

Damage potential of fluvial and pluvial flooding

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Background

When evaluating the damage potential of river flooding, it is common practice to use the tool "EconoMe" provided by BAFU, the Swiss federal office for the environment. This tool enables engineers to estimate the monetary damage at property level, which then helps to evaluate and prioritize flood protection measures as well as judge their cost-effectiveness. In comparison, the assessment of damage from surface runoff is in its infancy. With the new VSA-recommendation "Hydraulic Evaluation of Drainage Systems" (in consultation), there is now a guideline for Swiss municipalities to evaluate the impact of surface runoff. The recommendation suggests using the indicative hazard map for surface runoff provided by BAFU to identify areas which are likely to be affected. For these areas it is recommended to undertake a plausibility-check of the map and conduct an evaluation of the damage potential.

Objectives of the suggested topic

The objective of this master thesis is to compare the damage potential of river flooding (fluvial flooding) and flooding from surface runoff (pluvial flooding) for selected case studies. For this, you will create a surface runoff model of a catchment and compute the surface runoff for several precipitation events with different annualities. You will make an on-site plausibility-check and compare your results with the BAFU indicative hazard map for surface runoff. Next, you will evaluate the damage potential with the help of the tool "EconoMe" due to surface runoff and due to river flooding.

Based on this, the following questions can be discussed:

- For the investigated case study, how high is the potential damage due to fluvial and pluvial flooding? How does the damage potential correlate with the investigated annuality of an event?
- What are the sensitivities of the surface runoff model?
- What is the added value of the surface runoff model in comparison to the information from the indicative hazard map? Is the indicative hazard map a suitable foundation for evaluating the damage potential of surface runoff?

Specific information / Requirements

- The student will need to acquire knowledge for modelling with Mike+
- Use of GIS application (e.g. QGIS) and the "EconoMe" tool from BAFU
- Knowledge in German is of advantage

Advisors and Supervisors

Advisor: Prof. Dr. Max Maurer

Supervisors: João P. Leitão (Eawag, SWW)
Fabrizia Fappiano (Eawag, SWW)
TBD (Hunziker Betatech)

Contact information

Name: João P. Leitão

Email: JoaoPaulo.Leitao@eawag.ch