Impact of the flood from 2010 on the groundwater level in the Rye Island

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In the beginning of June 2010, almost 50-year flood discharge was achieved in Komárno on the Danube River, which contributed to the increase in water levels in the lower part of the Váh River. The impact of the flood situation from the 2010 on the groundwater level in the Rye Island was solved using the MODFLOW numerical model in the Groundwater Modeling System (GMS) environment.

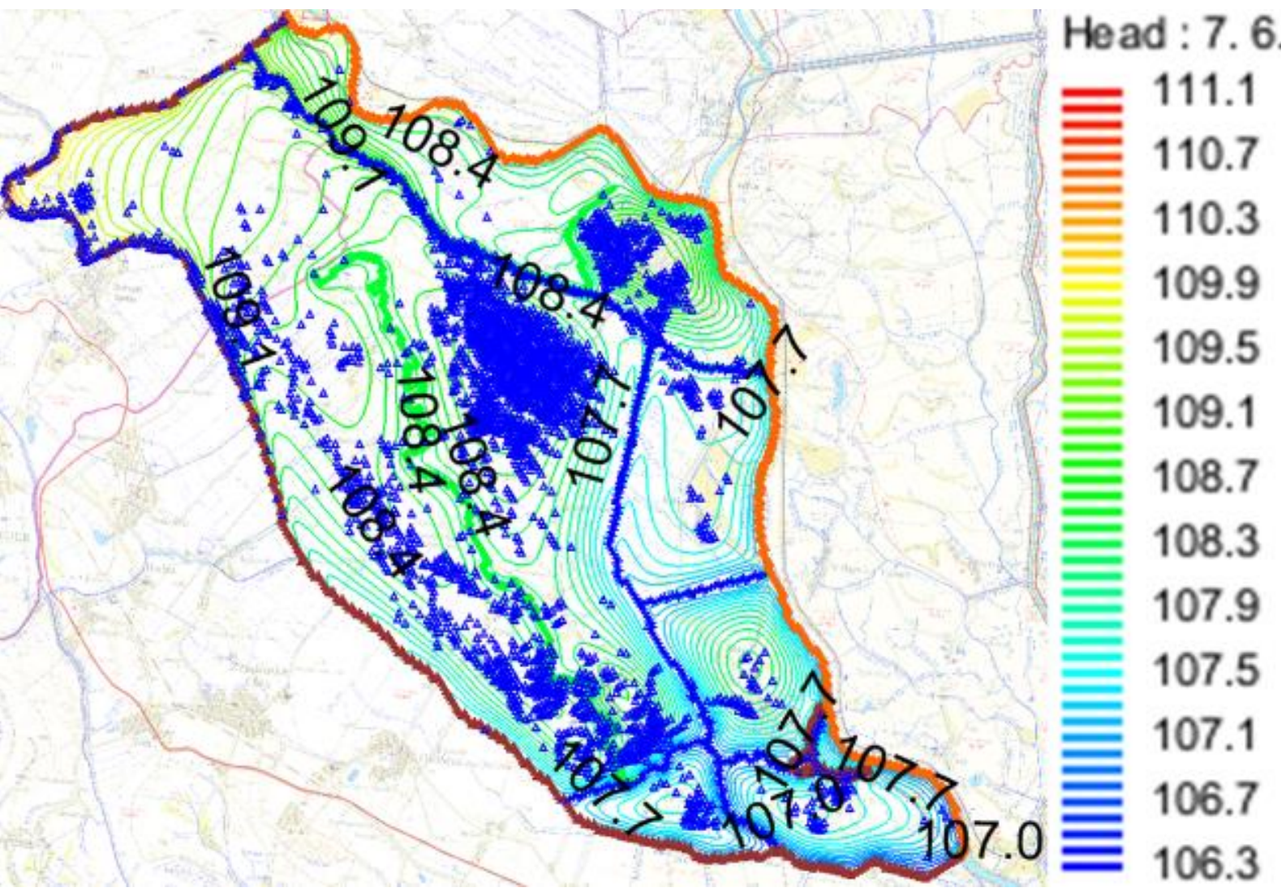

Fig. 1. Map of calculated piezometric head for June 7, 2010 [m a. s. l.] (**Δ** – flooded areas)

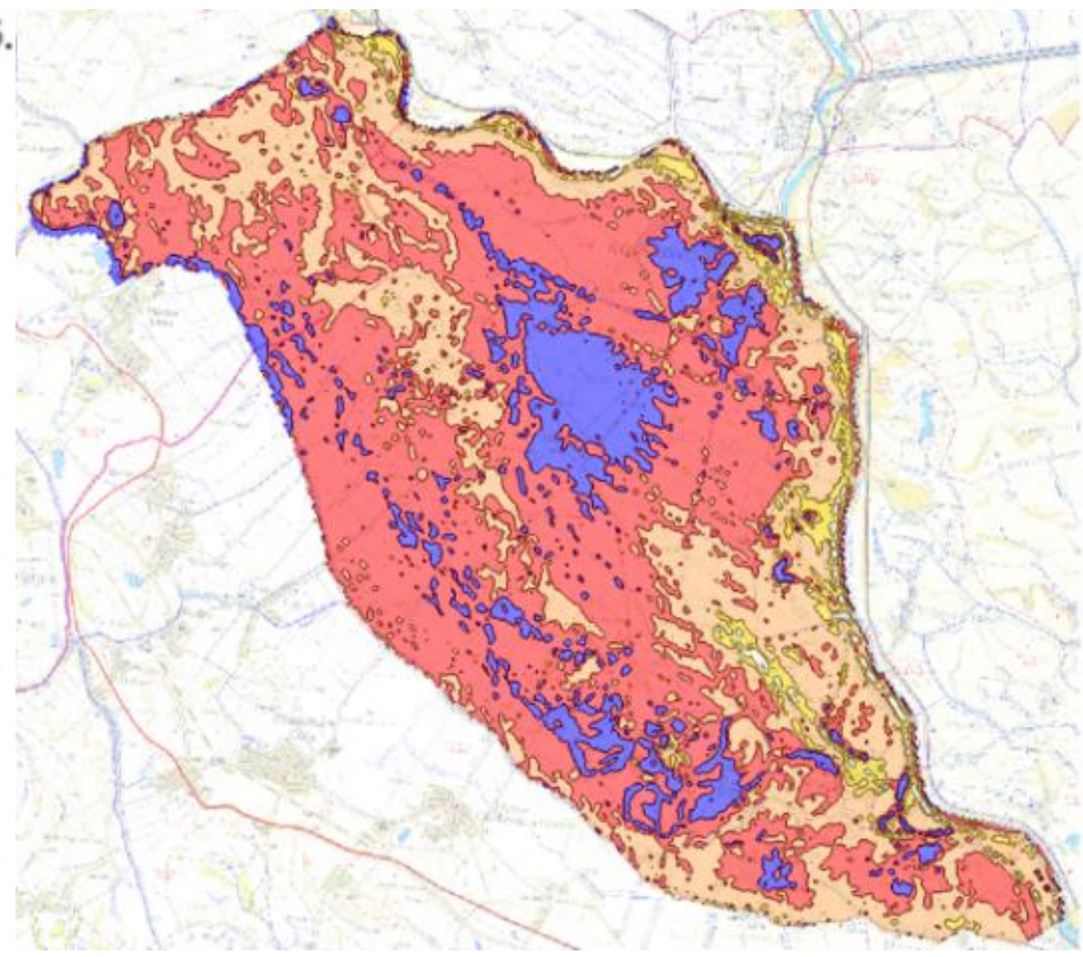

Fig. 2. Map showing the depth of the groundwater level (area: 215 km^2)

The contours of the calculated piezometric groundwater head during the culminations of the flood waves on the Váh River and on the Danube River was illustrated defining a large flooded part of the area of interest due to rising groundwater level. This can have a lot of negative impacts, e. g. for the agricultural production, or even flooding of sewage treatment plants and contamination of drinking water in wells. Also, the map showing the depth of the groundwater level under the terrain was constructed.

The research establishes the basis for a construction of the flood hazard maps and flood risk management plans taking groundwater into account, which was in the background compared to the fluvial flooding.