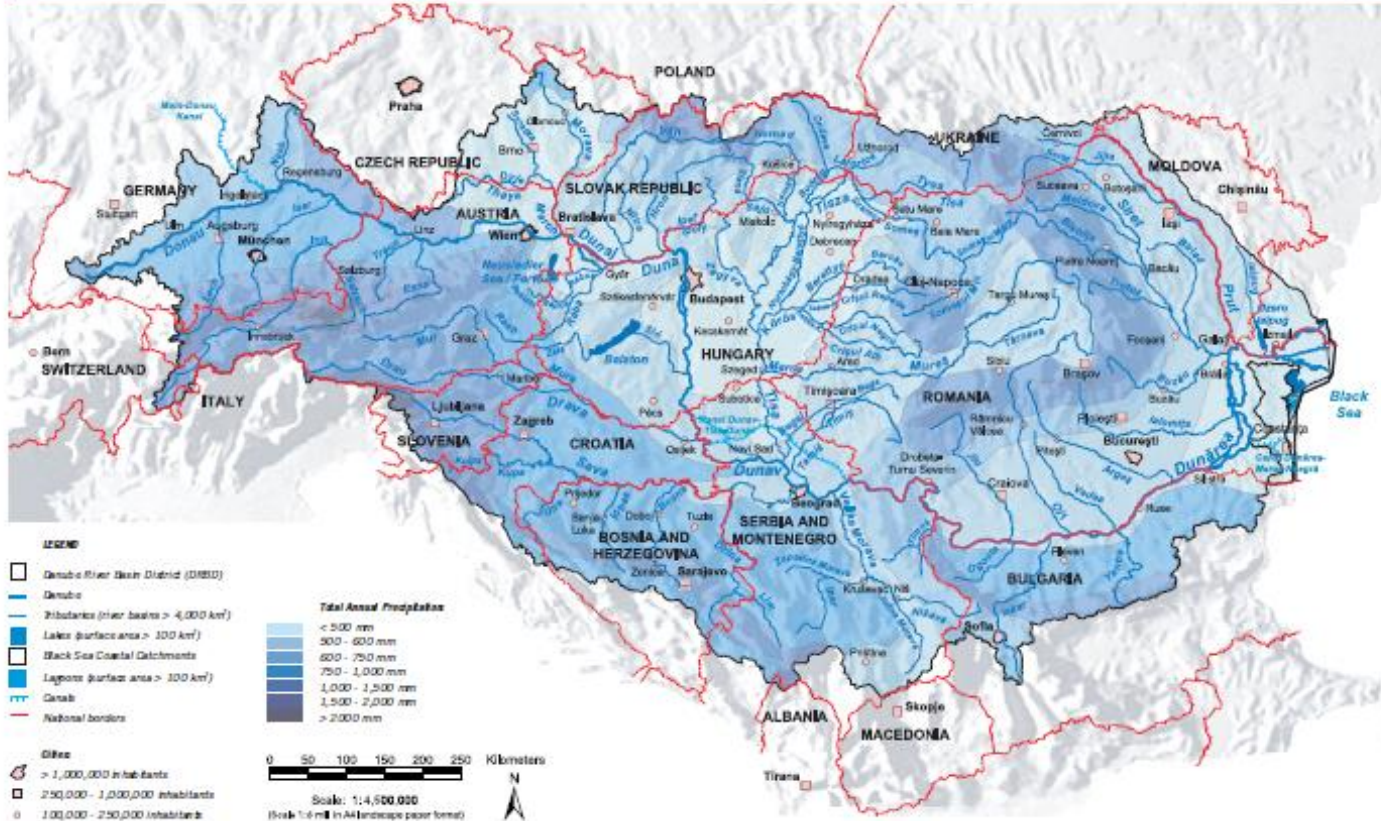
University of Ljubljana

IHP UNESCO

Precipitation of DRB

Danube River Basin District: Annual Precipitation

MAP 3



The data was derived from the Atlas of the Danube Countries (Map 1.63 Annual Precipitation, DRBD). The time series covers the period from the 1950s to the 1990s. The precipitation figures involved in regional landscape-levels (based on UNEP/WHO Danube Pollution Reduction Programme, 1999, Map 2 Geographical Indicators: Geomorphological Regions and Annual Precipitation) and do not represent precipitation values. Further details are contained in the National reports (Part 03).

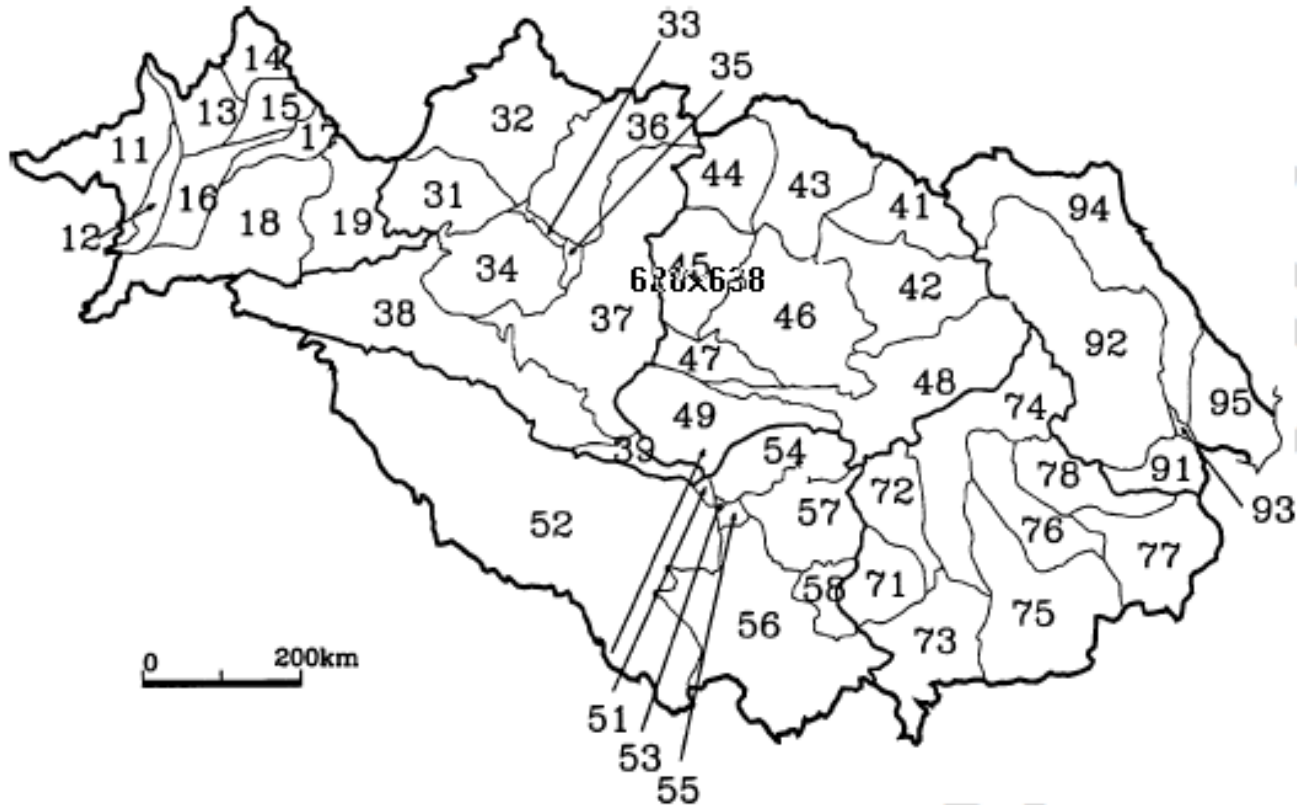
Product of KPOB, Vienna

The product includes geographical data licensed from European National Mapping Agencies: GeoDatabase v2.0 (GeoGeographical) was used as the basic topographic base for DE, AT, CZ, IT, SI and HR. The data for the other countries is based on MAP/Level 0 data from NMA. The outer border of the DRBD is based on national information from DE, AT, CZ, SK, SI, HR, BA, CS, BG, RO, UA and ME. For PL, AL, MK and IT the data of the European Commission Joint Research Centre was used.

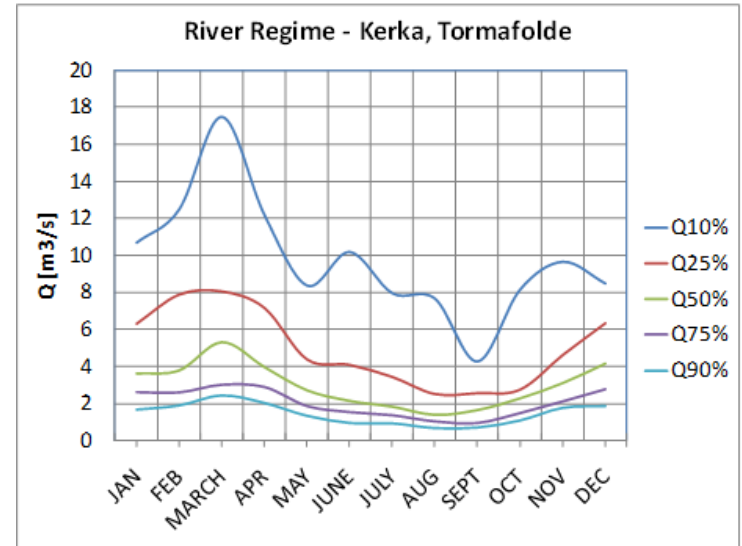
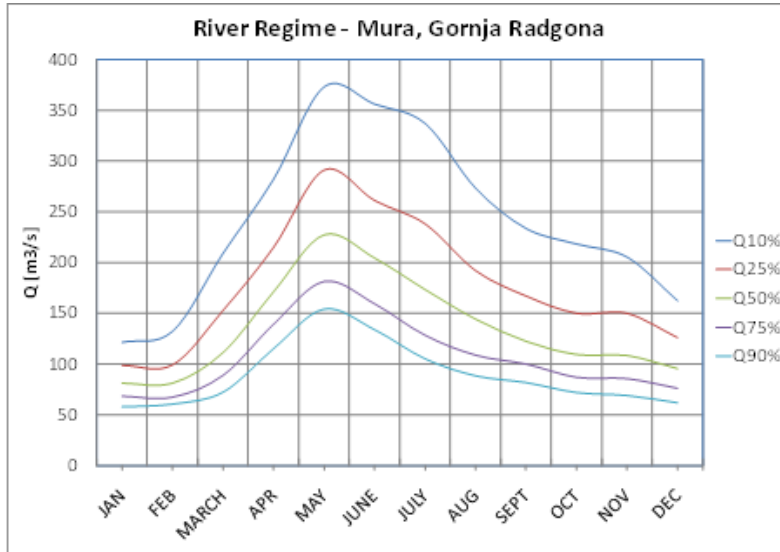
Revised by: FWWWS, Vienna, June 2005. The production of the map was financially supported by:



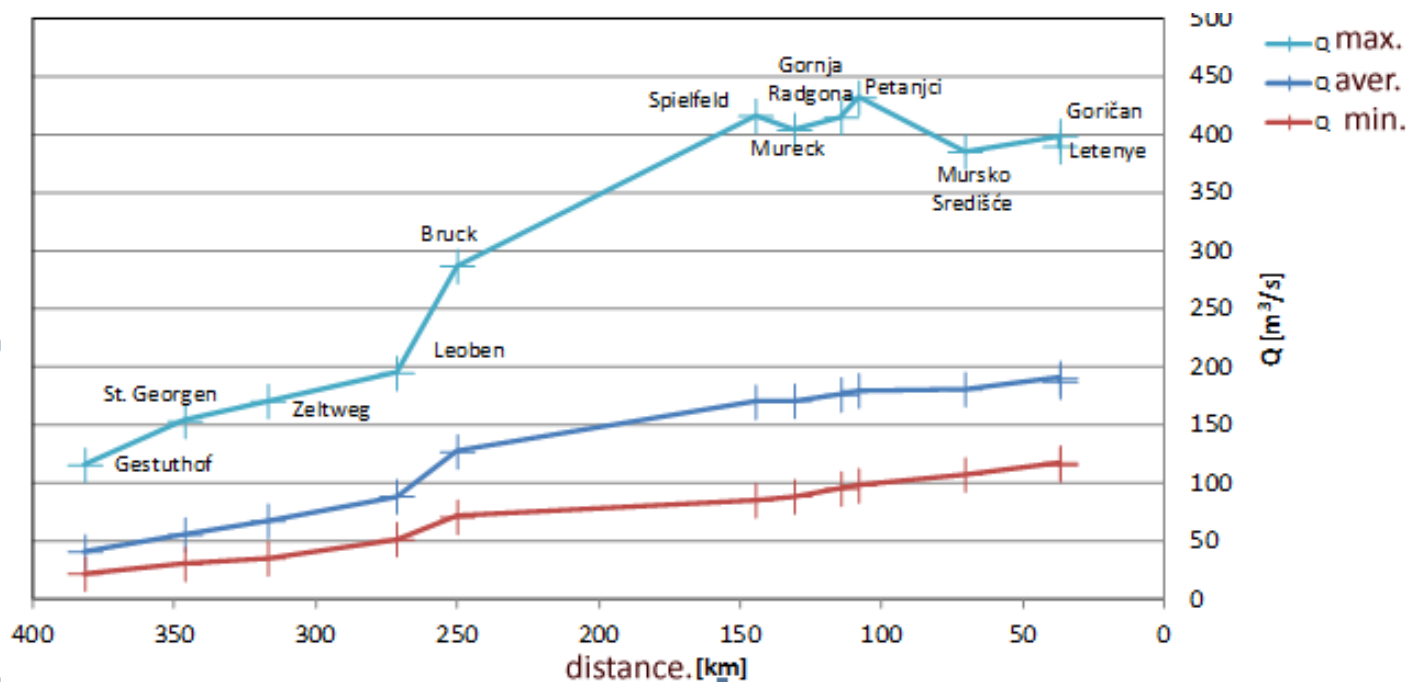
Large international tributaries



The Mura River



The Mura River



The Danube cooperation

- the Danube Commission 1948
- The Regional Hydrological Cooperation of the Danube Countries in the framework of the IHP – UNESCO - 1974
- ICPDR - International Commission for Protection of Danube River 1994

Meja Brilly (Ed.)



Hydrological Processes of the Danube River Basin

Perspectives from
the Danubian Countries

 Springer

recent development

FLOOD REGIME OF RIVERS IN THE DANUBE RIVER BASIN

Ch1: Average daily discharge and annual peak discharge series collection.

Ch2: Analysis of homogeneity of annual time series.

Ch3: Analysis of cyclicity and long-term trends of annual series, and Qmax series.

Ch4: Analysis of the intra-annual regime changes based on monthly series.

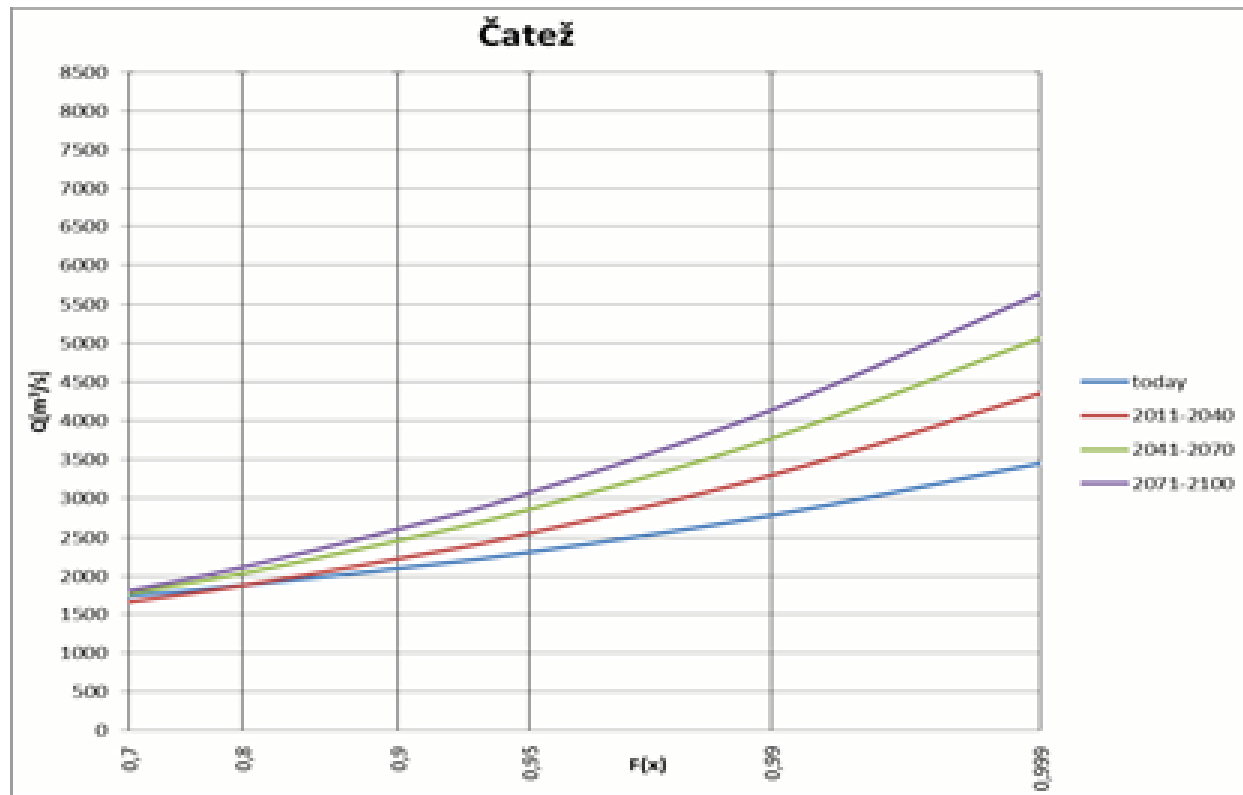
Ch5: Development of relations between values of NAO, QBO and SO indexes and discharge series.

Ch6: History and propagations of Danube floods.

Ch7: Statistical analyses of extreme discharges.

Ch8: Regionalization of flood regimes according to magnitude of fluctuations, NAO, and their synchronicity

Probability diagram of peak discharges on WS Čatež

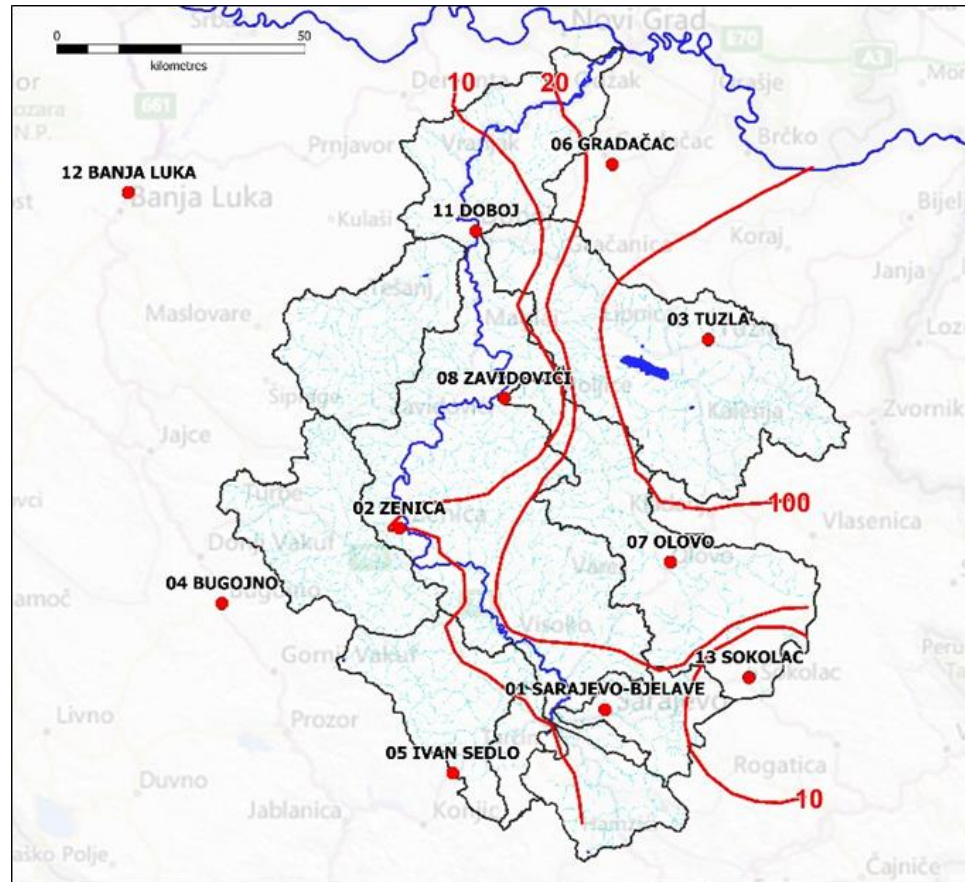


Adaptation measures

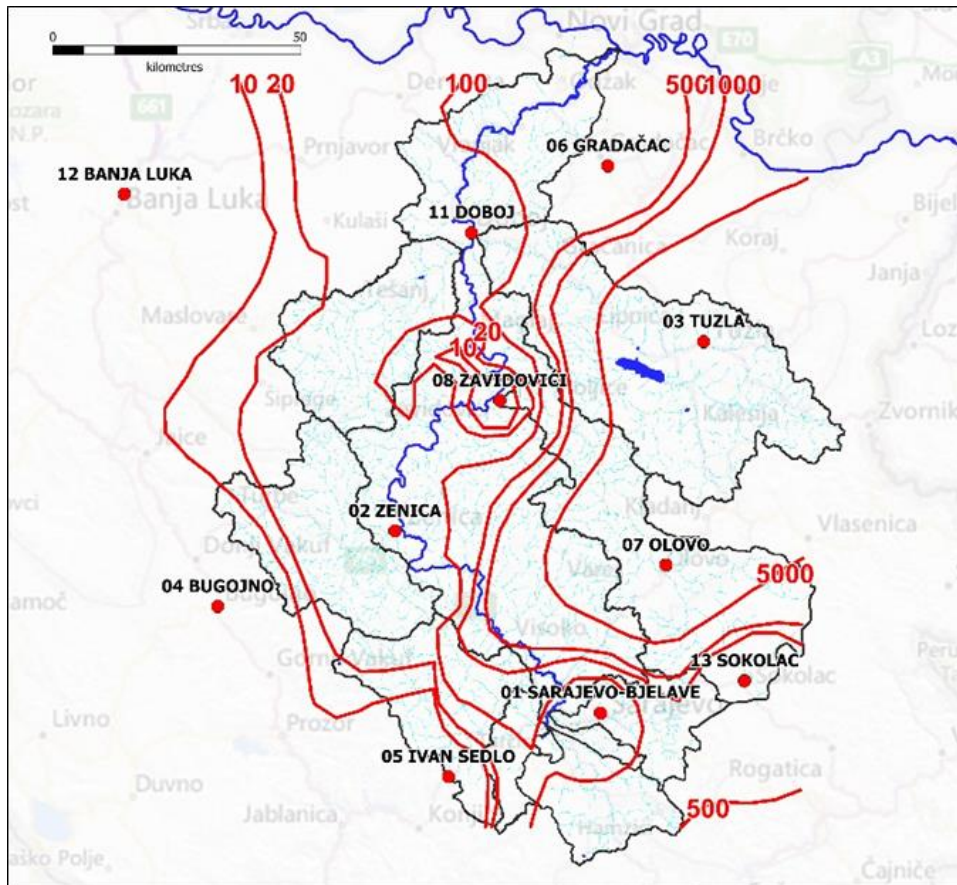
1. Institutional strengthening
2. Determination of cross sections for monitoring changes in the morphology of the river bed
3. The development of hydrologic models for the prediction of flood flows
4. Development of hydraulic models for calculating water levels along the Sava River and the tributaries

5. Increase of the level of protection of major cities along the Sava River: Belgrade, Zagreb and Ljubljana.
6. Giving more space to rivers, by deepening and widening of the river channel; increasing the floodplains by lowering the surface and the movement of dams; removal of structures that impede water flow.
7. Protection of agricultural areas should be kept on today's level or even at a lower level
8. Integration of flood protection measures with water management, Water Framework Directive and sustainable development.

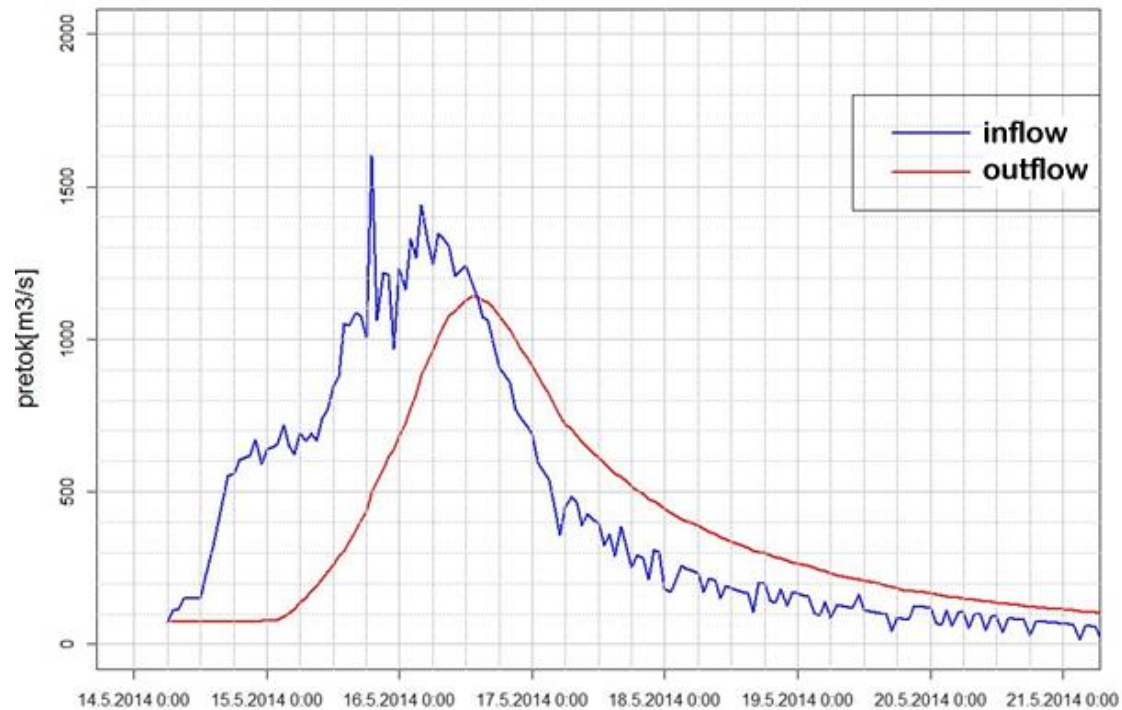
One day precipitation



Two days precipitation



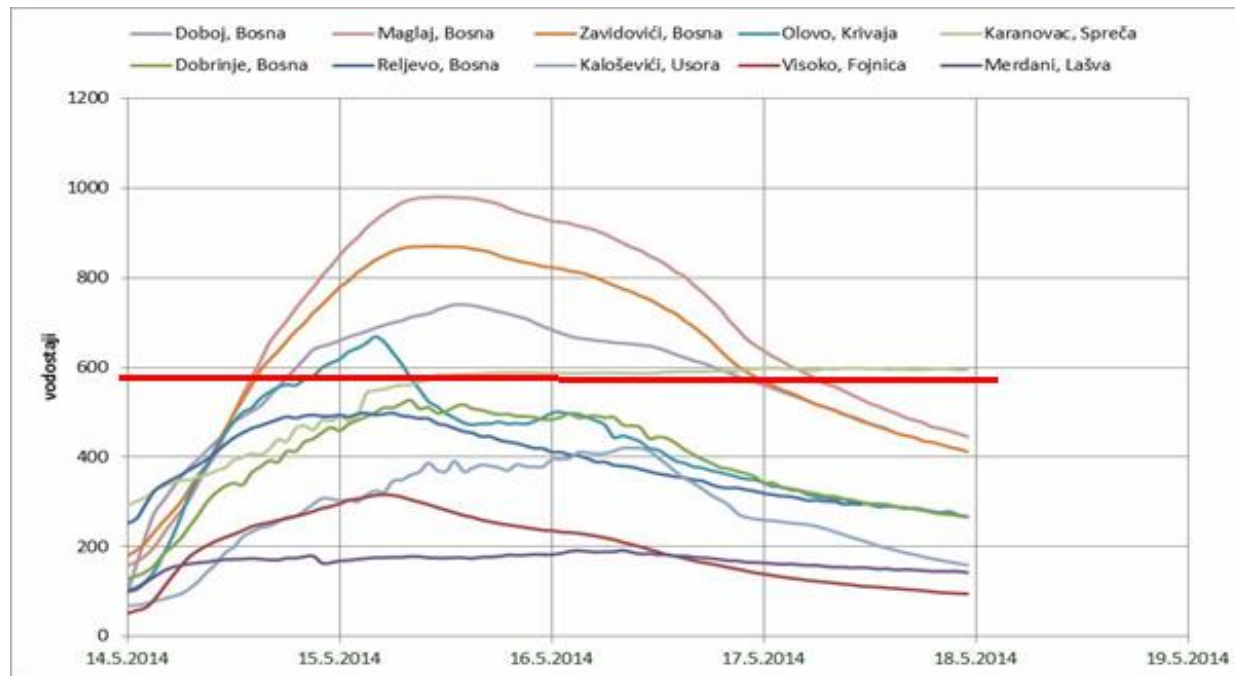
The Modrac water storage



Probability of maximum flows

Return period	Modriča	Doboj	Maglaj	Zavidovići	Raspotočje	Dobrinje	Reljevo
10	2214	2091	1508	1164	904	600	345
20	2551	2420	1764	1320	1039	717	400
50	2990	2795	2120	1520	1220	880	464
100	3318	3087	2479	1673	1360	1058	510
2014		4300	3578	2525		1608	439,7

Measured water levels



Always take a full picture in mind!

