

VisAdapt—Increasing Nordic Houseowners' Adaptive Capacity to Climate Change

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ABSTRACT

This poster presents the design and implementation of the web-based visual analytics tool VisAdapt which allows houseowners in the Nordic countries to assess potential climate related risk factors that may have an impact on their living conditions, and to get an overview of existing guidelines of how to adapt to climate change and extreme weather effects.

Index Terms: I.3.6 [Computing Methodologies]: Methodology and Techniques—Interaction techniques; J.2 [Physical sciences and engineering]: Earth and atmospheric sciences

1 INTRODUCTION

Over the last couple of years, the Nordic countries have experienced severe damages and rising costs due to weather related events, such as flooding and storms. As a result, insurance companies have had an increase in the number of compensation payments made to houseowners. Over the coming years, payments are expected to rise even more throughout the Nordic region when the Nordic countries are facing several expected climate change and weather related challenges such as increased annual precipitation, more common and intensified cloudbursts, increased annual temperatures, sea level rise, increased number of landslide events and potentially more days with strong wind.

The web-based visual analytics tool VisAdapt (see figure 1) applies elements of geographic and information visualization to increase individuals' capacity to adapt to climate variability and change by facilitating exploration and learning of expected climate and weather related effects in the Nordic region. Users can select specific locations or regions to discern information about potential climate impacts and adaptation measures from national government authorities, municipalities and insurance companies in Denmark, Norway and Sweden. This enables assessment of local vulnerability and reflection of possible adaptation options. VisAdapt is predominantly developed for private houseowners, but has potential to function as a decision support and information tool for insurance professionals, land-use planners or property managers.

2 RELATED WORK

The growing complexity and number of climate models [4] and the increasing amount of climate-related data have called for new tools

to support communication. Most of the research points towards using interactive map-based visualization tools. Good examples of such trends are tools displaying natural hazards data [5] or vulnerability data [1, 3]. Most of these tools feature successful layouts and interfaces, however, they are almost exclusively developed for professional users, making them inaccessible to laypeople such as houseowners that not necessarily have any knowledge about interactive visualization or climate change. A second issue is how interactive visual analytics tools should be designed and developed in order to transform knowledge on climate change and climate impacts into real decision processes and adaptation actions. As many authors outline (see, for example, [2]) a solution to this is ready-to-use adaptation measures which can be provided along with information on possible natural threats. However, the existing literature lacks practical hints on how this can be designed and implemented.

The VisAdapt tool differs from current state-of-the-art visualization tools in the area of climate change and adaptation in that the tool is developed specifically for non-experts and in that it includes adaptation measures specifically designed for houseowners.

3 VISADAPT

The main layout of VisAdapt is shown in figure 1. The interface is structured as a three step exploration process and designed to guide non-expert users in locating their house and exploring data and guidelines for this location:

- 1. Location:** the user inserts the address of the location to investigate, as well as specific features of his/her own house, such as roof type or topography of the garden.
- 2a. Climate Scenarios:** the user can explore different climate scenarios to investigate projected changes in temperature, precipitation and other climate parameters.
- 2b. Risk Maps:** the user can investigate risk maps and explore, for example, the expansion of sea level rise for a particular area.
- 2c. Exposure Indices:** this option lets the user analyse exposure indices [3] for flooding, landslides or storms.
- 3. Adaptation measures:** information is provided on possible adaptation measures that are of particular relevance to the climate parameters which are expected for the selected region and to the specific house type.

Throughout the development process, the tool has continuously been evaluated with houseowners. An expert group consisting of insurance professionals has also been involved throughout the development process to ensure that the included data and developed methods are valid and useful for the end users.

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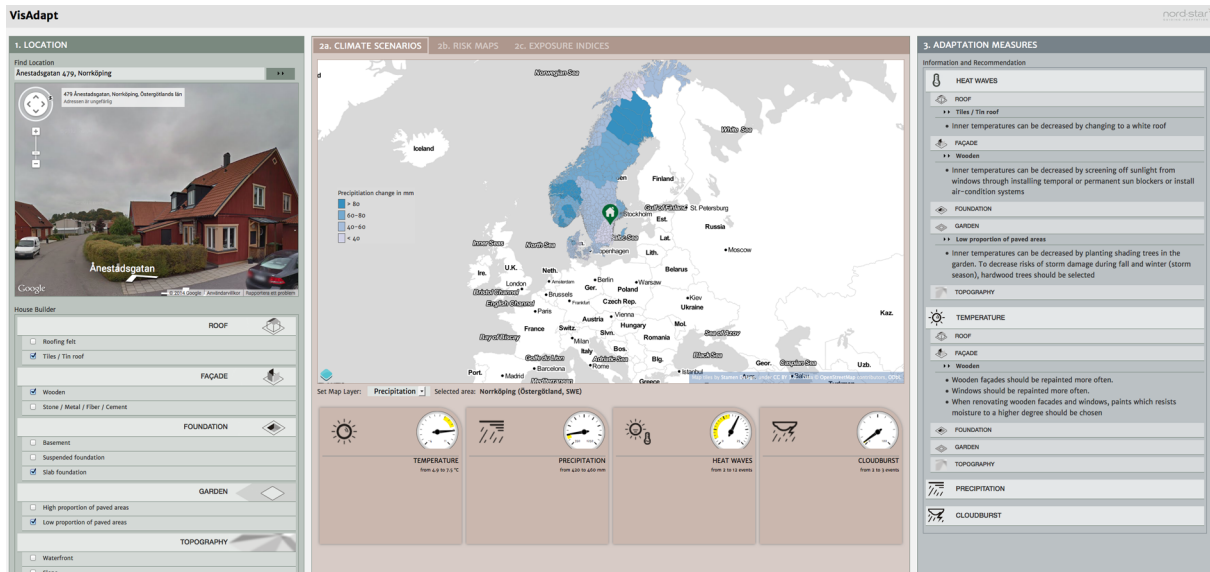
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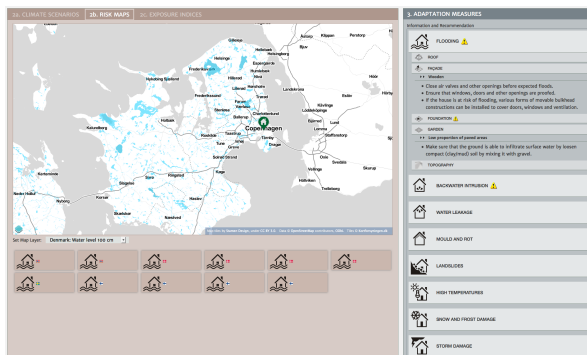
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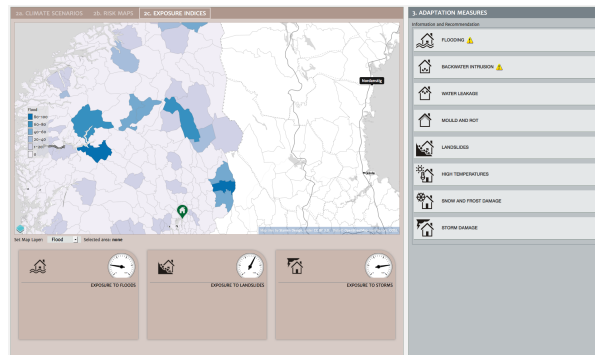
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(a) The VisAdapt tool is structured in three main parts making it easy to use for non-experts that are not familiar with interactive visualization tools.



(b) The Risk Maps view and related adaptation measures.



(c) The Exposure Indices view and adaptation measures.

Figure 1: The visual analytics tool VisAdapt developed for increasing homeowners' adaptive capacity to climate change. The interface is divided into three main parts (a). 1. Location where the user inputs his/her house address and uses the 'house builder' to specify what parts of the house to include in the analysis. The middle section is divided into three subsections: 2a Climate Scenarios where, for example, projected changes in temperature can be explored, 2b Risk Maps (b) where, for example, risk zones for 50-year flooding can be investigated, and 2c Exposure Indices (c) where the user can analyse exposures to floods, landslides and storms. As a last step, in 3. Adaptation measures, the user gets information on which specific adaptation measures that would be suitable to take.

4 CONCLUSIONS

This poster presents the visual analytics tool VisAdapt, specifically developed for making Nordic homeowners more aware of climate change risks and how they can effect their house and what adaptive measures to take. The tool has been continuously evaluated during the development process to ensure that the developed methods are valid and useful for the end users. The current version of the tool is targeted to users in the Nordic countries but the same concepts could be suitable for any country or region.

ACKNOWLEDGEMENTS

This work has been supported by the top-level research initiative sub-programme "Effect Studies and Adaptation to Climate Change" through the Nordic Centre of Excellence for Strategic Adaptation Research (NORD-STAR).

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