Optimisation of groundwater resources exploitation in the eastern part of the Czech-Saxon borderlands

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Groundwater
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INTRODUCTION

The main objective of joint Czech-German project is the calculation of the water balance of transboundary aquifer in the region of Saxony. The motivation for this project was repeated extreme droughts in 2014 and 2015 in Central Europe. The lack of rainfall negatively impacted particularly on vulnerable quaternary aquifers and in the shallow subsurface hardrocks aquifer.

Decline in groundwater levels in the major sedimentary basins has also been registered. According to current calculations, global warming reflected in the overall water balance in Central Europe an annual loss of 5 mm. With regard to the negative impacts of climate change, deep ground water resources in Czech Cretaceous Basin are becoming for both countries important strategic resource.

PILOTE SITE
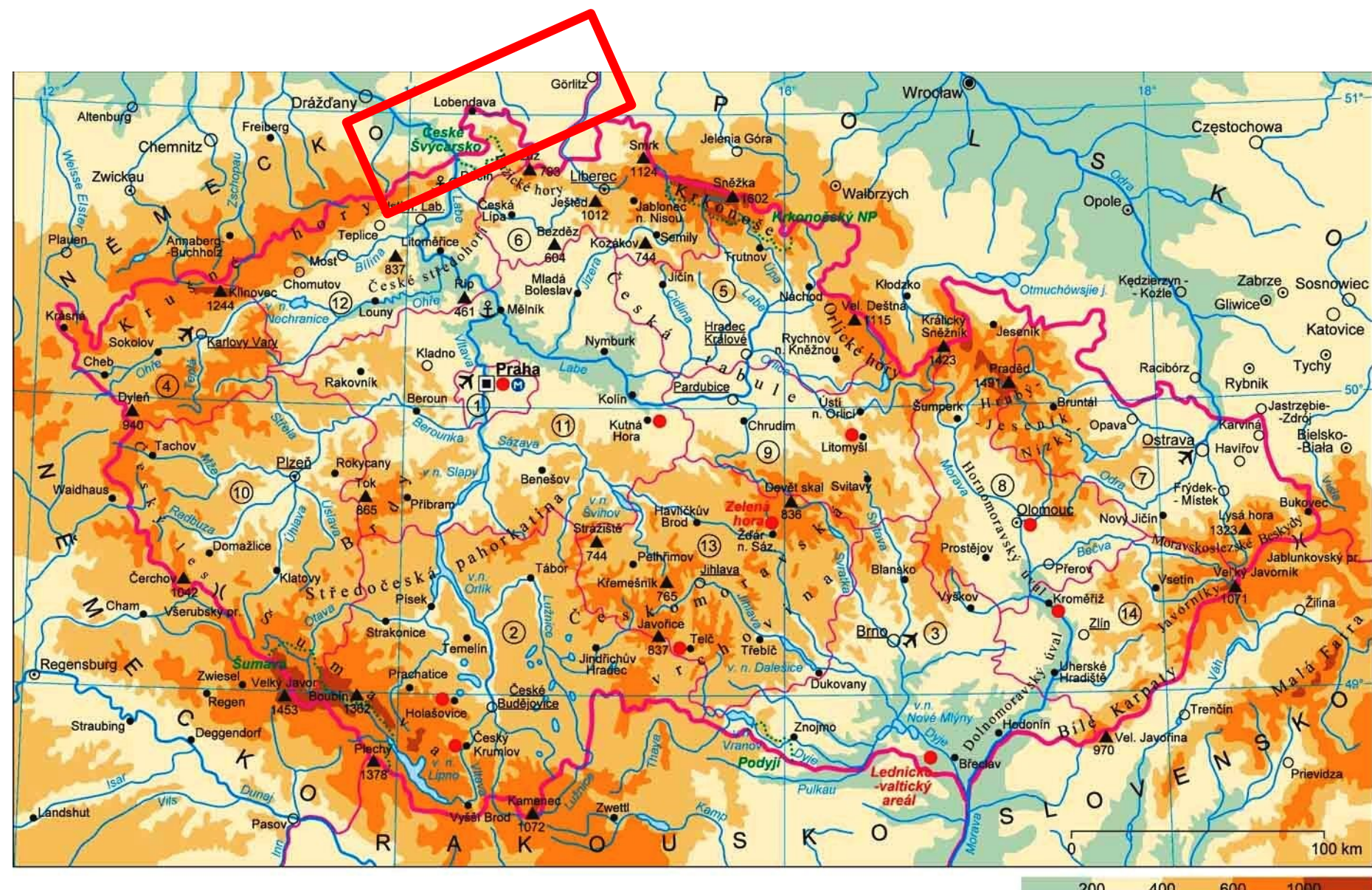
Bohemian Cretaceous basin is most important water management unit in the Czech Republic
the total thickness of predominantly sandstone sediments is up to 1000 m
The highest yields in the order of tens of l / s have aquifers on the border with Germany
Until now, the use of these strategic groundwater resources has not been coordinated
Given the lack of water on both sides, there is a risk of cross-border conflicts - influencing groundwater levels
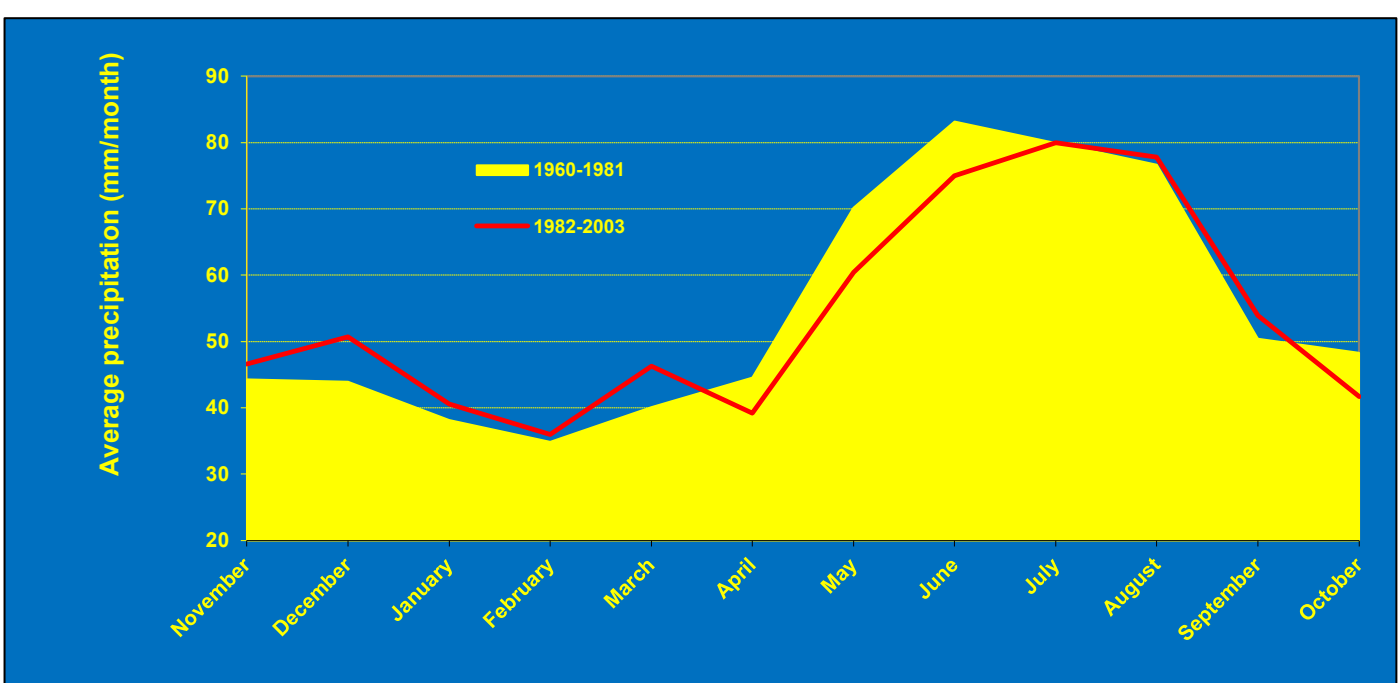
Changes of precipitation distribution between 1960 – 2003 in Czech Republic

Since the mid-1980s, there has been a statistically significant rise in water vapor due to an increase in air temperature - an increase of approximately 5 mm per year

METHODOLOGY

2017
Unification of Czech and German interpretation of geological structure. Geological model of the pilot site is the output

- Based on the unified geological data hydrogeological concentual model is compiled. Main cross-border aquifers and aquitards are defined,

Joint hydrogeological database is created including all hydrogeological wells and springs data, series of water abstraction information, climatological data and surface water flow data

2018
Water balance and soil models will be compiled as the infiltration input to hydraulic model

3D hydraulic hydrogeological model will be compiled and will be calibrated. His simulations and calculation of static and dynamic groundwater resources will be based on several climate scenarios. The model will be also able to simulate various landuse scenarios and includes a wide range of demographic and socio-economic development scenarios in both countries. All these factors will have a decisive impact on future water consumption in different spheres of national economy, especially in industry, agriculture.

2019
Based on the calibrated model several water management scenarios will be tested with the participation of endusers from both countries.

Decision support system allowing to optimize the exploitation of Czech Cretaceous basins simultaneously in Germany and in the Czech Republic will be the final output

EXPECTED RESULTS

❑ Climate change is manifested in Central Europe by more frequent occurrences of climatic extremes, most recently drought.

❑ This raises the demands for the use of groundwater resources, which receive the status of strategic resources.

❑ The on-going cross-border project demonstrates the possibilities of negative impacts mitigation on groundwater water resources..

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