

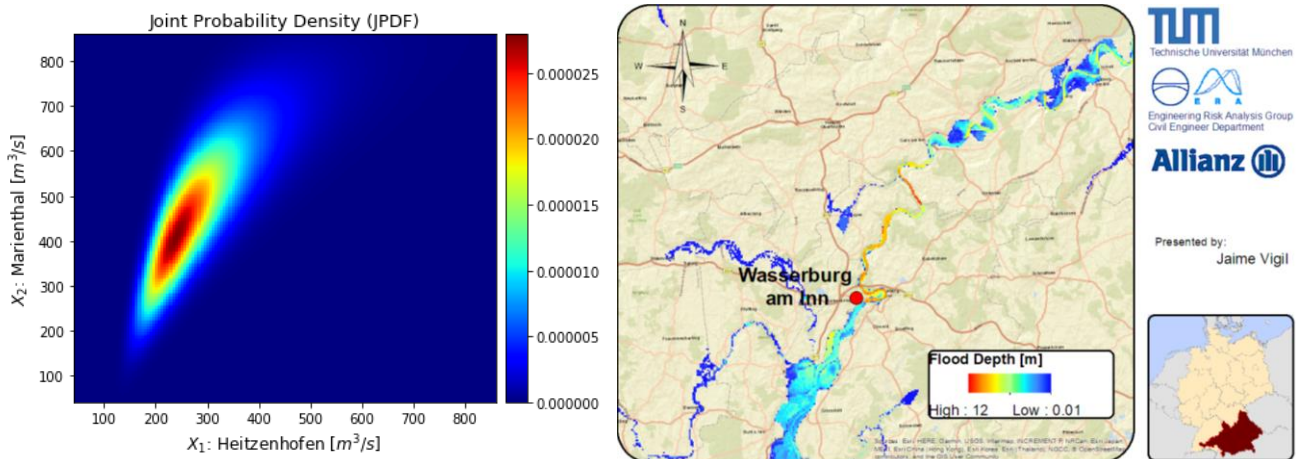
MSc thesis

Identification of Flood Loss Event Scenarios for Monitoring Accumulations in Property Insurance

Jaime Vigil, September 2018

Background

According to the United Nation's Office of Disaster Reduction, weather related events are becoming more frequent and, hence, their impacts are expected to grow. Catastrophe modelling plays an imperative role to comprehend the risk associated to certain perils that want to be managed. This research aimed to propose a pragmatic solution for creating flood loss events for large scale catchments to produce an exceedance probability curve for a property portfolio managed in a region.



Left: Marginalized Joint Probability Distribution Function of stations Marienthal and Heitzenhofen. Right: One realization of a flood event in the surroundings of Wasserburg, Inn river.

Methodology

The proposed methodology consisted in three modules that generate, from discharge data, flood loss events. Firstly, from discharge data a joint probability distribution for rivers modeled as random variables was estimated. Via a Monte Carlo Simulation, discharge events were sampled. The discharges were then translated into flood areas and depths using a deterministic model in conjunction with GIS-based methods. Finally, employing the theory of damage curves, it was estimated the expected loss an exposed property will suffer to a certain flood level.

Conclusion

The spatial distribution of the losses shown how certain big losses concentrated in some rivers rather than having a homogenous spread, with special attention to the Inn and Isar rivers. The area of study produced an empirical Exceedance Probability curve that shown how the losses for the studied portfolio presented a behavior that adjusted to the Weibull distribution. The solution studied was capable of produce several flood loss events and allow to construct a EP curve that could be used as a first tool for portfolio assessment.

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