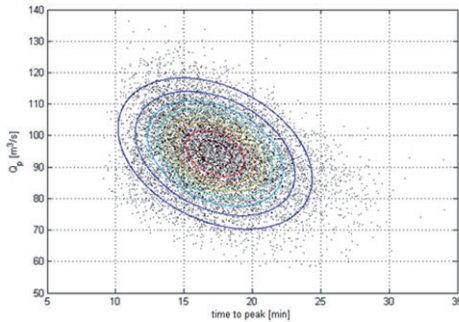
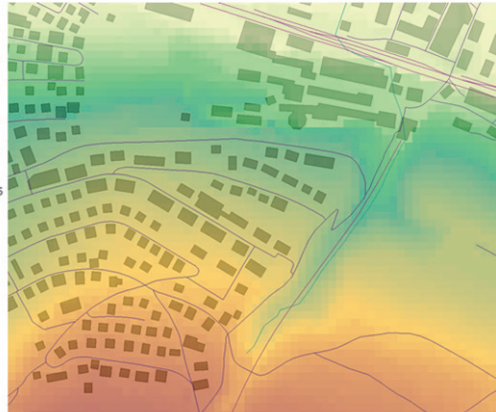


Dam Break Analysis under Uncertainty



$$\begin{pmatrix} h \\ hu \\ hv \end{pmatrix}_t + \begin{pmatrix} hu \\ hu^2 + \frac{gh^2}{2} \\ huv \end{pmatrix}_x + \begin{pmatrix} hv \\ huv \\ hv^2 + \frac{gh^2}{2} \end{pmatrix}_y = \begin{pmatrix} 0 \\ -ghb_x \\ -ghb_y \end{pmatrix}$$

"If a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts he shall end in certainties."
(F. Bacon, 1605)



Graphical abstract of research project
(Picture: S. Peter, VAW)

The goal of this research project is to develop a dam break analysis tool. An user friendly, numerically accurate and robust, and cost and time saving application shall be implemented. This application aims at supporting the decision makers in their risk assessment. Embedded in QGIS and BASEMENT, both existing software packages, the main focus of the project is on the quantification of the numerous uncertainties in dam break modeling. The origin of these uncertainties is the yet missing exact understanding of the progressive mechanisms of dam breaching, while this process being the most sensitive one regarding the flood inundation.

The uncertainty quantification will be accomplished by the use of meta-modeling, where simple approximations of the computationally intensive and physical based dam break models are at focus. In addition the strength of georeferenced data is utilized to include numerous spatial and socio-economical aspects in the post-processing, such as buildings, bridges, schools etc.

Keywords:	dam break analysis, flood wave calculation, automated simulation tool, uncertainty and sensitivity quantification, polynomial chaos expansion, probabilistic engineering methods
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