

Climate change impacts on flooding scenarios

Venice 19 - 20.09.2013



Case studies

- The Sava River Basin
- The Vipava/Vipacco River Basin

Hypothesis

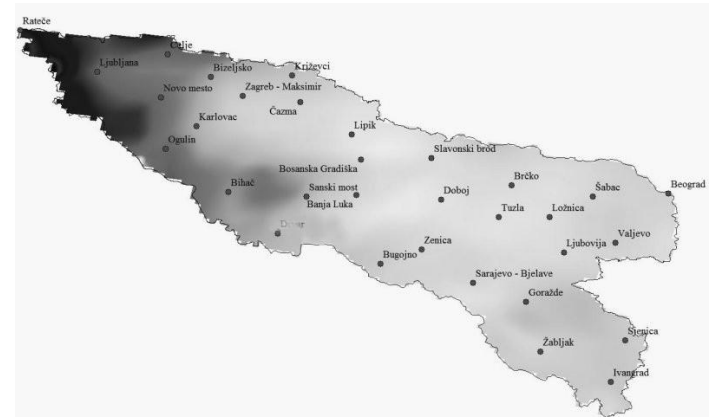
- the probability of occurrence of floods cause by particular probability of precipitation in the basin will not change due to climate change, and
- the characteristics of the river basin will not change in the future, due to climatic or anthropogenic influences.

Background of UNECE project

- Jupp, T. E. (2011): Water and Climate Adaptation Plan for the Sava River Basin, University of Exeter, Exeter, Devon EX4 4QF, UK, World Bank.
- Meerbach, D., Hancock, I. and Powell, A. (2010): Climate Trends in the Sava River Basin, World Bank.
- Climate change modelling and downscaling by E-OBS data

Project component A3

- **A3:** Compilation of various **existing climate change scenarios** for the region, their **impact on frequency and magnitude of extreme flood events**
 - Downscaling the global climatic scenarios into a scale appropriate for the Sava River Basin by set of E-OBS data
 - Preparation of an overview of existing hydrologic scenarios of changes in maximum/flood flows induced by climate change
 - Evaluation of the corresponding changes in probability curves and water levels



Component A5 - Conclusions

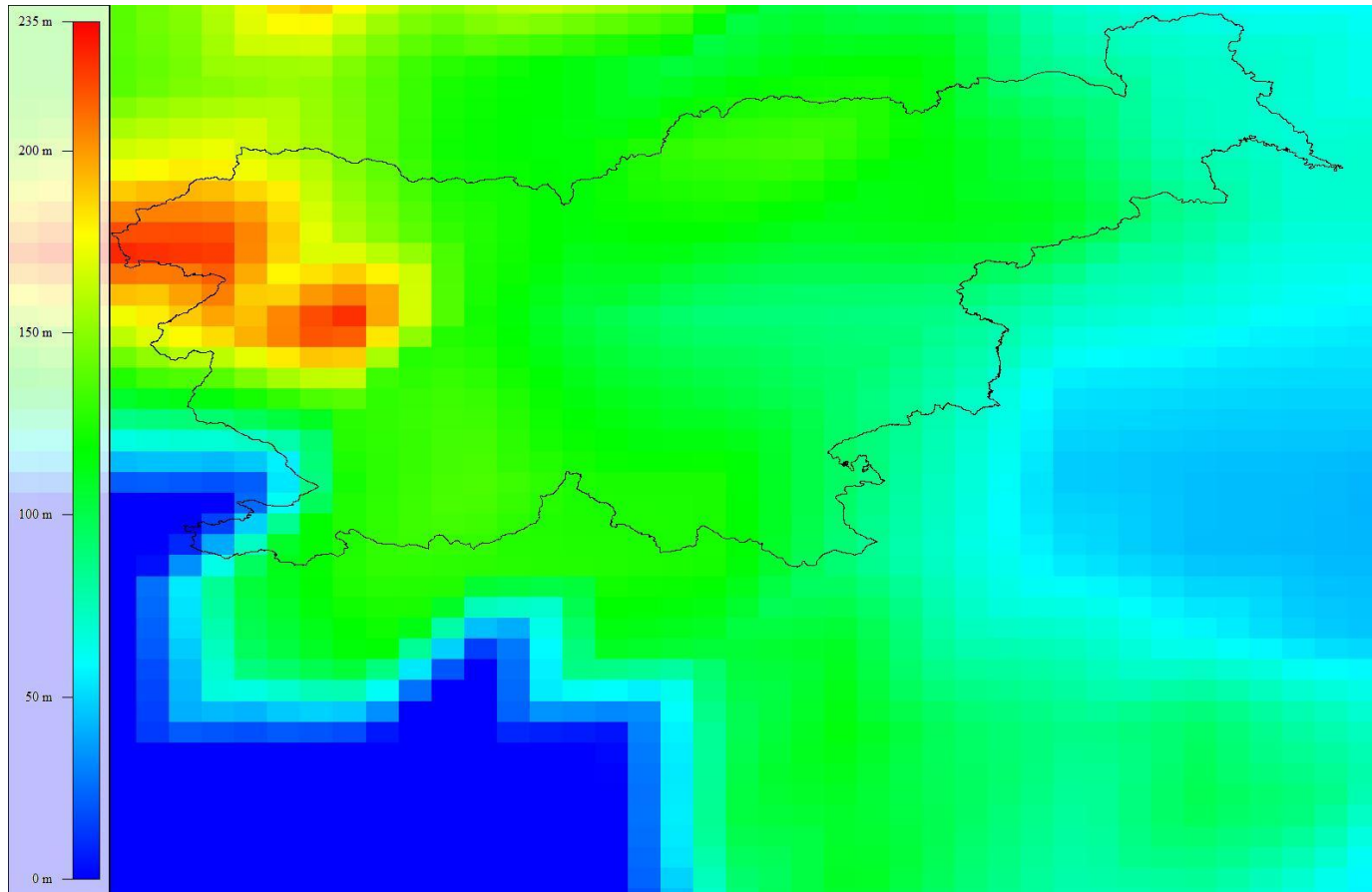
- **A5:** Preliminary identification of possible **adaptation measures**
 - development of common integrated alarm system
 - integrated flood risk management and integration of water management in spatial planning
 - reconstruction and maintenance of existing flood protection system



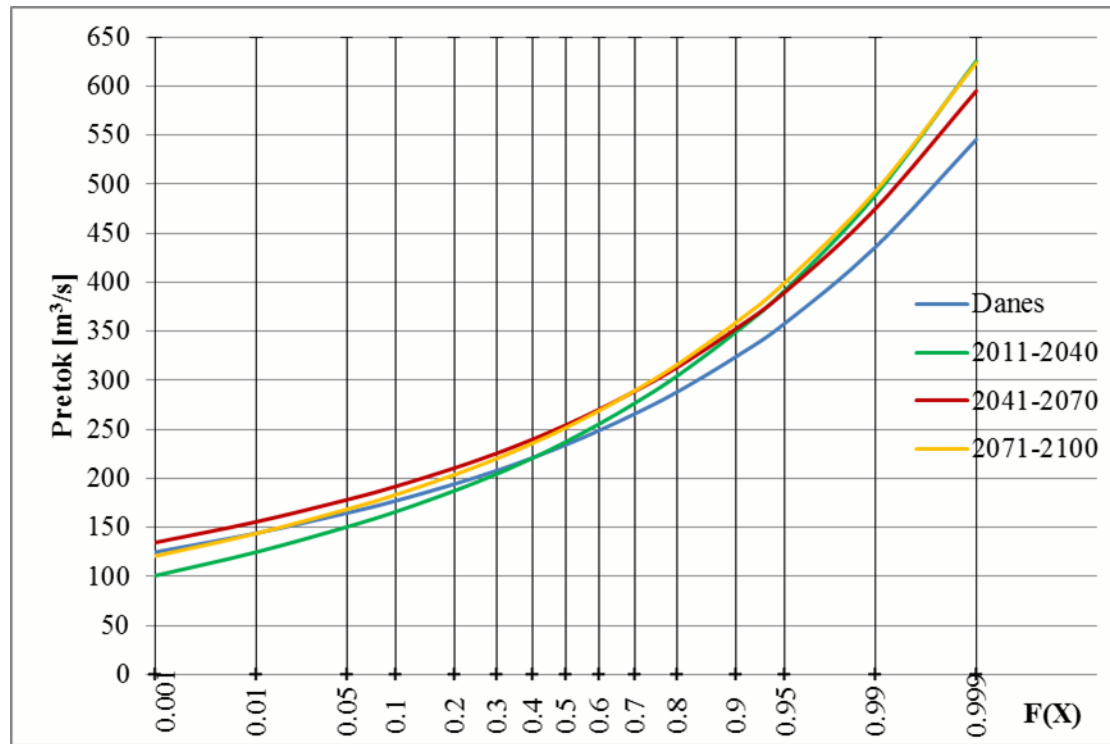
Lessons learned

- Climate change has significant impact on flood hazard and should be considered by almost all the flood risk measures
- Implementation of flood risk management measures takes a lot of time
- Multilevel integrated approach is essential for development
- Data collection is a challenge
- The basic premises should be adjusted to the future stage of development
- Sava Commission is a good framework for the coordination of projects integrated on the Sava RB level
- Engagement of local experts is crucial for the project success
- PEG FP of the ISRBC as a project steering group played an important role
- Final workshop triggered a wide discussion between the interested stakeholders

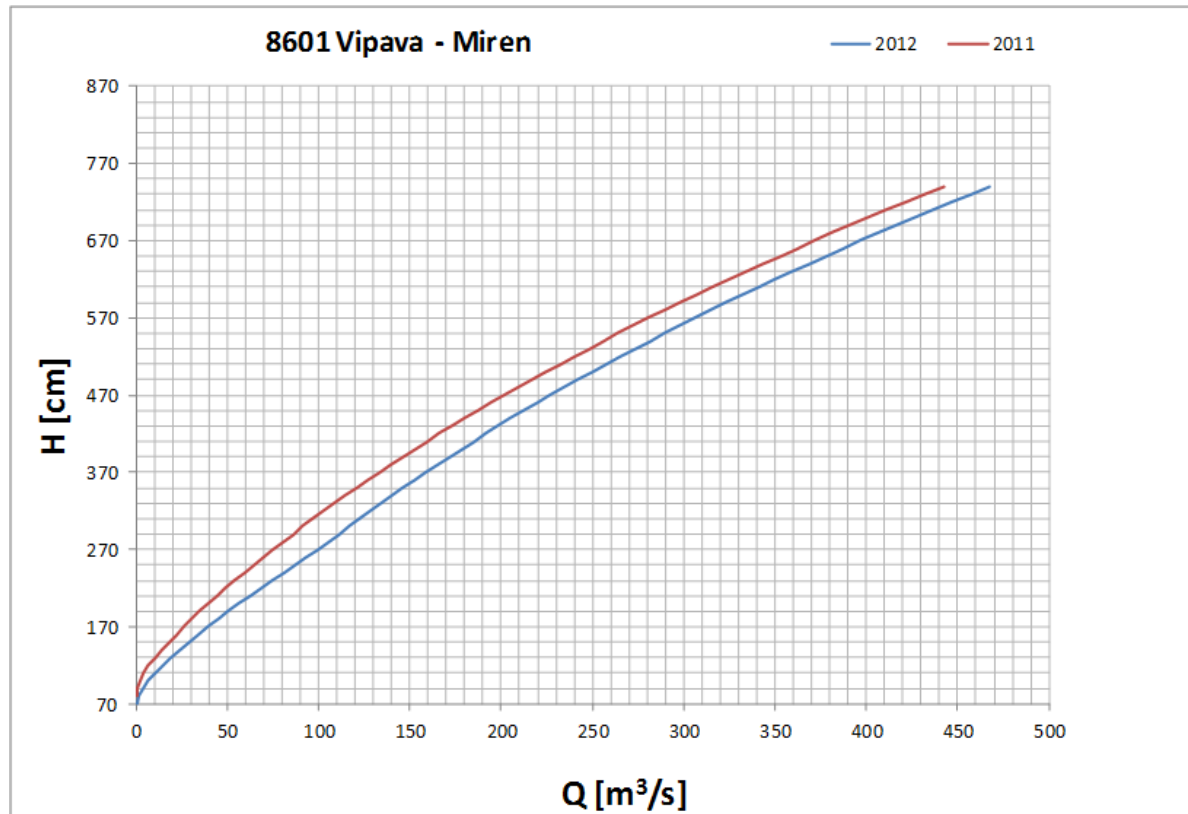
E-OBS autumn daily maximum rainfall with 100 years return period



Gumbel flood discharge probability functions for WS Miren including climate change



WS Miren rating curve from years 2011 and 2012



What we learn

The Climate change will increase flood hazard significantly. The hundred years return period event today could be only ten years return period flood event to morrow.

Vulnerability also changes in time, urban areas and transport structures are more vulnerable and agriculture areas are less vulnerable than in the past.

Solutions should integrate flood risk management, spatila planing and water management.

The outflow of the Vipava/Vipacco River is under strong impact of water level of the Soča/Isonzo River. The flood peaks on confluence have small time lag. Probability of flood in the confluence is function of discharges in both river and their coincidence. The backwater influence is significant on few kilometers upstream of the confluence.

There is also some unknown difference in ground elevation measurement between countries. Difference could be from few centimeters up to 40 centimetrs.