

# Master Thesis

## Real Time Decision Support for Loss Reduction Actions in the Face of Evolving Natural Hazards



### Introduction

Often, building structures, infrastructure systems and industrial facilities are built and operated on locations where natural hazards may take place; implying significant risks. As a part of the overall strategy of risk management for such engineered facilities the optional decision to shut down operation and to evacuate people and assets in the face of an emerging hazard event plays an important role. In fact strategic organizational measures often explicitly form part of the decision basis for the design and thus also of the documentation required to achieve permission by the authorities to construct and operate the engineered facilities. Important examples where such strategies are presently utilized include refineries and fixed offshore platforms subject to tropical cyclones, storm surges and tsunamis, but also urban habitats and public infrastructure subject to events such as storms, floods, landslides, avalanches and volcanic eruptions. In these situations where time for making decisions is very limited and the highly important decisions must be made by a few persons, real time decision support for loss reduction actions is indispensable.

### Task and scientific relevance

Focusing on one type of natural hazards (which will be decided at the meeting with the prospective student(s)), the student first starts with the identification of observable indicators and/or precursors which may be related to the intensity of the evolving natural hazard events as well as possible options for loss reduction actions. Then, the probabilistic models that describe the underlying process of the hazard events are established mostly based on literature available. Next, a decision problem is formulated for deriving the criteria for the commonment of the loss reduction actions. Finally, the formulated problem is adapted to practical situations and then solved.

During the course of the thesis work, the student will gain the knowledge of applied probability and statistics, and basic understanding of the decision theory.

### Further information:

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