

Information Visualization as a Decision Support Tool in the “RiskCHANGES” Spatial Decision Support System

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Introduction

The present study analyses the information visualization in the context of the web-based Spatial Decision Support System for natural risk management called “RiskCHANGES”.

Most of the existing web-based systems visualize static maps, limiting in such a way their use at a specific study area. The current work combines data filtering, dynamic visualization and data comparison by using a shared database. The proposed techniques enable the effectiveness in the navigation and the display of large amount of data. Furthermore, it contributes to the facilitation of the decision making processes.

Methodology

The developed methodology integrates data taxonomy with geo-visual analytics in order to provide flexibility in organizing, retrieving and displaying risk-related data within the system.

The needs' assessment is based on expert knowledge and the use cases are examined in regard to the user's interaction with the visualization tools.

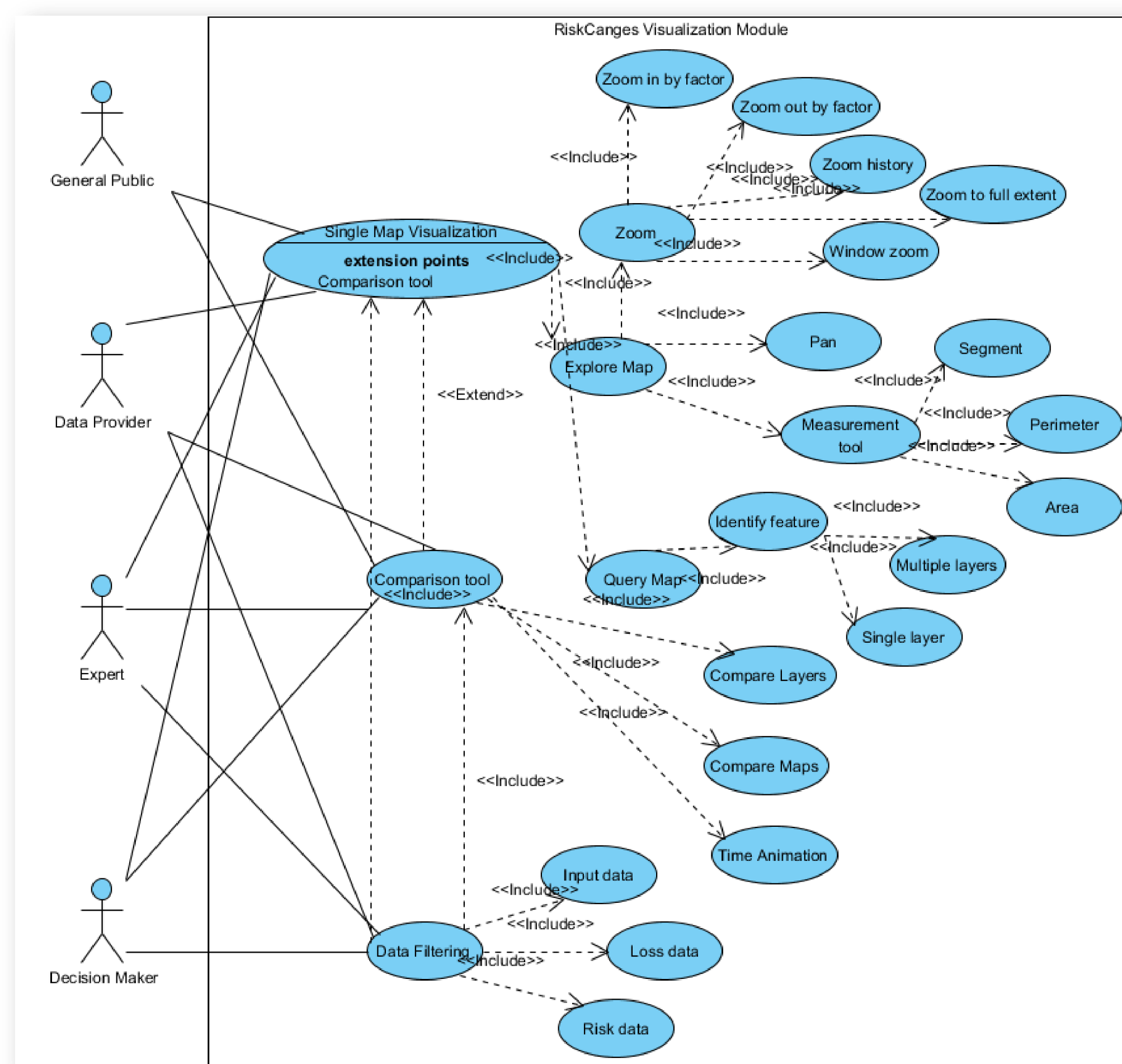
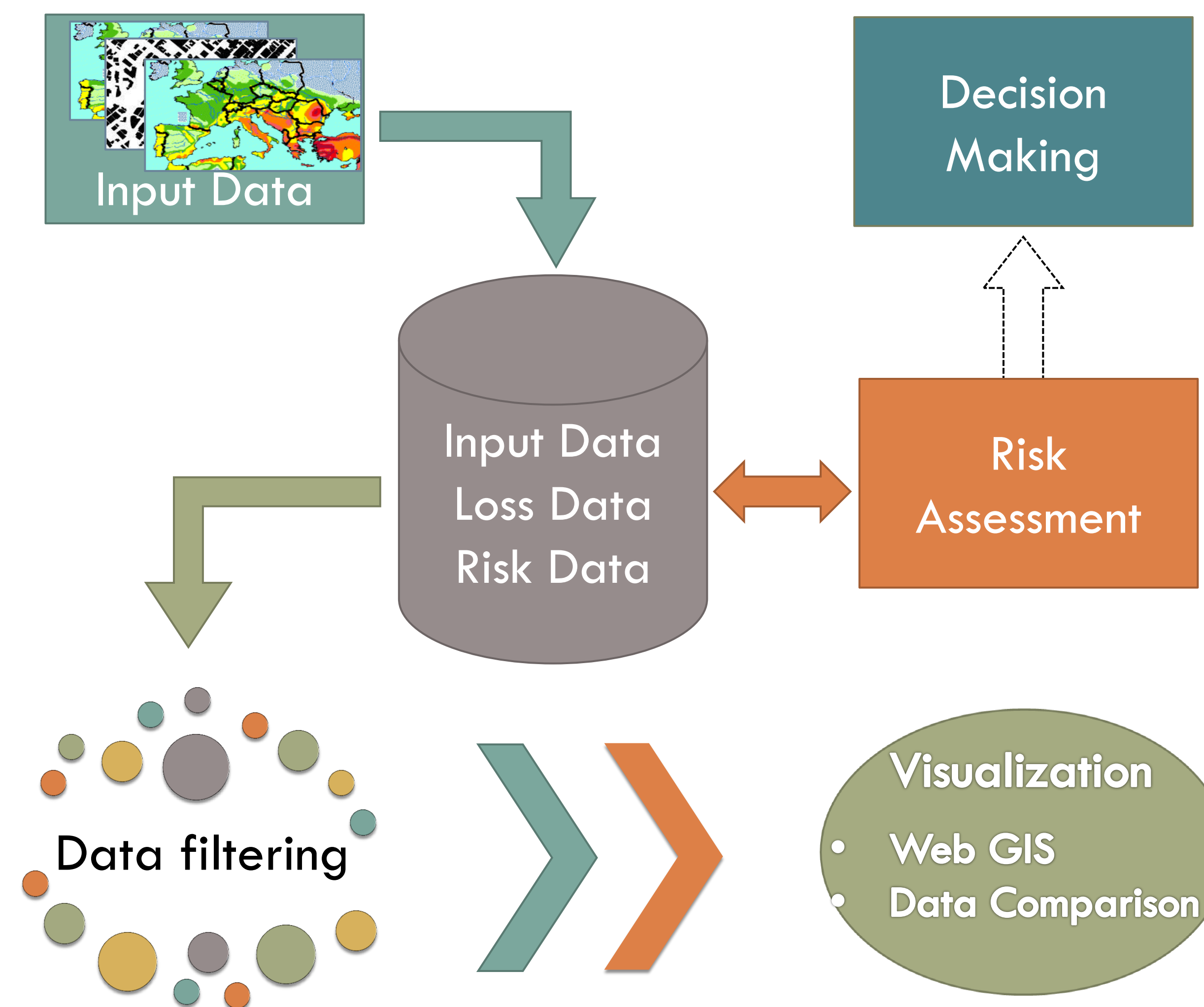


Fig. 1: Use case diagram

Conceptual Framework



Results

“RiskCHANGES” Information Visualization is a web-GIS application allowing **filtering**, **visualization** and **comparison** of risk-related data.

Data Filtering

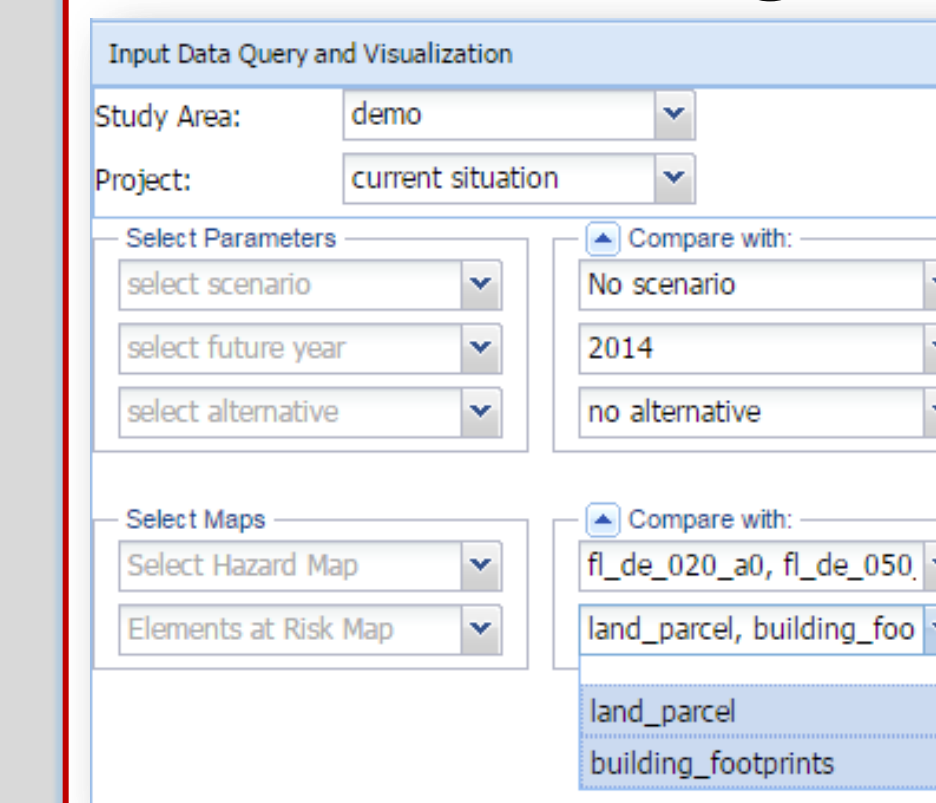


Fig. 2: Input data filtering

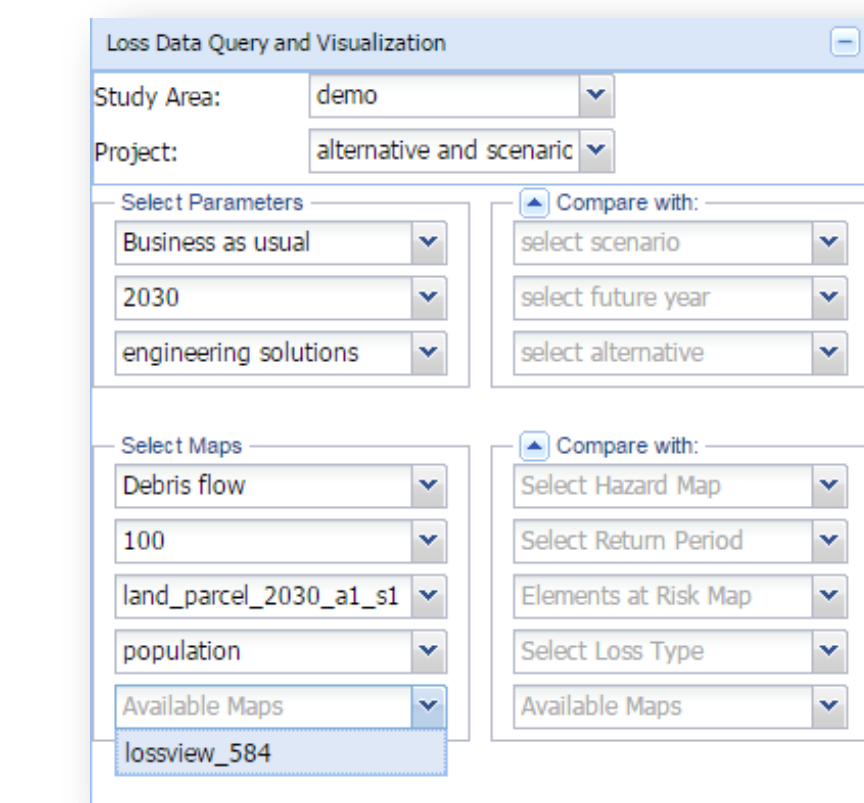


Fig. 3: Loss data filtering

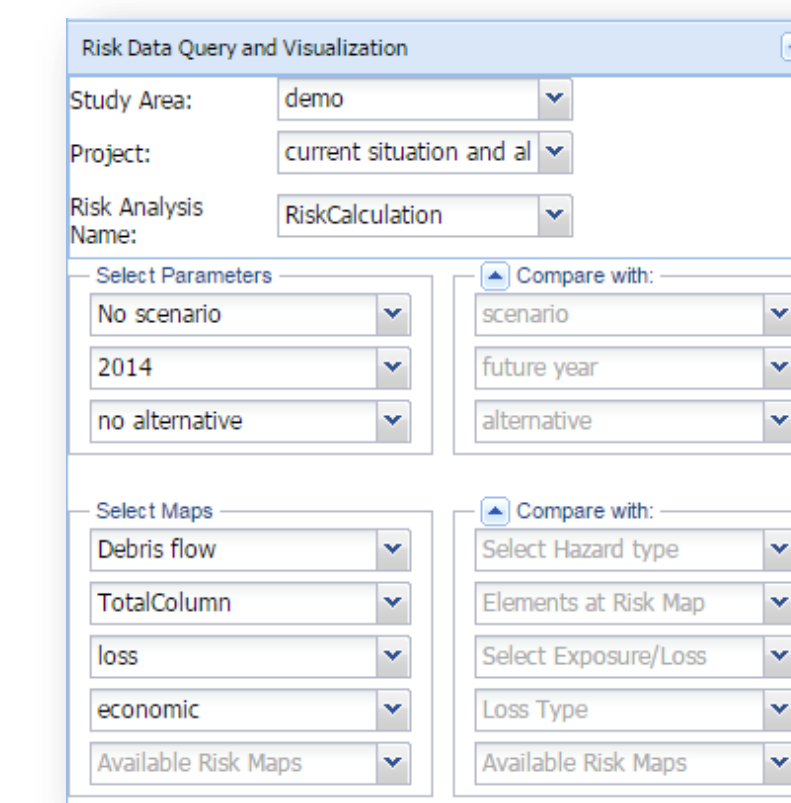
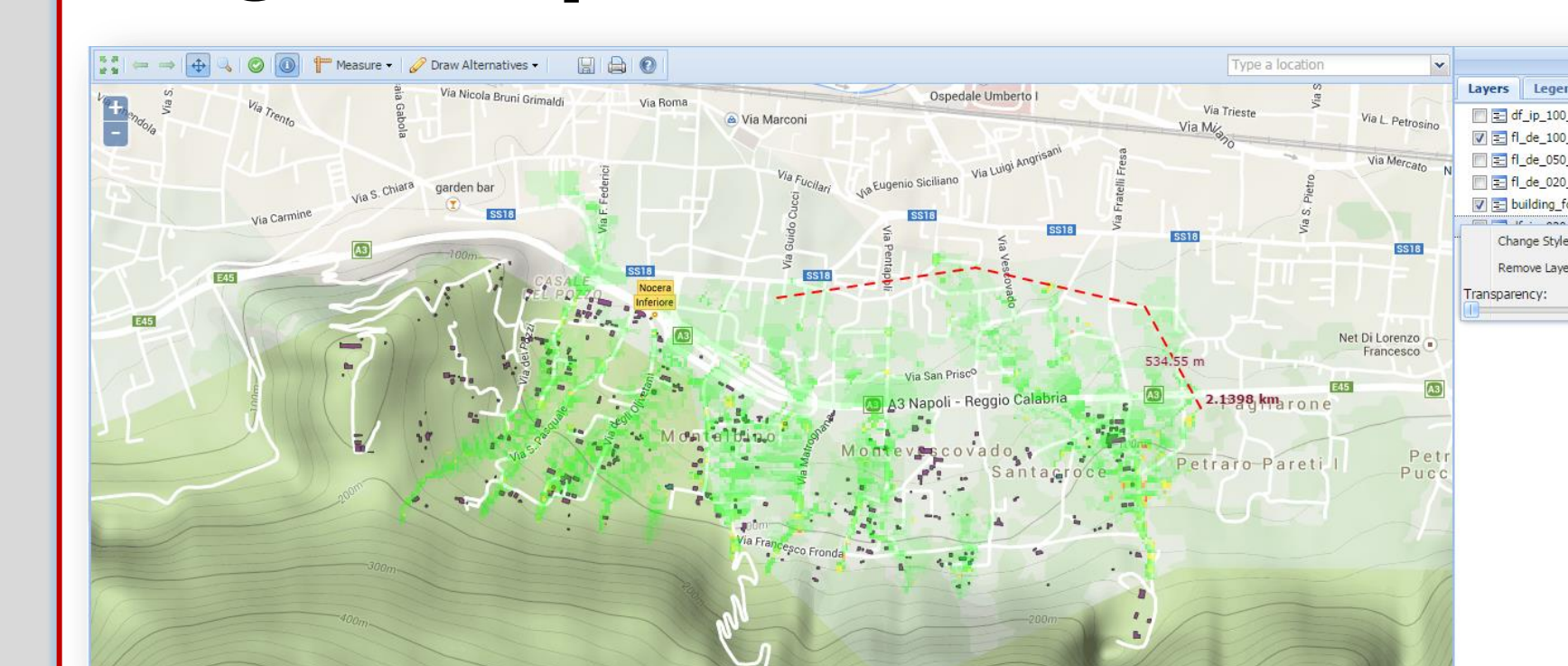


Fig. 4: Risk data filtering

Single Map Visualization



- Basic GIS tools
- Feature Info
- Layer tree
- Context Menu
- Map Legend

Data Comparison

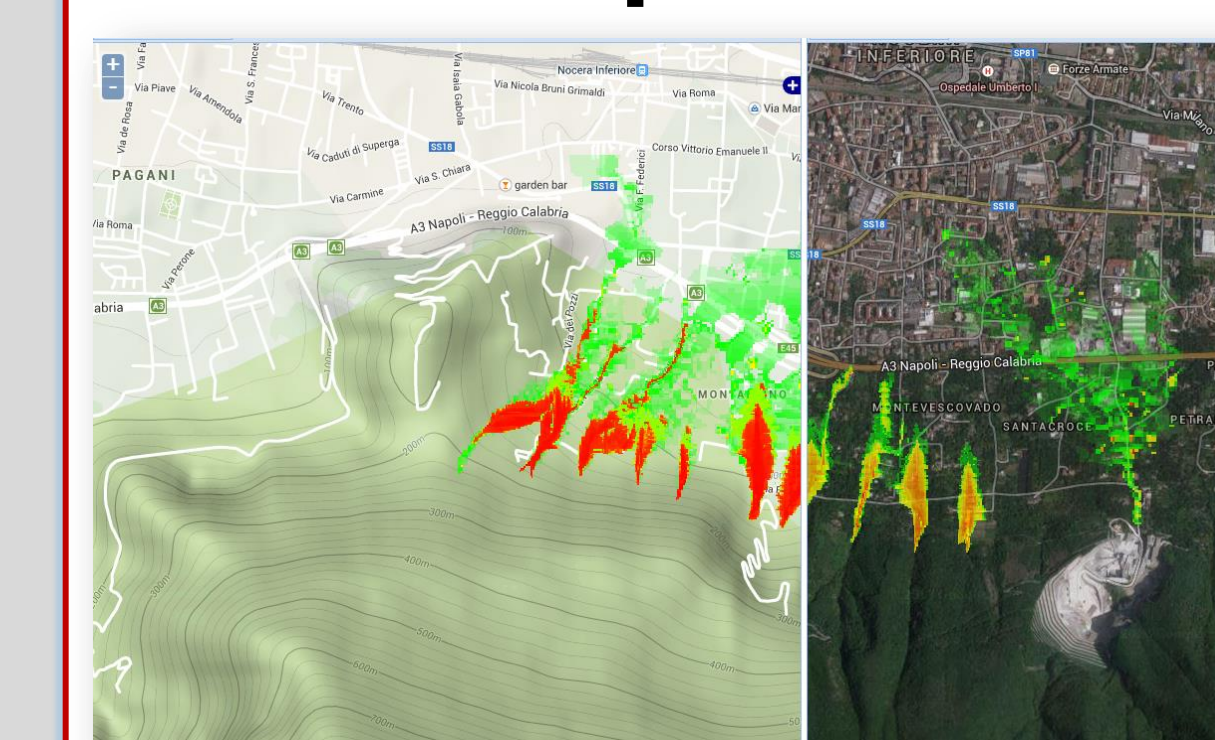


Fig. 5: Layers Comparison

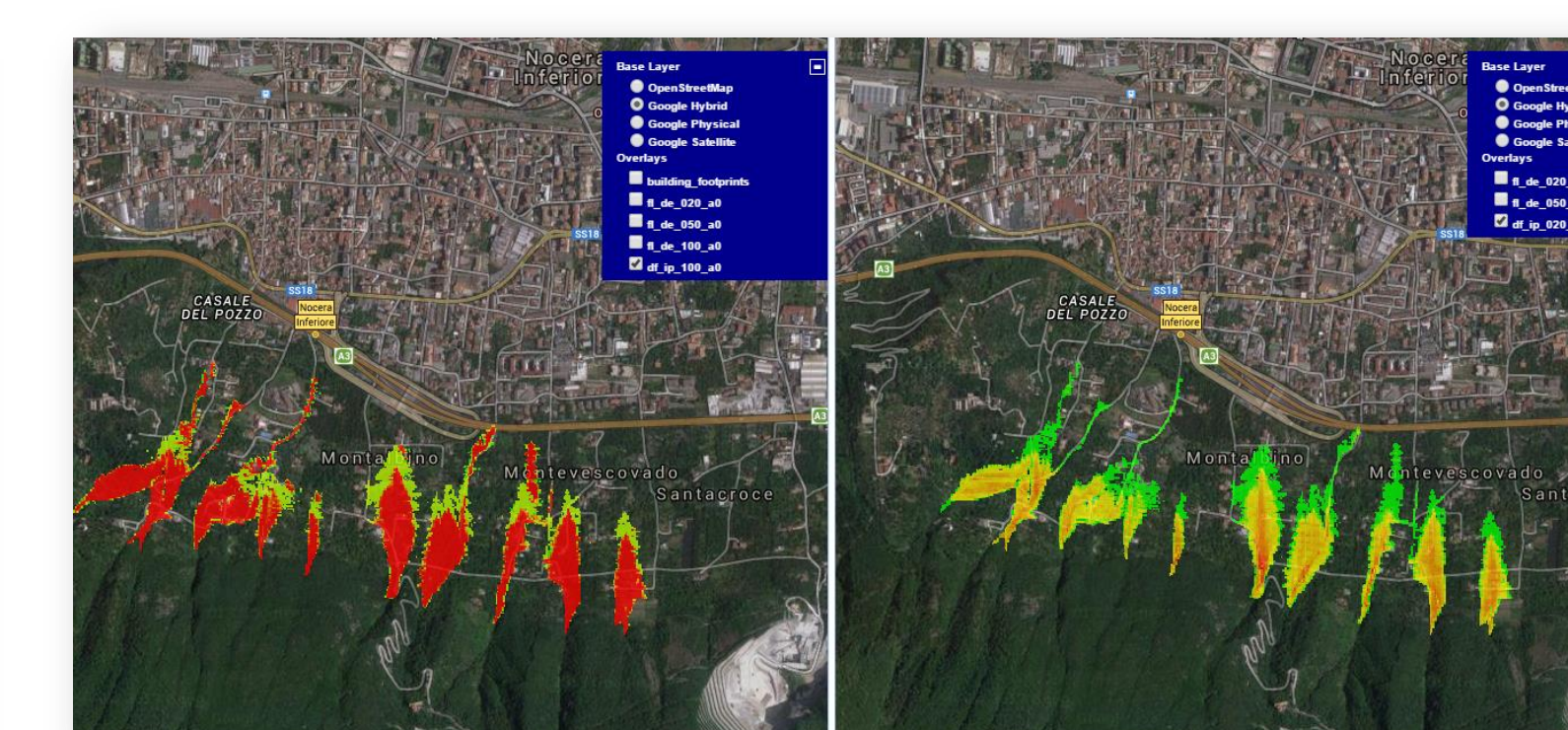


Fig. 5: Side by side map comparison

Implementation

The technological tools used for the system development combine open source JavaScript frameworks such as OpenLayers, ExtJS and GeoExt for the front-end application, PostgreSQL for data base management, and GeoServer for map services.

The communication between front-end and back-end is achieved by using the Python scripting language. The implementation follows the model-view-controller pattern in order to ensure flexibility and reusability of the system



<http://changes.itc.utwente.nl/CHANGES-SDSS>

Conclusion

The main concern of the research was to exploit the large amount of risk-related data in accordance to its representational goal. Thus, the system incorporates a filtering mechanism which leads either to a single map or to a map comparison visualization of the chosen data.

Future work will focus on providing customized feature information and on implementing the “on-the-fly” loss calculation.